



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

B.A. ENGLISH



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision: 75%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHC51	POSTCOLONIAL LITERATURE	CORE – 9	6	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

To introduce the issues and themes in Postcolonial literature

COURSE OBJECTIVE:

To make the students aware of the historical and sociological studies of Postcolonial Literature

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	become familiar with the literary concepts of post colonialism	Upto K3
CO 2	analyse the contributions of the prose writers of colonized countries	Upto K3
CO 3	understand the narrative forms of diverse cultures through short stories	Upto K3
CO 4	compare and contrast indigenous literature and culture	Upto K3
CO 5	examine the issues in post-colonial fiction	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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POSTCOLONIAL LITERATURE

UNIT– I: Poetry

Pablo Neruda	– Tonight I can write
Allan Curnow	– House and Land
Judith Wright	– Woman to Man
Margaret Atwood	– Morning in the Burned House
Kamala Wijeratne	– To a Student
Mamang Dai	– Small Towns and Rivers

UNIT– II: Prose

Chinua Achebe	– My Home under Imperial Fire (Part– I)

NgugiWaThiong'o	– Decolonizing the Mind

UNIT– III: Short Story

Henry Lawson	– The Drover's Wife
Katherine Mansfield	– The Garden Party (from the collection <i>The Garden Party and Other Stories</i>)
Grace Ogot	– The Green Leaves (from the Short Story collection <i>Land Without Thunder</i>)
V.S. Naipaul	– B. Wordsworth (from the Short Story collection <i>TheMiguel Street</i>)

UNIT– IV: Drama

Derek Walcott	– Dream on Monkey Mountain
Ama Ata Aidoo	– Anowa

UNIT– V: Fiction

Khushwant Singh	– Train to Pakistan
Amy Tan	– The Kitchen God's Wife
Chimamanda Ngozi Adichie	– Purple Hibiscus

TEXT BOOKS:

1. Patke, Rajeev S. *Postcolonial Poetry in English*. Oxford University Press, 2006.
2. Walcott, Derek. *Dream on Monkey Mountain and Other Plays*. 2009.
3. Dattani, Mahesh. *Final Solutions*. Penguin Publications, 2013.
4. Adichie, Chimamanda Ngozi. *Purple Hibiscus*. Harper Perennial, 2005.

REFERENCE BOOKS:

1. Leela Gandhi, *Postcolonial Theory: An Introduction*. OUP, 1998.
2. *After the Sunset: An Anthology of Postcolonial Literatures in English*. Oxford University Press, 2013.

DIGITAL TOOLS:

1. www.poetryfoundation.com
2. www.litcharts.com
3. africasource.com/achebe– home– and– exile

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	1		2	2			2	2		
CO2	1		2	2			2	2		
CO3	1		2	2			2	3		
CO4	2		2	2			2	3		
CO5	2	3	3	1				3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. S. BHUVANESWARI



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Percentage of Revision: 50%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHC52	SHAKESPEARE	CORE – 10	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

To introduce general aspects of Shakespeare and his plays

COURSE OBJECTIVES:

To help the students understand the greatness of Shakespeare and his plays

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the nature of theatres and audience of the Elizabethan age	Upto K3
CO 2	appreciate Shakespearean comedy	Upto K3
CO 3	appreciate Shakespearean Tragedy	Upto K3
CO 4	identify and explore the dialects of Shakespearean play	Upto K3
CO 5	understand and identify the elements of Shakespearean play	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SHAKESPEARE

UNIT– I: General Shakespeare

Shakespearean Theatre and Audience

Heroines in Shakespeare (Viola, Portia, Cleopatra, Desdemona, Cordelia)

Supernatural Elements in Shakespeare

Villains in Shakespeare (Iago, Shylock, Lady Macbeth, Claudius, Angelo)

UNIT– II: Comedy

The Merchant of Venice

UNIT– III: Tragedy

Macbeth

UNIT– IV: History Play

Julius Caesar

UNIT– V: Dark Comedy

Measure for Measure

TEXT BOOKS:

1. Stephen Greenblatt, ed. *The Norton Shakespeare*. 2nd Edition, 2 Vols. Gen. ed.. New York: W.W. Norton and Co., 2008.
2. MacDonald, Russ. *The Bedford Companion to Shakespeare: An Introduction with Documents*. New York: Palgrave, 2001.

REFERENCE BOOK:

Shakespeare, William, and A. H Bullen. *The Complete Works*. Barnes & Noble Books, 1994.

DIGITAL TOOL:

<https://www.gutenberg.org/ebooks/100>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	1		2	2			2	2	2	
CO2	1		2	2			2	2	2	
CO3	1		2	2			2	2	2	
CO4	1		2	2			2	2	2	
CO5		3	3	1				3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. S. BHUVANESWARI



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Percentage of Revision: 60%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHC53	INTRODUCTION TO LITERARY CRITICISM	CORE – 11	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

To trace the evolution of literary criticism from classical period.

COURSE OBJECTIVE:

To acquire knowledge about literary criticism.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the classical period of literary criticism	Upto K3
CO 2	demonstrate an understanding of Neo-Classicalists	Upto K3
CO 3	analyse and appreciate different perspectives of Romantic and Victorian critics	Upto K3
CO 4	comprehend Twentieth Century criticism	Upto K3
CO 5	demonstrate the emergence of various approaches	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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INTRODUCTION TO LITERARY CRITICISM

UNIT– I: 400 – 65 B.C.E.

Plato

Aristotle

Horace

UNIT– II: 15th– 17thCentury

Philip Sidney

John Dryden

Dr. Johnson

UNIT– III: 18th – 19thCentury

William Wordsworth

Samuel Taylor Coleridge

Mathew Arnold

UNIT– IV: 20thCentury

T.S.Eliot

I.A.Richards

F.R.Leavis

UNIT – V: Five Approaches of Literary Criticism

Moralistic Approach, Sociological Approach, Psychological Approach, Archetypal Approach, Formalistic Approach

TEXT BOOKS:

1. Prasad, Birjadish. *An Introduction to English Criticism*. Trinity Publishers, 1965.
2. Scott, W.S., *Five Approaches of Literary Criticism*, 1963.

REFERENCE BOOKS:

1. Malik, R. S, and Jagdish Batra. *New Approach to Literary Theory and Criticism*. Atlantic, 2014.
2. Barry, Peter. *Beginning Theory*. Viva Books. 2018.

DIGITAL TOOL:

<https://writingcommons.org/section/research/research– methods/textual– methods/literary– criticism/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	1		2	2			2		1	
CO2	1		2	2			2		1	
CO3		2		3			2		1	
CO4	1	2	2	2			2		1	
CO5		2		3			3		1	

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. S. BHUVANESWARI



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Percentage of Revision: 70%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHC54	ENGLISH LANGUAGE TEACHING	CORE – 12	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

To analyse language learning concepts and processes

COURSE OBJECTIVE:

To comprehend and analyse the methods and approaches related to language teaching.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	become familiar with the learning and teaching concepts	Upto K3
CO 2	understand basic methods and approaches	Upto K3
CO 3	understand the use of technology and ICT tools	Upto K3
CO 4	understand the principles of teaching prose, poetry	Upto K3
CO 5	develop You Tube, blogs	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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ENGLISH LANGUAGE TEACHING

UNIT – I:

Status of English in India; goals and objectives in teaching and learning English in India

UNIT – II:

Approaches and methods of teaching English – grammar translation method, direct method, structural approach, communicative approach, recent trends

UNIT – III:

Principles and techniques of Teaching of four language skills: Listening, Speaking, Reading, Writing

Teaching of grammar and vocabulary

Teaching of prose and poetry

UNIT – IV:

Technology, teaching aids and ICT tools for teaching/ learning English

UNIT – V:

Teaching English through Youtube, Blogs, Vlogs

REFERENCE BOOKS:

1. Frank Palmer, Grammar Kachru, *The Alchemy of English*. Larsen-Freeman, Diane. 2004.
2. *Techniques and Principles in Language Teaching*. New Delhi: Oxford University Press.
3. Richards, J. C. and T. S. Rogers. 1986. *Approaches and Methods in Language Teaching*. Cambridge University Press Saraswathi, V. 2004.
4. *English Language Teaching – Principles and Practice*. Orient Longman. Tickoo, M. L. 2003.
5. *Teaching and Learning English – A Sourcebook for Teachers and Teacher Trainers*. Hyderabad: Orient Longman

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	1		2	2			2	2		
CO2	1	2	2	2			2	2		
CO3	1	2	2	2	2		2	2		
CO4	1	2	2	2	2		2	2		
CO5	2	3	3	1	2			3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. S. BHUVANESWARI



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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHE51	FUNDAMENTALS OF ACADEMIC WRITING	ELECTIVE – 1	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

To develop English proficiency for academic purposes.

COURSE OBJECTIVE:

To help the students to integrate various skills of Basic English structure.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	develop and sharpen their academic and professional writing skills	Upto K3
CO 2	enhance reading, reasoning and research skills	Upto K3
CO 3	develop vocabulary	Upto K3
CO 4	develop grammatical patterns	Upto K3
CO 5	build their LSRW skills	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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FUNDAMENTALS OF ACADEMIC WRITING

UNIT– I:

Introduction to Academic Writing –Types of Academic Writing
(Descriptive, Analytical, Persuasive, Critical)

UNIT– II:

- Note making, Summarizing, Paraphrasing
- Syntheses, Analyses, Evaluation

UNIT– III:

Structure of an Argument– Introduction–Statement– Conclusion

UNIT– IV:

Organizing, Proof Reading, Referencing, Plagiarism

UNIT– V:

Citing Resources– Editing, Open Educational Resources
Book and Media Review

TEXT BOOKS:

- Tickoo and Sasikumar. *Writing with a Purpose*. OUP
- Pillai, Rajeev and Nair. *Written English for you*. Emerald Publishers.
- Renu Gupta, *A Course in Academic Writing* (New Delhi: Orient BlackSwan, 2010).

REFERENCE BOOKS:

- Liz Hamp– Lyons and Ben Heasley, *Study Writing: A Course in Writing Skills for Academic Purposes* (Cambridge: CUP, 2006).
- Ilona Leki, *Academic Writing: Exploring Processes and Strategies* (New York: CUP, 2nd edn, 1998)

DIGITAL TOOLS:

- <https://www.editage.com/insights/a-beginners-guide-to-academic-writing>
- https://edisciplinas.usp.br/pluginfile.php/3928474/mod_resource/content/1/Introduction%20to%20Academic%20Writing.pdf

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	1	2	2	2	3	3	2		1	3
CO2	1	2	2	2	3	3	2		1	3
CO3		2		3	3	3	2		3	3
CO4	1	2	2	2	3	3	2			3
CO5		2		3	3	3	2		3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. S. BHUVANESWARI



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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHE52	TECHNICAL WRITING	ELECTIVE – 1	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

To develop the skill of reading and writing.

COURSE OBJECTIVE:

To help the students create experimental work in class.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	explore technical process through writing.	Upto K3
CO 2	learn about different genre and techniques.	Upto K3
CO 3	have refined vocabulary skill.	Upto K3
CO 4	understand the importance of technical writing and channelize their skills.	Upto K3
CO 5	develop their writing skill.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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TECHNICAL WRITING

UNIT – I:

Introduction to Technical Writings

UNIT– II:

Figures – style – Formal and informal usage

UNIT– III:

Report Writing, Letter Writing, Resume Writing

UNIT– IV:

Developing Hints, Effective use of SMS, Advertisement

UNIT– V:

E– mail Drafting

Preparing Agenda and Writing Minutes, Covering Letter

TEXT BOOK:

Alred, Gerald J et al. *Handbook of Technical Writing*. St. Martin's Press, 2009.

REFERENCE BOOK:

B. N, Basu. *Technical Writing*. Prentice Hall India Learning Private Limited, 2007.

DIGITAL TOOL:

<https://birg.cs.wright.edu/resources/writing/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	1	1	2		3	3	2		1	3
CO2	1	1	2		3	3	2		1	3
CO3		2			3	3	2		3	3
CO4	1	2	2		3	3	2		1	3
CO5		2			3	3	2		3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. S. BHUVANESWARI



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Percentage of Revision: 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHE53	CREATIVE WRITING	ELECTIVE – 1	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

To introduce creative ideas of writing

COURSE OBJECTIVE:

To develop the skill of creative writing in the students

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	determine their goal as a writer.	Upto K3
CO 2	explore their creativity.	Upto K3
CO 3	learn about different genre and technique.	Upto K3
CO 4	acquire refined vocabulary skill	Upto K3
CO 5	reinforce their creative ideas into writing.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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CREATIVE WRITING

UNIT– I:

Art of Creative Writing – Importance of Reading – Imagination

UNIT – II:

Comprehension Skills – Skimming and Scanning – Reading Comprehension

UNIT– III:

Précis Writing – Summary – Abstract – Synopsis – Paraphrase

UNIT – IV:

Essay Writing – Analyzing literature

UNIT – V:

Writing story, Analyzing Settings, Character and Background

TEXT BOOKS:

1. Anuradha, Marwah, et al. *Creative Writing: A Beginner's Manual. India*, Pearson Education India, 2008.
2. Gangal, J.K, *Practical Course For Developing Writing Skills In English*. Delhi: PHI Learning, 2013.

REFERENCE BOOKS:

1. Washburn, Phillip L. *The Vocabulary of Critical Thinking*. Oxford University Press, 2010.
2. Hunter, D., n.d. *A Practical Guide to Critical Thinking*.

DIGITAL TOOL:

<https://oxfordsummercourses.com/articles/what-is-creative-writing/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	1	2			3	3	2		2	2
CO2	1	2			3	3	2		2	2
CO3		2			3	3	2		3	3
CO4	1	2			3	3	2		2	2
CO5		2			3	3	2		3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. S. BHUVANESWARI



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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHS51	TRANSLATION STUDIES: THEORY AND PRACTICE	SBS – 5	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

Percentage of Revision: 60%

To familiarize the history and theory of translation.

COURSE OBJECTIVE:

To make the students understand the theories of translation and translate passages from English to Tamil and vice versa.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the theory and practice of translation	Upto K3
CO 2	become familiar with the history of translation	Upto K3
CO 3	acquire clarity regarding problems of translation	Upto K3
CO 4	understand Classics from ancient and new Tamil literatures	Upto K3
CO 5	undertake an independent translation practice	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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TRANSLATION STUDIES: THEORY AND PRACTICE

UNIT– I:

Translation – Definition – Types – Equivalence in Translation

UNIT– II:

History of Translation

- Translation in Ancient Times
- Bible Translation (Tyndale and Wycliffe)
- 17th and 18th century
- Translation in 20th century

UNIT– III:

Problems of Translating – Prose – Poetry – Drama

UNIT– IV:

Karukku – Bama – translated by Lakshmi

Holmstrom Thirukkural – Thiruvalluvar – translated by G.U. Pope

(91 – 100) – The Utterance of Pleasant Words

UNIT– V:

Translate Tamil – English/English – Tamil paragraphs

TEXT BOOKS:

- Bassnett, Susan. *Translation Studies*. Taylor and Francis, 2013.
- Bama. Trans. Lakshmi Holmstrom. *Karukku*. Oxford University Press.

REFERENCE BOOKS:

- Kumar Das, Bijay. *Handbook of Translation Studies*. Atlantic Publishers & Distributors (P) Limited, 2009.
- Thirukkural. *English Translation and Commentary* by G.U. Pope. Thiruvalluvar – Author, Translator – Rev. George Uglow Pope. Create Space Independent Publishing Platform.

DIGITAL TOOLS:

- feminismindia.com/karukku– bama
- thirukkural133.wordpress.com
- literariness.org

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	1	2	2	2						
CO2	1	2	2	2						
CO3		2		3					3	3
CO4	1	2	2	2					2	2
CO5		2		3					3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSEDESIGNER: Dr. S. BHUVANESWARI



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Percentage of Revision: 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHS52	PERSONALITY ENRICHMENT	SBS – 6	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

To achieve excellence in overall development of personality

COURSE OBJECTIVE:

To help the students in career – visioning and planning.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	be more proficient in their future career	Upto K3
CO 2	to manage in different situations	Upto K3
CO 3	improve the quality of their body language	Upto K3
CO 4	utilize the skills acquired and use effectively in social space	Upto K3
CO 5	set a perfect goal in life and acquire it	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

PERSONALITY ENRICHMENT

UNIT – I: Self Disclosure

Self- Description – Who Am I? What Am I?

Feedback – How others perceive me?

SWOT

UNIT – II: Managing Feelings

Nature of Stress

Effects of Stress

Dealing with person

UNIT – III: Interpersonal Effectiveness

Building One's Self- Esteem

Celebrating success and Tolerating failure

Lateral Thinking

UNIT – IV: Professional Etiquette

Social Etiquette

Etiquette for Work space

Dress code

UNIT – V: Goal Setting and Time Management

The Basics of Effective Goals

Short Term and Long Term Goals

Managing Personal space and Work space

TEXT BOOKS:

1. Dhanavel, S. P. *English and Soft Skills*. Orient Black Swan, 2013.
2. Hurlock, E.B (2006). *Personality Development*, 28th Reprint. New Delhi: Tata McGraw Hill.

REFERENCE BOOKS:

1. Lucas, Stephen. *Art of Public Speaking*. New Delhi. Tata – Mc– Graw Hill. 2001
2. Mile, D.J. *Power of Positive Thinking*. Delhi. Rohan Book Company, (2004).
3. Pravesh Kumar. *All about Self – Motivation*. New Delhi. Goodwill Publishing House. 2005.
4. Smith, B. *Body Language*. Delhi: Rohan Book Company. 2004

DIGITAL TOOLS:

1. <https://www.artofliving.org/in-en/personality-development>
2. <https://www.managementstudyguide.com/personality-development.htm>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	1		2	2	3	3	2			3
CO2	1		2	2	3	3	2			3
CO3		2		3	3	3	2		3	3
CO4	1	2	2	2	3	3	2			3
CO5		2		3	3	3	2		3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE DESIGNER: Dr. S. BHUVANESWARI

Percentage of Revision: 50%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHC61	INTRODUCTION TO LITERARY THEORY	CORE – 13	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

To show an appreciation of the relevance and value of theoretical models in literary study.

COURSE OBJECTIVES:

- To demonstrate an understanding of important theoretical methodologies by summarising key concepts or arguments.
- To apply these concepts or arguments successfully in a close reading of a literary text.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	comprehend the value of theoretical models	Upto K3
CO 2	know the important key concepts and arguments	Upto K3
CO 3	acquire knowledge of literary theory and how to interpret	Upto K3
CO 4	develop a close reading and analysis of the text	Upto K3
CO 5	know and apply practical knowledge of critical theory and criticism	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

INTRODUCTION TO LITERARY THEORY

UNIT – I:

Introduction to Modernism
Introduction to Postmodernism

UNIT – II:

Introduction to Structuralism
Introduction to Post Structuralism

UNIT – III:

Introduction to Post Colonialism
Introduction to Feminism

UNIT – IV:

Introduction to New Historicism
Introduction to Eco Criticism

UNIT – V:

Gender Studies
Queer Theory

TEXT BOOK:

Barry, Peter. *Beginning Theory: An Introduction to Literary and Cultural Theory*. Manchester University Press; Distributed in the U.S. by Palgrave Macmillan, Manchester, UK, New York, 200

REFERENCE BOOK:

Krishnaswamy. N.et al., *Contemporary Literary Theory: A Students Companion*. Macmillan India Ltd, 2001.

DIGITAL TOOLS:

1. www.iep.utm.edu/literary
2. www.smartmontgomery.com/feminism/

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	1		2	2						
CO2	1		2	2						
CO3		2		3					3	3
CO4	1	2	2	2						
CO5		2		3					3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. G. KALAIVANI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision: 60%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHC62	PHONETICS AND TRANSCRIPTIONS	CORE – 14	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

To demonstrate knowledge of the International Phonetic Alphabet, have basic skills in phonetic transcription.

COURSE OBJECTIVE:

To make the students understand the main principles of articulation, be familiar with the main acoustic properties of the speech signal, and be able to design and perform very simple phonetic experiments.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand and have a better understanding of organs of speech and speech mechanism	Upto K3
CO 2	know the importance of sound speech and sound producing organs	Upto K3
CO 3	acquire knowledge of phonetic symbols	Upto K3
CO 4	develop a knowledge on phonetic transcriptions	Upto K3
CO 5	know and apply practical knowledge on syllabification and word accent	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

PHONETICS AND TRANSCRIPTIONS

UNIT – I:

The Organs of Speech

Speech Mechanism

UNIT – II:

Classification and Description of Vowel Sounds in English

UNIT – III:

Classification and Description of Consonant Sounds in English

UNIT – IV:

Word, Accent, Intonation, Syllabification, Stress

UNIT – V:

Phonetic Transcription of words (Select 100 Words)

Sentences (Formed out of the given 100 Words)

TEXT BOOK:

O'Connor. J.D. *Better English Pronunciation*, Cambridge University Press, 2005.

REFERENCE BOOKS:

1. Kansakar. T.R., *A Course in English Phonetics*, Orient Blackswan, 1998
2. Mandal. S.K., *How to Succeed in Group Discussions & Personal Interviews*, Jaico Publishing House, 2006
3. Balasubramanian.T, *A Textbook of English Phonetics for Indian Students*, Trinity press, 2014.

DIGITAL TOOLS:

1. www.flf.vu.lt/dokumentai/.../el.../A_Course_in_English_Phonetics.pdf
2. www.studyenglishtoday.net/english-phonetics.html
3. <https://www.youtube.com/watch?v=MPsz6QVZeVE>
4. www.abebooks.com

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	1		2	2						
CO2	1		2	2						
CO3		2		3					3	3
CO4	1	2	2	2						
CO5		2		3					3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. G. KALAIVANI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

UNIT – V: Phonetic Transcription of words (Select 100 Words)

1. Amount	21. Event	41. Idea	61. Observe	81. See
2. Argument	22. Examples	42. Important	62. Opposite	82. Sense
3. Be	23. Existence	43. Invest	63. Order	83. Sign
4. Beautiful	24. Experience	44. Knowledge	64. Organization	84. Simple
5. Belief	25. Fact	45. Law	65. Part	85. Society
6. Cause	26. Fast	46. Let	66. Place	86. Sort
7. Certain	27. Fear	47. Level	67. Pleasure	87. Suspec
8. Chance	28. Feeling	48. Living	68. Possible	88. Special
9. Change	29. Fiction	49. Love	69. Probable	89. Substa
10. Clear	30. Force	50. Make	70. Proper	90. Thing
11. Common	31. Form	51. Material	71. Purpose	91. Thoug
12. Comparison	32. Free	52. Measurement	72. Quality	92. True
13. Copy	33. General	53. Mind	73. Question	93. Use
14. Decision	34. Get	54. Motion	74. Reason	94. Walk
15. Degree	35. Give	55. Name	75. Respect	95. Way
16. Development	36. Good	56. Nation	76. Responsible	96. Wise
17. Different	37. Govern	57. Natural	77. Right	97. Word
18. Do	38. Happy	58. Necessary	78. Same	98. Work
19. Education	39. Have	59. Normal	79. Say	99. Yield
20. End	40. History	60. Number	80. Science	100. Zenit



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision: 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHC63	WOMEN'S WRITING	CORE – 15	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

To offer basic understanding of concepts like, Sex and Gender, Women's Liberation Movement and Feminism

COURSE OBJECTIVE:

To make the students learn select works that focus on the lives of women and reflect on what it means to be a woman and feminist from various sexual, racial, class, and national perspectives.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	get knowledge on women's writing and their literatures across globe	Upto K3
CO 2	develop awareness of the basic features and functions of the concept.	Upto K3
CO 3	help them write in different genres.	Upto K3
CO 4	address the themes and debates that have shaped changing culture and nature globally.	Upto K3
CO 5	strengthen the critical and literary skills and enrich their understanding skills	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

WOMEN'S WRITING

UNIT – I: Introduction

Three Waves of Feminism

UNIT – II: Poetry

Rita Dove	– Persephone, Falling
Judith Wright	– Request to a Year
Sylvia Plath	– Medusa
Gwendolyn Brooks	– A Sunset of the City
Kamala Das	– The Old Playhouse

UNIT – III: Prose

Virginia Woolf	– A Room of One's Own
Sojourner Truth	– Ain't I a Woman? (Speech)

UNIT – IV: Drama

Susan Glaspell	– Trifles
Claura Booth Luce	– Slam the Door Softly

UNIT – V: Fiction

Bapsi Sidhwa	– An American Brat

TEXT BOOK:

Desai, Anita. *Cry, the Peacock*. Orient Paperbacks. ISBN: 978–8122200850

REFERENCE BOOKS:

1. Margaret Walters. *Feminism: A Very Short Introduction*. Oxford University Press, 2005.
2. Ellen, Rooney. *Cambridge Companion to Feminist Literary Theory*. Cambridge University Press, 2006.

DIGITAL TOOL:

<https://guides.library.ualberta.ca/women-gender-studies>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	1		2	2						
CO2	1		2	2						
CO3		2		3					3	3
CO4	1	2	2	2						
CO5		2		3					3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. G. KALAIVANI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision: 70%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHC64	AMERICAN LITERATURE	CORE – 16	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

To offer basic understanding of concepts of American prominent writing and their culture

COURSE OBJECTIVE:

To make students learn select works that focus on American writers and their reflection.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	acquire knowledge on American literature and cultures of the nation.	Upto K3
CO 2	develop awareness of the basic features and functions of the concept.	Upto K3
CO 3	identify the key features of poetry.	Upto K3
CO 4	address the themes and debates that has shaped changing culture and nature globally.	Upto K3
CO 5	identify and describe the major critical approaches to literary interpretation: New Criticism/ Formalism, Reader – Response, Feminism, and Marxism	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

AMERICAN LITERATURE

UNIT – I: Poetry

Robert Frost	– Stopping by Woods on a Snowy Evening
Emily Dickinson	– A Bird, came down the Walk
Walt Whitman	– Song of Myself
Langston Hughes	– Mother to Son
Sylvia Path	– Lady Lazarus
Maya Angelou	– On the Pulse of Morning

UNIT – II: Prose

Ralph Waldo Emerson	– The American Scholar
Martin Luther King	– I Have a Dream

UNIT – III: Short Story

O' Henry	– The Last Leaf
Washington Irving	– The Legend of Sleepy Hollow
John Steinbeck	– The Chrysanthemums

UNIT – IV: Drama

Tennessee Williams	– Glass Menagerie
Sam Shepherd	– Buried Child

UNIT – V: Fiction

Ernest Hemingway	– The Old Man and the Sea

TEXT BOOK:

Fisher, and Samuelson. *An Anthology : American Literature of the Nineteenth Century*. Eurasia Publishing House, New Delhi, 1970.

REFERENCE BOOKS:

1. Ernest Hemingway. *The Old Man and the Sea*. RHUK Publisher.
2. Neal Pollack. *Anthology of American Literature*. Harper Collins Publishers.

DIGITAL TOOLS:

1. www.poemhunter.com
2. www.poetryfoundation.com
3. www.gradesaver.com
4. supersummary.com/i0have-a-dream-speech
5. Poeticous.com/frost/the-figure-a-poem-makes

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	1		2	2			2	2		
CO2	1		2	2			2	2		
CO3	1		2	2			2	2		
CO4	1		2	2			2	2		
CO5		3	3	1				3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. G. KALAIVANI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision: 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHE61	INDIAN LITERATURES IN TRANSLATION	ELECTIVE – 2	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☒

COURSE DESCRIPTION:

To focus on ideas and the ways in which translations reflect cultural and aesthetic values

COURSE OBJECTIVES:

To place due emphasis upon their discursive potential in the contemporary times.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	acquire knowledge on various Indian or regional literatures translated in English	Upto K3
CO 2	create an awareness on the salient features of the concept	Upto K3
CO 3	understand multiple genres	Upto K3
CO 4	insight into the various global debates	Upto K3
CO 5	strengthen their critical and literary skills and enrich their comprehending skills	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

INDIAN LITERATURES IN TRANSLATION

UNIT – I: Poetry

- Umashankar Joshi – Fragmented (Gujarati)
Gopalakrishna Adiga – Do Something, Brother (Kannada)
O.N.V. Kurup – Earthen Pots (Malayalam)
From Kuruntokai 66 – What his Girl Friend Said to Her (Tamil)

UNIT – II: Prose

- Swami Vivekananda – Response to Welcome (*Swami Vivekananda's Speeches at the World's Parliament of Religions*, Chicago, 1893)
M.K. Gandhi – Shyness, My Shield
(*The Story of My Experiments with Truth*)
Buddhadev Bose – Chapter – 1 (An Extract from an *Acre of Green Grass*)
Premchand – January Night

UNIT – III: Non – Fiction

- Jai Rattan – Life of Bolaram
Ambai – A Kitchen in the Corner of the House
Lakshmi Kannan – India Gate

UNIT – IV: Drama

- Girish Karnad – Nagamandala

UNIT – V: Fiction

- Poomani – Heat

TEXT BOOK:

Gandhi, M.K. *My Experiments with Truth*. Delhi Publishing House, New Delhi.

REFERENCE BOOK:

Anna Kurien. *Texts and Their Worlds I* Ed., – Foundation Books

DIGITAL TOOLS:

- <https://journals.sagepub.com/doi/abs/10.1177/002198949302800110?journalCode=icla>
- <https://www.grin.com/document/369169>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO 9	PSO10
CO1	1		2	2			2	2		
CO2	1		2	2			2	2		
CO3	1		2	2			2	2		
CO4	1		2	2			2	2		
CO5		3	3	1				3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. G. KALAIVANI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision: 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHE62	GENDER STUDIES	ELECTIVE – 2	5	-	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

To focus on ideas and the ways in which Gender studies reflect social values and equality.

COURSE OBJECTIVES:

To introduce Gender studies as an academic discipline and to explain changing trend in the equal status of both men and women.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	get an introduction on Gender studies and the related theories	Upto K3
CO 2	be aware of the features of the concept.	Upto K3
CO 3	engage themselves with different genres	Upto K3
CO 4	address the thematic debates in global literary ambiance	Upto K3
CO 5	be enriched in their spirit of criticism and the power of comprehension	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

GENDER STUDIES

UNIT – I: Introduction

Definition – Scope of gender studies – Differences between sex and gender, Interdisciplinary nature of Gender studies, Gender studies Vs Women's studies, Need for Gender as an analytical variable.

UNIT – II: Gender Concepts

Stereotypes – Gender roles – Gender Ideology – Sexual Minorities – LBGTQ – Understanding patriarchy – Gender issues in development – Gender sensitization and training.

UNIT – III: Gendering Institutions

Individual – Family – class – caste – religion – Society – Patriarchal – Matrilineal – Women and Culture – Role Status – Socialization – Internalization – Changing Scenario – Power relations, Decision making – Female Headed Households.

UNIT – IV: Education and Economic Institutions

Gender and Education – Enrolment pattern – Primary to Higher Education – literacy Rates – Drop-out Rates – gender gap – Sexual Division of Labour – pay gap – wage differentials

UNIT – V: Gender and Work

Gender Segregation – glass ceiling – pipeline leakage – Unpaid labour – invisibility – organized and Unorganized Sectors – Wage Discrimination – Production – Reproduction – Deindustrialization and Business.

TEXT BOOKS:

1. Oakley, Ann. (1972). *Sex and Gender and Society*. London; Temple smith Robinson, Victoria., & Diane, Richardson. (Eds.) (1993).
2. Krishnaraj, Maithreyi. *Introducing Women's Studies: Feminist Theory and Practice*. London: Macmillan (1995).

REFERENCE BOOKS:

1. Gokilavani. (2000). *Remaking Society for Women: Visions Past and Present*. New Delhi: Indian Association for Women's Studies.
2. *Women's Studies: Principles, Theories and Methodologies*. Department of Women's Studies: Alagappa University.
3. Saraswati, Ayu. L., Shaw, Barbara & Rellihan, Heather. (2017). *Introduction to Women's, Gender, and Sexuality Studies: Interdisciplinary and Intersectional Approaches*. Oxford University Press.

DIGITAL TOOL:

<https://guides.library.ualberta.ca/women-gender-studies>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO 9	PSO10
CO1	1		2	2			2	2		
CO2	1		2	2			2	2		
CO3	1		2	2			2	2		
CO4	1		2	2			2	2		
CO5		3	3	1				3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. G. KALAIVANI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision: 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHE63	ART FOR LITERATURE	ELECTIVE – 2	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course looks closely at the relationship of film, visual art, and literature.

COURSE OBJECTIVES:

- To create visual, screen plays and screen adaptations from great works of literature.
- To focus on ideas and the ways in which work can be studied and interpreted with close relevance to art and aesthetic values.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	receive knowledge to survey literature through art	Upto K3
CO 2	comprehend the basic features and functions of the concept.	Upto K3
CO 3	engage themselves with varied genres of literature	Upto K3
CO 4	be aware of globally emerging trends with regard to art and literature	Upto K3
CO 5	strengthen their critical and literary skills and enrich their understanding skills	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

ART FOR LITERATURE

UNIT – I:

Literature and Its Elements: Different genres of Literature, Character Archetypes. Understanding how literary genres and ideas have been incorporated into theatre, cinema and art.

UNIT – II:

Art and its Elements: Elements of Art, Organizing Principles. Taking select paintings and analyzing them. The Art of Seeing: Adaptations from Works of Fine Art into other mediums

UNIT – III:

Theatre and its Elements: The Origins of Writing for Western Theatre, Acts and Dramatic Structure, Characterization and Improvisation on Screen. Adaptations & writing effectively for Audience Engagement.

UNIT – IV:

Film and its Elements: Narrative Structure, Two and Three Point Narrative Structures, Character Arc, Prototypes and Stereotypes. How to develop a character for Screen, Adaptations to film and from Art and Theatre into film

UNIT – V:

Understanding how Literature, Theatre, Film and Art relate to each other and are influenced by the historical, philosophical, religious, political, and musical works of the period in which they are produced. The underlying human emotions that is common to all great works of Art, Literature, Theatre and Film. How they can be used effectively by a writer.

TEXT BOOK:

Marmor, Max. (1992). *The Literature of Art: Select Bibliography of Sources in English. Art Documentation*: Journal of the Art Libraries Society of North America.

REFERENCE BOOKS:

1. Adams, Laurie Schneider, [2002] *Looking at Art*, Prentice Hall, New Jersey. ~ 20 ~
2. Brown, Dan [[2003], *The Da Vinci Code*, Doubleday, New York.
3. Giannetti, Louis [2011], *Understanding Movies*. 13th edition, Prentice Hall, New Jersey.
4. Martin, George R. R. [1996] *A Game of Thrones*, Bantam Books, New York.
5. Soles, Derek [2002], *The Prentice Hall Pocket Guide to Understanding Literature*

DIGITAL TOOLS:

1. www.thoughtandvisions.com
2. www.academia.edu

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	1		2	2			2	2		
CO2	1		2	2			2	2		
CO3	1		2	2			2	2		
CO4	1		2	2			2	2		
CO5		3	3	1				3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. G. KALAIVANI



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision: 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHE64	TRAVEL LITERATURE	ELECTIVE – 3	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☒

COURSE DESCRIPTION:

To acquire knowledge about the studied texts and about an important and popular *literary* genre.

COURSE OBJECTIVE:

To develop the student's ability to analyse and discuss *travel* narratives in the light of, and aided by, relevant theory.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	receive knowledge travelogues, an innovative literary genre	Upto K3
CO 2	develop awareness of the basic features and functions of the travel narratives, a creative literary art	Upto K3
CO 3	effectively record their travels and adventures	Upto K3
CO 4	differentiate between and appreciate the emerging trends in travel literature across the globe.	Upto K3
CO 5	strengthen their analytical skills to thematically analyse the travelogues and other indigenous forms of travel literature	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

TRAVEL LITERATURE

UNIT – I: Introduction

Introduction to Travel Writing

Travel Literature and its Evolution

UNIT – II: Memoir

Ibn Batuta – The Court of Muhammad bin Tughlaq

Khushwant Singh – City Improbable

UNIT – III: Non- Fiction

Mark Twain – The Innocent Abroad (Chapter VII, VIII and IX)
(Wordsworth Classic Edition)

Ernesto Che Guevara – The Motorcycle Diaries: A Journey around South America
(The Expert, Home land for Victor, The City of Viceroys),
Harper Perennial

UNIT – IV: Short Story

Rahul Sankrityayan – From Volga to Ganga (Translation by Victor Kierman)
(Section I to Section II) Pilgrims Publishing

UNIT – V: Travelogue

Nahid Gandhi – Alternative Realities: Love in the Lives of Muslim Women,
Chapter 'Love, War and Widow', Westland, 2013

Elisabeth Bumiller – May you be the Mother of a Hundred Sons: a Journey among the
Women of India, Chapters 2 and 3, pp.24–74
(New York: Penguin Books, 1991)

TEXT BOOK:

Susan Bassnett, '*Travel Writing and Gender*' in *Cambridge Companion to Travel Writing*,
ed. Peter Hulme and Tim Young (Cambridge: CUP, 2002) pp, 225–241

REFERENCE BOOKS:

1. Tabish Khair, '*An Interview with William Dalrymple and Pankaj Mishra*' in
Postcolonial Travel Writings: Critical Explorations, ed. Justin D Edwards and Rune
Graulund (New York: Palgrave Macmillan, 2011), 173–184
2. Casey Balton, '*Narrating Self and Other: A Historical View*', in *Travel Writing: The
Self and the Other* (Routledge, 2012), pp.1–29

DIGITAL TOOL:

<https://www.eng-literature.com/2021/12/travel-literature-travelogue-definition-examples-books.html>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	1		2	2			2	2		
CO2	1		2	2			2	2		
CO3	1		2	2			2	2		
CO4	1		2	2			2	2		
CO5		3	3	1				3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. G. KALAIVANI



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision: 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHE65	MYTH AND LITERATURE	ELECTIVE – 3	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This paper aims at enabling students to explore the world of myth and their origin through a study of literary texts of different cultures and countries.

COURSE OBJECTIVE:

It also seeks to familiarize mythic concepts and symbols so that students recognize them when they come across them in literary texts.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	receive knowledge on myth literature recognize the prominence of Myth as a genre of literature	Upto K3
CO 2	become familiar with mythical concepts and symbols and kinds	Upto K3
CO 3	critically appreciate Myth as an imaginative art form	Upto K3
CO 4	address the themes and debates that have shaped changing culture and nature globally.	Upto K3
CO 5	strengthen the critical and literary skills and enrich their understanding skills	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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MYTH AND LITERATURE

UNIT – I: Introduction to Mythology

Beginnings of Myth – Retelling/Restating of Myths – Natural Phenomena as Myth – Political Dimensions of Myth – Myth and Ritual – Myth and Metaphysics – Myth, Legends and Folktale – Modern Urban Myths

UNIT – II: Greek Mythology

Theogony – Greek Epic Cycle – Homeric Cycle – The Chief Gods and Goddesses of the Greeks

(Prescribed Texts: *The Iliad*, *The Odyssey*)

UNIT – III: European Mythology

Greek antecedents of Roman Mythology – Celtic Mythology and the Arthurian Cycle – Myth and Legend – The Robin Hood cycle.

(Prescribed Text: *The Wanderings of Oisin* – W.B. Yeats)

UNIT – IV: Hindu Mythology

Introduction to Hindu Scriptures – The Vedas – The Ramayanas – The Mahabharatas – The Puranas – The Itihasas – Difference between the Vedas and the Puranas – The Hindu Trinity – The Incarnations of Vishnu – The Puranic Tradition – Brahma – Saraswati – Vishnu Lakshmi – Avatars of Vishnu – Shiva – Uma – Parvati – Durga (Prescribed Texts: *Traivikramam* – Mahendravarman)

UNIT – V: Scandinavian and Anglo-Saxon Mythology

The Skaldic and Saga tradition – The Coming of the Gods – The Cult of Odin – The God of the Sky – The Deities of the Earth – The Family of the Gods – The World of the Gods – The Coming of Christianity (Prescribed Text: *The Hobbit* – J.R.R. Tolkien)

TEXT BOOK:

Segal, Rabert A., '*Myth and literature*', *Myth: A Very Short Introduction*, 1st edn, Oxford Academic, 2004.

REFERENCE BOOKS:

1. Bulfinch, Thomas. *The Age of Chivalry*. New York: Airmont Books, 1965. Print.
2. Coupe, Laurence. *Myth*. London: Taylor & Francis, 2008. Print.
3. New Critical Idiom Series Davidson, Ellis. *Scandinavian Mythology*. India: Standard Literature, 1982. Print.
4. Dorairaj, Joseph. *Myth and Literature*. Gandhigram: Folklore Resources and Research Centre, 2003. Print.
5. Dryden, John., trans. *Metamorphoses. By Ovid*. London: Wordsworth Classics, 1998. Print.
6. Graves, Robert. *The Greek Myths Volume I and II*. New York: Penguin Books, 1960. Print.

DIGITAL TOOLS:

1. www.ovid.lib.virginia.edu
2. www.archive.org/hindumythology

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO 9	PSO10
CO1	1		2	2			2	2		
CO2	1		2	2			2	2		
CO3	1		2	2			2	2		
CO4	1		2	2			2	2		
CO5		3	3	1				3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. G. KALAIVANI



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision: 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UEHE66	ECO LITERATURE	ELECTIVE – 3	5	-	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

To understand core concepts and methods from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.

COURSE OBJECTIVES:

To appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	acquire knowledge on eco literature and environmental issues	Upto K3
CO 2	develop awareness of the environmental issues and the bondage that exists between human and natural systems	Upto K3
CO 3	write in different genres.	Upto K3
CO 4	develop an understanding and a spirit of inquiry into the globally emerging trends in eco literature	Upto K3
CO 5	strengthen the critical and literary skills and enrich their understanding skills	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

ECO LITERATURE

UNIT – I: Introduction to Indian Eco criticism

Definition, scope and importance of Indian Eco criticism

UNIT – II: Nativism

Identity – Nationalism – Multiculturalism – Assimilation – Indigeneity

Arjun– Mahasweta Devi

Budhan – A Play by Denotified Chhharas

UNIT – III: Tinai

Tinai – Definition of Tinai – Five landscapes or tinai

(Prescribed Texts: Selections from akam and puram poetry)

UNIT – IV: Folk Literature

Folk Literature – Oral Tradition – Folk Songs

(Prescribed Texts Chhattisgarhi Song from Bhil Community)

UNIT – V: Ecology and Media

Scope and Importance of Media in Promoting Ecological Issues – Eco media

(Films and Documentaries)

TEXT BOOKS:

1. Alex, Rayson K., ed. *Culture and Media: Explorations in Eco criticism*. London: Cambridge Scholars Publishing, 2014. Print.
2. Lomax, Alan. *Folk Songs: Style and Culture*. New Jersey: Transaction Publishers, 2009. Print.

REFERENCE BOOKS:

1. Paranjape, Makarand, ed. *Nativism: Essays in Criticism*. Pune: Sahitya Akademi, 1997. Print.
2. Roy, Arundhati. *End of Imagination*. Cochin: D.C. Books, 2001. Print.
3. Selvamony, Nirmal, Nirmaldasan and Rayson K. Alex. *Essays in Eco criticism*.
4. Selvamony, Nirmal and Nirmaldasan. *Tinai I, II and III*. Chennai: PASO, 2003. Print.

DIGITAL TOOLS:

1. <https://www.science.smith.edu/climatelit/ecocriticism/>
2. routledge.com/Interrogating-Eco-Literature-and-Sustainable-Development-Theory-Text/Mukherjee-Roy/p/book/9781032206653

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	1		2	2			2	2		
CO2	1		2	2			2	2		
CO3	1		2	2			2	2		
CO4	1		2	2			2	2		
CO5		3	3	1				3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. G. KALAIVANI



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B.B.A.



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision-20%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBNC51	OPERATIONS MANAGEMENT	CORE – 11	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course helps to provide basic knowledge about the concepts in Operations Management and introduces the major areas in Production department.

COURSE OBJECTIVES:

- To introduce the basic concepts of Operations Management.
- To provide insight about major systems, Lay – out design, PPC, Production and introduce SQC

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	identify the basic concepts of Operations Management	Upto K3
CO2	apply the concepts of Operations Management to obtain competitive advantage	Upto K3
CO3	design the format for effective utilization of resources	Upto K3
CO4	analyze the concepts and use them to take good business decisions	Upto K3
CO5	use the knowledge obtained and gain competitive advantage to earn more profit	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

OPERATIONS MANAGEMENT

UNIT – I:

Operations management – definition – importance – functions – advantages – production systems – intermittent – continuous – scheduling – meaning – scheduling procedures.

UNIT – II:

Plant location – factors affecting plant location – plant layout – principles – types of layout – product – process – combination layout.

UNIT – III:

Plant maintenance – merits and demerits – Production planning and control – objectives – functions – work study – method study and work measurement.

UNIT – IV:

Purchasing of materials – objectives – procedure – **Inventory control techniques** – ABC analysis – Productivity improvement and operations strategy – six basic components of operation

UNIT – V:

Material handling – objectives – principles – equipments – quality control – SQC – control charts – value analysis and waste control.

TEXT BOOK:

Dr.K. Aswathappa and Prof.K.Shridharabhat, *Production and Operation Management*. Himalaya Publishing House, Recent Edition.

REFERENCE BOOKS:

1. *Production and Operation Management* – Dr.B.S.Goel (PragatiPrakashan Publication)
2. *Production Management* – Elwood Buffa (Johnnuron)
3. *Integrated Materials Management* – Gopalakrishnan (Tata McGraw Hill)

DIGITAL TOOLS:

1. https://en.wikipedia.org/wiki/Operations_management
2. [www.investopedia.com/terms/o/operations – management](http://www.investopedia.com/terms/o/operations-management)

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2				2	
CO2		2	2		2	2
CO3	2	3	2			
CO4	2	2	2	2		1
CO5	2	2	2	3	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. T.R.JEEVA PRIYA



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision-20%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBNC52	HUMAN RESOURCES MANAGEMENT	CORE – 12	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This Course helps to understand the role of Human Resources in today's Organizations. Key Functions such as Job Analysis, Recruitment, Training and Performance Appraisal are also examined.

COURSE OBJECTIVES:

- To make the students aware of the HRM elements.
- To expose students on basic HRM functions.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the fundamental Concepts and functions of Human Resource Management.	Upto K3
CO 2	explain about Job Analysis and Full Life Cycle of Recruitment Process.	Upto K3
CO 3	demonstrate on Training and Development, Types and Methods.	Upto K3
CO 4	understand about Wage and Salary Management and methods involved in it.	Upto K3
CO 5	gain knowledge on Performance appraisal and its methods to apply in an Organization	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

HUMAN RESOURCES MANAGEMENT

UNIT – I:

Human resource management –meaning and definition–objectives–scope – functions. Human resource planning –definition –objectives –need and importance –human resource planning process.

UNIT – II:

Job analysis – job description – Job specification and job evaluation – Recruitment –factors affecting recruitment –sources of recruitment –recruitment process – Definition of selection – selection methods and process – placement & Induction.

UNIT – III:

Definition of training –need and importance –steps in training programme –types of Training – Training Methods.

UNIT – IV:

Wage and salary administration – objectives and principles of wage and salary administration – components –methods of wage payments.

UNIT – V:

Performance appraisal –meaning and methods of performance appraisal.

TEXT BOOK:

Human Resource Management – S.S. Khanka, S.Chand Publications.

REFERENCE BOOKS:

1. *Human Resource Management* – SubbaRao
2. *Human Resource Management* – ShasiK.Gupta&Rosy Joshi – Kalyani Publishers
3. *Personal Management & Industrial Relations* – Tripathi& Reddy Himalaya Publishing House

DIGITAL TOOLS:

1. https://en.wikipedia.org/wiki/Human_resource_management
2. [www.inc.com/encyclopedia/human – resource – management.html](http://www.inc.com/encyclopedia/human-resource-management.html)

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3					
CO2		2		2	2	
CO3		2	2	3	2	
CO4	2	2		2		
CO5		2	2		2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. M. S. BALAJI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision-10%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBNC53	FINANCIAL MANAGEMENT	CORE – 13	6	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course helps to provide the basic Knowledge on Corporate Financial Management

COURSE OBJECTIVES:

- To introduce the basics of Corporate Finance
- To make them understand the tools of Capital Budgeting and Cost of Capital.
- To create awareness on various sources of capital for corporate.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the basics of financial management and its scope	Upto K3
CO 2	determine various sources of finance to corporate form of business	Upto K3
CO 3	discuss various concepts related to Working Capital management.	Upto K3
CO 4	make use of various tools to calculate cost of capital	Upto K3
CO 5	develop analytical skills in selection of project for finance.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

FINANCIAL MANAGEMENT

UNIT – I:

Nature of financial management – scope – objectives of the firm – profit maximization Vs wealth maximization – Functions of finance – Organisation of finance function – Controller Vs treasurer – Investment decision – financing decision and dividend decision.

UNIT – II:

Sources of capital – long term, intermediate term and short term – types of securities – debt, equity and preferred stock – capital structure planning – EBIT – EPS analysis.

UNIT – III:

Working capital and cash management – advantages of adequate working capital – Management and determinants of working capital – Estimation of Working Capital (Simple Problems on trading concerns only) and cash budget. (Simple Problems)

UNIT – IV:

Cost of capital – cost of debt – cost of equity – cost of preference – cost of retained earnings and weighted average cost of capital (Simple Problems).

Dividend decision – factors affecting dividend decision – alternative forms of dividends.

UNIT – V:

Techniques of capital budgeting – capital budgeting process – time value of money – investment evaluation methods – payback period, accounting rate of return, net present value, **Internal rate of return**. (Problem on IRR to be excluded) and Profitability Index

NOTE: Question must be asked 60% on theory 40% on Simple problems.

TEXT BOOK:

Financial Management – Shashi Gupta Sharma, Kalyani Publishers, New Delhi. (recent edition)

REFERENCE BOOKS:

1. *Financial Management* – I.M. Pandey
2. *Financial Management* – Khan and Jain

DIGITAL TOOLS:

1. [www.managementstudyguide.com/financial – management.htm](http://www.managementstudyguide.com/financial-management.htm)
2. [www.yourarticlelibrary.com/financial – management/financial – manage...](http://www.yourarticlelibrary.com/financial-management/financial-manage...)

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3				
CO2		3	2		2	2
CO3	3			3		
CO4	2		3	3		2
CO5	2	1	3		2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. B. ANBAZHAGAN



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision-25%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBNE51	CASE ANALYSIS	ELECTIVE – 1	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The purpose of this course is to examine a specific case or business problem and to allow the students to provide solution with Managerial Expertise.

COURSE OBJECTIVES:

- To allow students with real expertise and understanding, as well as judgement to improve their Managerial Skill.
- To make the students apply various managerial concepts in managerial decision making and to provide judgement on uncertain situations.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	know how to examine the managerial case or problem.	Upto K3
CO 2	know the basic management leadership theories mostly used in industries and understand methods to manage change	Upto K3
CO 3	analyse the event occurred with Marketing Problems	Upto K3
CO 4	provide Solution for uncertain situations and provide solutions with their Managerial abilities in human resource management	Upto K3
CO 5	have an increase in their Managerial Efficiency and will be able to prepare reports which will help them to handle Organization Environment.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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CASE ANALYSIS

OBJECTIVES:

The main objectives of this course is to make the students get into the habit of diagnosing problems, analyzing and evaluating alternatives and formulating workable plans of actions through classroom participation and discussion.

One case per week has to be discussed by the students. Approximately 12 – 13 cases will be discussed during the semester. The cases should be distributed by the teacher concerned on the different functional areas of the management as specified

The students should be trained to discuss the cases in small groups and develop analytical thinking and to present the findings to the common class. The chairmanship should be rotated among the students. This is to develop conference leadership. They should also be trained to write case reports.

The examiner should give a case or case let and asks the students to identify the problem in the case. Analyse the causes and suggest suitable alternative courses of action after considering the relative merits and demerits of each alternative.

AREAS OF CASES DEALT:

- i. General Management Cases(MBO, Planning Process, Managerial Functions)
- ii. **Cases from Organizational Behaviour**(Change Management,Leadership, Motivation)
- iii. Cases from Marketing Management (Sales Promotion, Advertisement, Online Marketing)
- iv. Cases from Human Resource Management (Training, Selection, Stress Management)

QUESTION PAPER PATTERN:

“Analyse the following case and write your report”.

The marks may be allocated as follows:

1. Summary of case facts and identifying the problem situation of issues (10 Marks).
2. Analyzing the causes of the problem situation or issues (10 Marks)
3. Stating the various alternative courses of action possible (15 Marks)
4. Discussing the relative merits and demerits of each alternatives (15 Marks)
5. Choosing the best alternative course of action and stating the reason for the choice with applicable management concepts (10 Marks)
6. Report format and conclusions and overall presentation (15 Marks)

NOTE: Only one case should be given.



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SYLLABUS

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REFERENCE BOOKS(Cases Only):

1. *Principles and Practices* – Dinakar Pagare
2. *Marketing Management* – C.B. Mamoria & Satish Mamoria
3. *Human Resource Management* – C.B. Gupta
4. *Organisational Behaviour* – B.P. Singh & T.N. Chabbria

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3				2	
CO2		3	2			
CO3		3	3	2		
CO4	2	2	3	2		1
CO5			2		2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr.B. ANBAZHAGAN



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision-100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBNE52	TOTAL QUALITY MANAGEMENT	ELECTIVE – 1	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

To make the students gain knowledge of different quality management techniques in the managerial processes and at the shop floor.

COURSE OBJECTIVE:

To introduce main Principles of Business and Social Excellence and skills to the students to use Quality Management Methodology for the implementation of TQM in Business.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	get acquainted with Fundamental principles of TQM and a brief introduction on it.	Upto K3
CO2	understand Conceptual framework on the Various Quality Models and Tools.	Upto K3
CO3	know about various Quality Management Standards and how it is applied in the organization	Upto K3
CO4	understand about Benchmarking and FMEA Analysis to know what are the failure rates in a production unit and how an organization manages it.	Upto K3
CO5	summarize on thorough understanding of TQM Principles and about ISO 9000 Standards in business.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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TOTAL QUALITY MANAGEMENT

UNIT– I:

Basic concepts of Quality – Introduction, Meaning and Definition of Quality, Quality costs. Total Quality Management – Definition, characteristics, concepts, elements, pillars, principles, Barriers to TQM implementation.

UNIT– II:

Continuous process improvement – Introduction, Input/output process model, Jurantriology, PDSA cycle, 5S House Keeping, Seven tools of Quality (Q – 7 Tools) – Check sheets, histogram, Cause and effect diagram, Pareto diagram, Stratification analysis, Scatter diagram, Control chart.

UNIT– III:

The Six Sigma Principle – Meaning, Need, Concept, Process and Scope. New Seven Management tools – Affinity diagram, Relationship diagram, Tree diagram, Matrix diagram, Decision tree, Arrow diagram, Matrix data analysis diagram.

UNIT– IV:

Bench marking – Introduction, meaning, objectives, types, process, benefits and pitfalls. FMEA – Requirements of Reliability, Failure Rate, FMEA Stages: Design, Process and Documentation.

UNIT– V:

ISO 9000 Quality Management Systems – Introduction, meaning, need, ISO 9000 series of standards, classification and comparison of standards, selection of ISO standards, Registration, Documentation, Quality Auditing.

TEXT BOOK:

V.Jayakumar, 2008, *Total Quality Management*, Lakshmi Publications, Chennai

REFERENCE BOOKS:

1. K.ShridharaBhat, 2016, *Total Quality Management: Text & Cases*, Second Revised Edition, Himalaya Publishing House, Mumbai
2. D.D.Sharma 2008, *Total Quality Management – Principles, Practices and Cases*, Sulthan Chand & Sons, New Delhi

DIGITAL TOOLS:

1. <https://asq.org/quality-resources/total-quality-management>
2. <https://www.investopedia.com/terms/t/total-quality-management-tqm.asp>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2					
CO2		2	2		2	
CO3	2		2			
CO4		2	1		2	
CO5	2	2			2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. K. G. RAJA SABARISH BABU



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SYLLABUS

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Percentage of Revision-100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBNE53	STRATEGIC MANAGEMENT	ELECTIVE – 1	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course helps to provide basic knowledge about strategic management and to formulate strategies associated with Business.

COURSE OBJECTIVES:

- To deal with formulation and implementation of Strategy.
- To study and understand the various steps in Strategic Management.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	identify the basic concepts of Strategy, needs and limitations	Upto K3
CO2	demonstrate the environmental analysis, SWOT Analysis and Value Chain Approach	Upto K3
CO3	summarize the factors influencing strategy and 7s Framework	Upto K3
CO4	define how to implement the strategy and evaluation of strategy	Upto K3
CO5	understand Strategic Control Process and Use the knowledge to Adopt the Business Uncertainties	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

STRATEGIC MANAGEMENT

UNIT – I: Strategic Management

Strategic Management – Definition – Levels of Strategic Management – Strategic Management Process – Limitations and Misgivings – Principles of Good Strategy.

UNIT – II: Environment Analysis

Environment Analysis – Importance, Types of Environments – Environmental Factors – Methods of Scanning – SWOT Analysis – Value Chain Approach.

UNIT – III: Strategic Formulation

Strategic Formulation – Strategic Options – Choice of Strategy, Portfolio Analysis – BGC Growth Share Matrix – GE Multifactor Portfolio Matrix – Competitive Analysis – 7s Framework. International Operations – Globalization of Business – Complexity of International Environmental Analysis.

UNIT – IV: Activating Strategy

Activating Strategy – Structural Implementation – Functional Implementation – Behavioural Implementation – Procedural Implementation.

UNIT – V: Strategic Control

Strategic Control – Control Process. Management of Change – Barriers to Change – Change Requirements – Implementation of Strategic Change

TEXT BOOKS:

1. Kazmi, Azhar – *Strategic Management and Business Policy* – 3rd Ed, New Delhi: Tata McGraw Hill Education Pvt. Ltd., 2008
2. Francis Cherunilam – *Business Policy and Strategic Management Text and Cases* – Himalaya Publishing House.

REFERENCE BOOK:

R. Srinivasan. *Strategic Management the Indian Context* – Prentice Hall of India Pvt. Ltd

DIGITAL TOOLS:

1. <https://iedunote.com/strategic-management>
2. <https://strategicmanagementinsight.com/topics/strategic-management-planning.html>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3					
CO2		3		2		2
CO3	2	3	2			
CO4	2	2		2		2
CO5		2	2	3	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. T R JEEVA PRIYA



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision-100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBNSP1	GROUP DISCUSSIONSKILLS (PRACTICALS)	SBS – 5	–	2	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	–	100	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

To train the students in effective group communication and to improve their listening skill

COURSE OBJECTIVE:

To provide a comprehensive approach to learn basic and effective methods of group communication

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	know about Group Discussion	Upto K3
CO2	understand the types of Group Discussion	Upto K3
CO3	know about the rules in Group Discussion	Upto K3
CO4	analyze and discuss various management topics within a group	Upto K3
CO5	know the importance of Team Work	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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GROUP DISCUSSION SKILLS – PRACTICALS

UNIT – I:

Introduction to Group Discussion

Types

UNIT – II:

Importance of Listening

Format of Group Discussion

UNIT – III:

Do's and Dont's in Group Discussion

Group Evaluation Pattern

UNIT – IV:

Leadership Topics – (Leader or Follower, Excellent leadership skills – Nature or Nurture, Are women better leaders than men)

Business – (Will the great Indian real estate bubble burst soon?, Moonlighting, 5G in India, Boom of Service Sector in India)

Current Affairs (E – Learning Challenges, Atmanirbhar Bharat Abhiyan, Future of Cryptocurrency, Bullet Trains in India– Pros and Cons.)

General Topics (Is the Youth of India confident or confused? Social Media Usage – Pros and Cons, FDI in India, Privatization, Corruption)

UNIT – V:

Globalization

Team Work

NOTE:

- This Subject is recommended to be practically evaluated by the Subject handling Staff with Chairman
- Approximately 15 Group Discussion topics have to be discussed in classroom
- Practical Group Discussion will be conducted to evaluate the students

Students will be evaluated based on

- Initiation Skills – 20 Marks
- Presentation Skills – 15 Marks
- Listening Skills – 15 Marks
- Group Ethics – 20 Marks
- Awareness – 30 Marks
- The Head of the Department, the faculty who handles the subject will be in the practical examination at the end of the semester

40 Marks will be passing minimum, Students who fail to attend this practical will not be permitted to take up their Sixth Semester Examinations.



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TEXT BOOK:

Hari Mohan Prasad & Rajnish Mohan, *Group Discussion & Interview* – Third Edition, Tata McGraw Hill's Education Private Limited, New Delhi.

REFERENCE BOOKS:

1. Nitin Sharma. 2012, *Group Discussion* – Unicorn Books, New Delhi
2. Dr.N, SantoshRanganatha. 2017, *Techniques for Effective Group Discussion* – Himalaya Publishing House, Mumbai

DIGITAL TOOLS:

1. <https://www.groupdiscussionideas.com>
2. <https://www.mbauniverse.com>

GD VIDEO LINKS:

1. <https://youtu.be/U2S8R168ipU>
2. https://youtu.be/qymUH_pzPXc

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2				2	
CO2		3	2			
CO3				2		
CO4	2	2	3	2		1
CO5			2		2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. K. G. RAJA SABARISH BABU



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision-10%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBNC61	MANAGEMENT ACCOUNTING	CORE – 15	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course helps to provide the basic Knowledge on Management Accounting to the students.

COURSE OBJECTIVES:

- To teach basic tools for Managerial Decision Making.
- To impart working knowledge on basic financial statement analysis.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	understand the scope of Management Accounting.	Upto K3
CO 2	get exposure on the tools and techniques of Management Accounting	Upto K3
CO 3	gain practice in preparing various Budgets	Upto K3
CO 4	understand and apply the Financial Statement Analysis with Ratios and Fund flow statement	Upto K3
CO 5	apply Marginal Costing techniques in Managerial Decisions.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

MANAGEMENT ACCOUNTING

UNIT – I:

Management accounting – meaning – nature – scope – advantages and disadvantages – management accounting Vs Financial accounting – Management Accounting Vs Cost Accounting – financial statement analysis – comparative – common size – trend percentages.

UNIT – II:

Ratio analysis – meaning– **mode of expression** – merits and demerits –classification of ratios (Simple problems only) – DuPont control chart.

UNIT – III:

Fund flow statement – meaning – merits and demerits – preparation of fund flow statement without adjustments – Cash flow statement – meaning merits and demerits – preparation of cash flow statement (Simple problems only).

UNIT – IV:

Marginal costing – meaning – merits and demerits – break even point – application of marginal costing – simple problems in Marginal Costing.

UNIT – V:

Budgetary control – meaning – objectives– merits and demerits– steps in Budgetary control – classification of budgets simple problems on cash budget, flexible budget, production budget, and sales budget – zero base budgeting.

Note:60% Marks for theory and 40% marks for problems.

TEXT BOOK:

Management Accounting –Shashi Gupta, Sharma, Neeti Gupta, Kalyani Publishers, New Delhi. Edition: 2013.

REFERENCE BOOKS:

1. ***Management Accounting*** – R.S.N.Pillai and Bagavathi
2. ***Management Accounting*** – S.N. Maheswari

DIGITAL TOOLS:

1. [www.careerride.com/fa – management – accounting.aspx](http://www.careerride.com/fa-management-accounting.aspx)
2. icai.org/post.html?post_id=10161

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2			
CO2		3	3		2	2
CO3	3		2	3		
CO4	2		3	3		1
CO5	2	1	3		3	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr.B. ANBAZHAGAN



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SYLLABUS

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Percentage of Revision-20%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBNC62	ENTREPRENEURSHIP DEVELOPMENT	CORE – 16	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☐	Entrepreneurship ☒

COURSE DESCRIPTION:

This course helps to provide basic knowledge about Entrepreneurship, it highlights the functions, characteristics of entrepreneur and introduces the financial and non – financial institutions supporting entrepreneurs.

COURSE OBJECTIVES:

- To introduce the basic concepts of Entrepreneurship.
- To provide insight about major functions of Entrepreneur.
- To expose about various institutions supporting Entrepreneurs

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	identify the basic concepts of Entrepreneurship	Upto K3
CO 2	apply the basic concepts to prepare project report	Upto K3
CO 3	get to know about institutions supporting entrepreneurs	Upto K3
CO 4	understand the incentives and concessions given by Government to small entrepreneurs	Upto K3
CO 5	use the knowledge obtained to understand the problem and revive sick units	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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ENTREPRENEURSHIP DEVELOPMENT

UNIT – I: Entrepreneur

Definitions – Characteristics of an Entrepreneur – Functions of an Entrepreneur – Entrepreneur Vs Manager – Types of Entrepreneurs.

UNIT – II: Women Entrepreneurs

Concepts – Factors influencing women entrepreneurs – types of women entrepreneurs – problems of women entrepreneurs – Remedial measures

UNIT – III: Project Identification

Meaning and Definition of Project – Project Classification – Project Life Cycle. Project Report – Meaning – Components of Project report.

UNIT – IV: Institutional Support to Entrepreneurs

Institutions at National Level – Industry Associations – Industry Related Research Institutions – Specialized Training Institutes – Institutions at Tamil Nadu. Institutional Finance to Entrepreneurs – State Financial Corporations (SFCs) – Small Industries Development Bank of India (SIDBI) – **Commercial Banks**.

UNIT – V: Incentives for Small – Scale Units

Meaning – Objectives – Subsidy – Meaning – Central Government Subsidy Schemes – Tax Concessions – Assistance – Subsidy Schemes of Government of Tamil Nadu. Sickness in Micro, Small and Medium – Definition of Sick unit – Causes of Industrial Sickness – Measures to Prevent Sickness

TEXT BOOK:

Entrepreneurship Development – E. Gordan, K. Natarajan, Himalaya Publishing House, 5th Revised Edition.

REFERENCE BOOKS:

1. *Entrepreneurship Development*: P. Saravanel
2. *Entrepreneurship Development*: Jeyashree Suresh

DIGITAL TOOLS:

1. https://www.tutorialpoint.com/entrepreneurship_development/entrepreneur...
2. https://en.wikipedia.org/.../Entrepreneurship_Development_institute_of

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3		2		2	
CO2		2	2		2	2
CO3	2	3	2			
CO4	2		2	2		1
CO5	2	2	2	3	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. B. ANBAZHAGAN



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision-40%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBNC63	RESEARCH METHODOLOGY	CORE – 17	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course helps to provide the basic Knowledge on Research Methodology

COURSE OBJECTIVES:

- To introduce the concepts of Research methodology
- To prepare the students for Simple Field Study

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	relate and be able to explain business research	Upto K3
CO 2	understand about sampling methods and identify the difference between probability and non – probability sampling method	Upto K3
CO 3	understand about Data collection methods.	Upto K3
CO 4	analyse the Data	Upto K3
CO 5	learn about interpretation and report writing	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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RESEARCH METHODOLOGY

UNIT – I:

Research – Meaning – Definition – Objectives – Types – Significance – Problems encountered by Researchers in India – Criteria of Good Research– Research Process.

UNIT – II:

Research Design – Meaning – Need – Important Concepts relating to research design – **Different Research Designs** – Research Design in case of Exploratory Research Studies– Research Design in case of Descriptive and Diagnostic Research Studies – Research Design in case of Hypothesis testing Research Studies

UNIT – III:

Sampling Design – Census Survey and Sample Survey – Characteristics of Good Sample Design – Sampling Design Process – Criteria of Selecting a Sampling Procedure – Sampling Techniques.

UNIT – IV:

Measurement and Scaling Techniques – Types Of Data – Sources of Error in Measurement – **Scaling** – Meaning – Types of Scales – Method of Data Collection – Questionnaire Construction

UNIT – V:

Classification & Tabulation of Data – Bar chart , Pie chart – Interpretation – Meaning – Importance – Report Writing – Types Of Report – Layout/Outline of Research Report.

TEXT BOOK:

Research Methodology, Methods & Techniques – Second Revised Edition – C.R. Kothari – New Age International Publishers.

REFERENCE BOOKS:

1. *Research Methodology and Report Writing*– Shashi K Gupta, PraneetRangi – Kalyani Publishers
2. *Research Methods in Social Sciences* – Dr. S. Nakkiran Dr. R. Selvaraju – Himalaya Publishing House.
3. *Research Methodology* – Dr. A. Mustafa – Nayas Publications, Madurai.

DIGITAL TOOL:

www.modares.ac.ir/uploads/Agr.Oth.Lib.17.pdf, <https://en.wikipedia.org/wiki/Methodology>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3				2	
CO2	2	2	2			2
CO3		2	2		2	
CO4			3	2		
CO5		2	2	3	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. T. R. JEEVA PRIYA



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision-40%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBNE61	SERVICES MARKETING	ELECTIVE – 2	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This Course gives an overview of Services Marketing, Marketing Mix, Strategies and Process Involved in Service Marketing.

COURSE OBJECTIVE:

Considering the importance of Services Marketing and Scope for employment in Industry, the course is offered to teach Services Marketing Mix.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand about Services Marketing – classification and Demand vs Supply Management.	Upto K3
CO 2	acquireknowledge on Services Marketing Mix and its elements.	Upto K3
CO 3	know about types of Distribution channels and about the role of People and Physical Evidence in Services Marketing.	Upto K3
CO 4	understand about Services Marketing Process and Marketing Strategies.	Upto K3
CO 5	receiveknowledge on Service Quality and Various dimensions and tools associated with it.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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SERVICES MARKETING

UNIT – I:

Services Marketing – Introduction – types – nature – characteristics – classification of services – difference between services and products – managing demand and supply in services.

UNIT – II:

Services marketing mix – Overview.

Product: Core Services, Peripheral Services.

Pricing: Basis of Pricing.

Promotion: Marketing Communication Mix, Promotion Techniques.

UNIT – III:

Place: Channels of Distribution / Intermediaries and its types.

People: Developing Customer Conscious Employees – Empowering People – Benefits.

UNIT – IV:

Physical Evidence: Peripheral Evidence – Essential Evidence – Process: Designing the process – **Services as a System.**

UNIT – V:

Service Quality – Dimensions – Influencing expectations – Customer Expected Quality – Tools for achieving Service Quality – Causes of Service Quality problem – Principles guiding Improving of Service Quality.

TEXT BOOK:

Services Marketing – Appaniah, Reddy, Anil Kumar, Nirmala – Himalaya Publishing House

REFERENCE BOOKS:

1. *Services Marketing* – S.M. Jha – Himalaya Publishing House
2. *Services Marketing* – Vasanti Venugopal, Raghu, V.H – Himalaya Publishing House

DIGITAL TOOLS:

1. www.marketing-schools.org/types-of-marketing/services-marketing.html
2. www.marketingteacher.com/introduction-to-services-marketing/

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO	3	2				
CO2		2	2		2	
CO3		2	1			
CO4			3	2	2	2
CO5		2			2	

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNERS: 1. Dr. M. S. BALAJI

2. Dr. K. G. RAJA SABARISH BABU



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision-100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBNE62	RETAIL MANAGEMENT	ELECTIVE – 2	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course helps to provide basic knowledge about retailing and introduces the concept of stores operation management and emphasis the importance and growth of retailing in India.

COURSE OBJECTIVES:

- To introduce the basic concepts of Retail Management.
- To provide insight about Stores Operation management, retail marketing mix.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	identify the basic concepts of Retailing	Upto K3
CO 2	understand the concept of Stores Operation and HR related issues in Retailing	Upto K3
CO 3	design the format for effective Stores Operation	Upto K3
CO 4	introduce concepts of Micro Marketing and Multi Channel Retailing	Upto K3
CO 5	use the knowledge obtained and become a successful retailer	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

RETAIL MANAGEMENT

UNIT – I:

Retailing – meaning of retailing – Definition – Functions of retailing – Main drivers of retailing in India – Distinction between Retailing and Electronic Tailing – Future trends in retail formats.

UNIT – II:

Classification of Retailer – Store based – Non – store based – Services retailing – Difference between Services and Merchandise retailer.

UNIT – III:

Stores Operation Management – Store Planning and Location Planning – Store Design and the Retailing Image mix – Space mix – Retail Space management – Ground rules for successful space and lay – out management – Visual Merchandising – Benefits – Shop displays – Types.

UNIT – IV:

HR Issues and Concerns in Retailing – Man Power Planning – Recruitment – Motivation and Retention – Remuneration Structure – Role of Retail Sales Personnel – Qualities – Personal Selling Process.

UNIT – V:

Retail Marketing Mix – Components – Micro Marketing – Meaning – Customer Response to Micro Marketing – Multi Channel Retailing – Meaning – Key channels of Multi Channel retailing – Challenges for Multi Channel Retailing – Advertising Mix.

TEXT BOOKS:

1. *Retailing Management* – SwapnaPardhan (Tata McGraw Hill Education Private Limited)
2. *Modern Retail Management* – J.N. Jain and P.P. Singh (Regal Publications)
3. *Retail Management – Functional Principles and Practices* – Gibson G. Vedamani (JAICO Publishing House)

REFERENCE BOOKS:

1. *Retail Management – A Strategic Approach* – Barry Berman and Joel R. Evans (Prentice Hall of India Private Limited)
2. *International Retail Management* – Petes Fleming (Jaico Publication)

DIGITAL TOOLS:

1. <https://managementstudyguide.com/retail-management.htm>
2. <https://www.tutorialspoint.com/retail-management/retail-management-tutorial.pdf>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3				2	
CO2		2	2		2	2
CO3	2	3	2			
CO4	2	2	2	2		2
CO5	2	2	2	3	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. M. S. BALAJI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision-100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBNE63	DIGITAL MARKETING	ELECTIVE – 2	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course helps to provide basic knowledge about Digital Marketing and introduces the concept of SEO and various social media marketing.

COURSE OBJECTIVES:

- To have an insight of Online Marketing, Social Media Marketing and their Strategies.
- To Know how to Market Products Online and through various Digital Media's.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	explain about fundamental concepts of Digital Marketing	Upto K3
CO 2	outline about the importance of Online Marketing	Upto K3
CO 3	understand about Email Marketing and Blogging and how to market the products using these technologies.	Upto K3
CO 4	know about Social Media Marketing and their Components and how it impacts today's business.	Upto K3
CO 5	summarize on Digital Marketing and recent trends in it.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

DIGITAL MARKETING

UNIT – I:

Digital Marketing – Meaning, Components and Importance. Digital Marketing for B2B, Market Segmentation for B2B – POEM Framework.

UNIT – II:

B2B Search Engine Marketing; Importance, Search Engine Optimization, Web search, Major search Engines, Optimizing the site's content. B2B Online Marketing; Effectiveness, Online Advertising Vs Traditional Advertising.

UNIT – III:

B2B Email Marketing – Meaning of B2B Email Marketing, Different Types of mailing. B2B Blog Marketing – Need, Running the blog. Youtube Marketing – Pay per click.

UNIT – IV:

B2B Social Media Marketing – Understanding, Importance, Developing Social media Marketing strategy Podcast – Understanding, creating, Developing Podcast strategy. B2B public relations – Meaning, benefits.

UNIT – V:

Online Retail Sector – Online Financial Services – Online Travel services – Online career services – online publishing – online entertainment – consumer Protection Privacy and Information Rights – Warranties and New Products.

TEXT BOOK:

B2B Digital Marketing; Using the Web to Market Directly to Business – Michael Miller– Pearson Education Inc.

REFERENCE BOOKS:

1. B2B Digital Marketing; Using the Web to Market Directly to Business – Michael Miller – Pearson Education Inc.
2. Turban, E., King, D. and Lee, J., Electronic Commerce: A Managerial and Social Networks Perspective, 2015, 8/e, Prentice Hall

DIGITAL TOOLS:

1. <https://www.disruptiveadvertising.com/marketing/b2b-digital-marketing/>
2. <https://digitalmarketinginstitute.com/blog/6-of-the-best-digital-marketing-strategies-for-b2b-business-corporate>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2				
CO2		3	2	2		
CO3	2		2		1	
CO4		2		3	2	2
CO5		2	2		2	

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. K. G. RAJA SABARISH BABU



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Percentage of Revision-100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBNSP2	INTERVIEW SKILLS(PRACTICALS)	SBS – VI	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	–	100	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This Course aims at grooming the participants to attend the interview through sensitizing them about proper formal circumstances

COURSE OBJECTIVES:

- To facilitate students to succeed in interviews
- To enhance professional skill
- To enhance self – esteem

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the methods & types of Interview	Upto K3
CO 2	be aware about the dress codes of Interview	Upto K3
CO 3	know the technique of Resume writing	Upto K3
CO 4	build self-confidence and to face difficult situation	Upto K3
CO 5	be aware about Frequently asked questions in Interviews	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

INTERVIEW SKILLS

UNIT – I:

Interview Etiquettes

Types of Interview

UNIT – II:

Dress Code & Mannerism

Body Language

UNIT – III:

Resume Writing

Corporate Readiness

UNIT – IV:

Stress Interviews

Self Confidence

UNIT – V:

Interview FAQs

Handling Rejections

NOTE:

1. An Interview atmosphere will be created in the classroom
2. Students will be trained to face interview with their resumes
3. Face to Face Interviews will be conducted to each candidate in class rooms

EVALUATION

4. Students will be evaluated at the end of the semester on their skills acquired
5. The Examiners will be the HOD & the faculty.

External Expert is Optional.

The Marks in this paper will be allotted as follows

Dress Code – 20

Bio Data – 20

Body Language – 20

Communication – 20

Handling Situations – 20

40 Marks will be passing minimum, Students who fail to attend this practical will not be permitted to take up their Sixth Semester Examinations.



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

TEXT BOOK:

Hari Mohan Prasad & Rajnish Mohan, *Group Discussion & Interview* – Third Edition, Tata McGraw Hill's Education Private Limited, New Delhi.

REFERENCE BOOK:

Sajitha Jayaprakash, *Interview Skills*– Himalaya Publishing House, Mumbai

DIGITAL TOOLS:

1. <https://www.myinterviewpractice.com>
2. <https://www.interviewbuddy.in>

INTERVIEW VIDEO LINKS:

1. <https://youtu.be/JrbnTZPjg0k>
2. <https://youtu.be/wW0Ij-X98ek>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2				2	
CO2		2	2		2	2
CO3	2	3	2		1	
CO4	2	3	2	2		2
CO5	2	2	3		1	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

**COURSE DESIGNERS: Dr. K. G. RAJA SABARISH BABU
and Dr. B. ANBAZHAGAN**



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

B.Com.



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

PERCENTAGE OF REVISION 10%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCEC51	INCOME TAX LAW & PRACTICES – I	CORE – 11	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The course is designed to explain the various concepts of Income Tax.

COURSE OBJECTIVES:

- Introduce the Income Tax Act and the exempted incomes U/S 10
- Explain the concepts of Allowances , perquisites, Provident Fund under the head Income from Salary
- Define income from House Property
- Illustrate the Business and Professional Income
- Describe the essentials of Capital gain and Other Sources.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the various concepts of Income Tax and the sections of various exempted incomes	Upto K3
CO 2	identify the exempted and taxable allowances , perquisites and to solve the problems based on Income from Salary	Upto K3
CO 3	calculate the Net Annual Value under the head House property	Upto K3
CO 4	compute the Income from Business and Profession	Upto K3
CO 5	identify the capital assets and solve the problems of Capital gain and also the other sources incomes.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

INCOME TAX LAW & PRACTICES – I

UNIT – I: Income Tax Act, 1961

Definition – Income – Assessment–Assessment Year–Previous Year Person–Assesse – Resident – Resident but not ordinarily resident–Nonresident – Deemed Income Capital receipts and Revenue Receipts – Capital expenditure and Revenue expenditure. Exempted Incomes u/s 10, Exempted income on free trade zones u/s 10A, Special economic zones u/s 10AA, Export oriented zones u/s 10B, 10BA, charitable trust u/s 11, 12, and 13, political parties u/s 13A.

UNIT – II: Computation of taxable income – Income from Salary

Definition, Meaning, Provident fund–Allowances, Perquisites, Gratuity, Pension, Encashment of Leave salary – Deduction u/s 16/–.

UNIT – III: Income from House Property

Meaning, Incomes from House property wholly exempt from tax, different categories of House properties: – Let out and self-occupied house, Gross Annual Value, Net Annual Value, computation of Income from House Property.

UNIT – IV: Profits and gains from Business or Profession

Definition of Business and Profession, meaning of admissible and inadmissible expenses, Depreciation and other deductions.

UNIT – V: Capital Gains and Income from Other Sources

Meaning, Short Term Capital, Long Term Capital Gain, deduction u/s 54 and Income from Other Sources: Meaning, Casual Incomes, Interest incomes, interest on debenture, income from securities (dividend).

Note: Question Paper Pattern: 70% Problems, 30% Theory.

TEXT BOOK:

Reddy T. S and Hari Prasad Reddy Y., *Income Tax Theory, Law and Practice* – Margham Publications, Chennai–17, Nineteenth edition 2021.

REFERENCE BOOKS:

1. Dr. Vinod K. Singhania. *Student Guide to Income Tax*, Taxmann Publications (P.) Ltd., New Delhi, 46th Edition
2. Bagawathi Prasad, *Income Tax Law and Practice*, New Age International Publishers (p.) Ltd., Edition 32.

DIGITAL TOOLS:

1. <https://www.collinsdictionary.com/dictionary/english/resident>
2. <https://www.merriam-webster.com/dictionary/allowance>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	3	3	3	2
CO2	3	3	2	3	3	3
CO3	3	3	3	2	2	3
CO4	2	3	3	3	3	2
CO5	2	3	3	3	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. N. M. MEKALA



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

PERCENTAGE OF REVISION 20%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCEC53	CORPORATE ACCOUNTING – I	CORE – 13	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

The course is designed to make the students gain basic accounting knowledge & skills applicable to Corporate Accounting.

COURSE OBJECTIVES:

To make the students

- develop a conceptual understanding of the fundamentals of Corporate Accounting.
- ensure the knowledge of distinction between 'Debenture' and 'Share', Accounting for issue of Debentures
- understand the procedure of final accounts of joint stock company as per new provisions.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	analyse about the procedure for issue , forfeiture and reissue of shares	Upto K3
CO 2	gain knowledge about the redemption of debentures	Upto K3
CO 3	acquaint knowledge with the calculation of profit – prior incorporation.	Upto K3
CO 4	compute the problems related to accounting treatment in the books of purchasing company and the vendor company	Upto K3
CO 5	prepare the valuation of goodwill and shares	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

CORPORATE ACCOUNTING – I

UNIT – I: Issue, forfeiture and Reissue of Shares

Shares – Definition – Classes of shares – Issue of shares – Over Subscription and Under subscription – Pro-rata allotment – Issue of shares at par – Issue of shares at premium – Issue of shares at discount – Forfeiture of shares – Re-issue of forfeited – Redemption of Preparations.

UNIT – II: Issue of Debentures and Redemption of Debentures

Debentures – Definition – Classification of Debentures – Distinction between 'Debenture' and 'Share' – Issue of Debentures – Accounting for issue of Debentures

Redemption of Debentures – Redemption without provision – Redemption out of Provision – Cum-Interest and Ex-Interest

UNIT – III: Final Accounts of Joint Stock Companies

Final Accounts of Joint Stock Companies (as per Revised Schedule VI presented in Vertical Format): Calculation of managerial remuneration – Contents of final statement – Profit and Loss account and Balance sheet.

Profit Prior to Incorporation: Meaning – Treatment of profit or loss prior to incorporation – Methods of ascertaining profits or loss prior to incorporation – Basis of Apportionment of Expenses – Steps involved in ascertaining pre and post incorporation profits

UNIT – IV: Amalgamation, Absorption and Reconstruction

Meaning – Purchase consideration as per AS 14 – Methods of Accounting for Amalgamation – Accounting treatment in the books of purchasing company and the vendor company (Excluding external reconstruction)

Alteration of share capital – Internal reconstruction – Scheme of capital reduction – Construction of Balance Sheet after reconstruction.

UNIT V: Valuation of Goodwill and Shares

Goodwill – Definition – Factors affecting value of goodwill – Need for valuation – Methods of Valuation – Valuation of shares – Yield method – Earning capacity method – Fair value of a share.

Note: Question Paper Pattern: 70% Problems, 30% Theory.

TEXT BOOK:

Reddy T.S & Dr. Murthy A , *Corporate Accounting*, Margam publications

REFERENCE BOOKS:

1. Gupta R L Radhaswamy M, *Corporate Accounting Volume II*, Sultan Chand & Sons.
2. Dr. Arulanandam M A, Dr. Raman K.S, *Advanced Accountancy*, Vol.II (Corporate Accounting), Himalaya Publishing House.
3. Dr. Sukla S M, Dr.Gupta K L, *Corporate Accounting*, Sahitya bhawan Publications

DIGITAL TOOLS:

1. https://www.jandkicai.org/pdf/16776Issue_Etc.pdf
2. https://www.bdu.ac.in/cde/SLM/SLM_FULL/B.Com%20B.M%20Books%20Soft%20Copy/Corporate%20Accounting/Unit%202.pdf
3. <https://learn.financestrategists.com/explanation/shares-and-debentures/profit-or-loss-prior-to-incorporation/>
4. <http://web.gjuonline.ac.in/distance/book/bcom/BCOM%20204%20Advance%20Accounting.pdf>
5. https://siesce.edu.in/docs/resources/Amalgamation%20of%20Companies_31457.pdf

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	3	2
CO2	3	3	3	3	3	3
CO3	3	3	2	2	3	3
CO4	3	3	3	2	2	2
CO5	3	3	2	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE DESIGNER: Dr. R. R. VISHNUPRIYA

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCEC54	ENVIRONMENT OF BUSINESS	CORE – 14	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

To enable the students

- examine the impact of environmental changes in business
- provide knowledge of the policies and legal provisions of the government with respect to the business environment in India
- provide and insight into the ethical aspects in all areas of business

COURSE OBJECTIVES:

To make the students

- develop ability to understand and scan business environment
- have an overview of political and legal environment
- understand the various economic factors and policy
- learn international factors
- equip with knowledge of social and cultural factor

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	scan the environment and its effect on business	Upto K3
CO 2	be equipped with provisions of the government with respect to the business	Upto K3
CO 3	analyse economic system and the policies	Upto K3
CO 4	cope with the international practices in the business	Upto K3
CO 5	analyse cultural factor and social responsibilities of business	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

ENVIRONMENT OF BUSINESS

UNIT– I: Business Environment

Concept and Definition of Business – Characteristics of business – Scope of business. Meaning of business environment – nature – significance – types of business environment – elements of external environment

Environmental analysis: Concept – importance – techniques – approaches to environmental analysis

UNIT– II: Political and Legal Environment

Constitutional Environment – Characteristics of India's Constitution – fundamental rights and duties – functions of the state – Economic roles of government – The Consumer Protection Act, 1986 – The Competition Act, 2002 – The Environment Protection Act, 1986 – measures to protect and improve environment

UNIT– III: Economic and Technological Environment

Meaning of Economic system – characteristics and functions of an economic system – types of economic system – comparison

Technological Environment: Meaning – factors governing technological environment – impact – technological environment in India – incentives and concessions

UNIT– IV: Global/International Environment

Globalization: Meaning – features – strategies for globalization – globalization of Indian business – obstacles to globalization – factors favouring globalization

Multinational Corporations: Concept – characteristics – reasons for growth of MNCs – TRIPs – TRIMs – GATT – WTO – objectives and functions – Difference between GATT and WTO

UNIT– V: Social and Cultural Environment

Demographic Environment: Introduction – population control policy – human development – culture and business: concept – elements – impact of foreign culture on business. Business and society: changing concept of business – objectives of business – factors influencing the choice of objectives – social responsibility of business towards different groups

TEXT BOOK:

Gupta, C.B. (2011), *Business Environment*, Sultan Chand & Co., New Delhi

REFERENCE BOOKS:

1. Aswathappa, K. (2016), *Essentials of Business Environment*, Himalaya Publishing House, Mumbai
2. Francis Cherunilam (2015), *Business Environment*, Himalaya Publishing House, Mumbai
3. Adhikary, M. (2010), *Economic Environment of Business*, Sulthan Chand & Co., New Delhi
4. Chidambaram .K & Alagappan .V, *Business Environment*, Vikas Publishing House Ltd., Mumbai.

DIGITAL TOOLS:

1. <https://www.ddegjust.ac.in/>
2. <https://www.himpub.com/>
3. <https://vtechworks.lib.vt.edu/>
4. <https://ebooks.lpude.in/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	2
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	2
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNER: Dr. P. PONRAJ



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCEE52	INDUSTRIAL ORGANISATION	ELECTIVE – 1	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The course is designed to make the students to gain the basic knowledge of industrial systems and industrial revolution.

COURSE OBJECTIVES:

To make the students

- receive knowledge of modern industry
- get knowledge of promotion of new undertaking and plant location
- understand the concepts of industrial combination
- develop the knowledge of causes and effects of capitalization.
- gain knowledge of financial markets

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the knowledge of modern industry	Upto K3
CO 2	provide the concepts of promotion of new undertaking and plant location	Upto K3
CO 3	gain knowledge of the concepts of industrial combination	Upto K3
CO 4	explain the knowledge of causes and effects of capitalization.	Upto K3
CO 5	understand the relationship between market outcomes, social welfare, and the conduct of firms;	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

INDUSTRIAL ORGANISATION

UNIT– I:

Evolution of modern industry – The basic Industrial discoveries– Handicrafts production
Factory system – Industrial systems proceeding present methods – Industrial Revolution – its
main features – Economic and social effects of inventions.

UNIT– II:

Establishing a new undertaking – Promotion of a new undertaking – meaning and important
steps in promotion. Plant location – steps in the selection of the plant site – present trends in
plant location – layout and buildings – meaning – Importance and principles of layout
procedure – Design of Industrial buildings – size of business units – Factors that affect size –
Optimum size – Factors affecting the optimum size.

UNIT– III:

Industrial combination – Type of combinations – conditions that let to combinations – Reasons
for the slow growth of combinations – Control of combinations with specific reference to the
Monopolistic and Restrictive Trade Policies Act.

UNIT– IV:

Organisation of Finance – Theories of capitalization – overt capitalization and under
capitalization – Meaning causes and effects of over capitalization and under capitalization –
Remedies – Capital Gearing – Sources of long, medium and short term Finance – Methods of
marketing securities .

UNIT– V:

Introduction to Financial Markets – Types of markets – Difference between capital and money
market – Stock Exchange – Features – Functions – Operators at stock exchange – Speculators
on stock exchanges – Listing of securities – objectives.

TEXT BOOK:

N.K. Sahini and Mani Parti Bharara - *Industrial Organisation*, Kalyani Publishers, 2011

REFERENCE BOOKS:

1. Y.K. Bhushan and P.Unnikrishnan –*Industrial Organisation and Management*.
Sulthan Chand & Sons Publications.
2. N.K. Sahini and Mani Parti Bharara – *Industrial Organisation*, Kalyani Publishers.

DIGITAL TOOLS:

1. <https://www.jstor.org/stable/2230485>
2. <https://classnotes.ng/lesson/industrial-combinations-commerce-ss2/>
3. <https://www.vedantu.com/commerce/financial-market>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	3	3	1	3
CO2	3	2	3	3	3	2
CO3	3	3	2	3	3	3
CO4	3	3	2	3	1	2
CO5	3	3	3	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. SITHU MURALIDHARAN DEVI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCEE53	E-BANKING	ELECTIVE – 1	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course explains about the various concepts and dimensions of E-banking, an assortment of digital payments, deposits systems, terminals and technology are dealt.

COURSE OBJECTIVES:

- To equip students with necessary knowledge and skills and competencies to occupy positions of management and administration in business, industry, public system and the government.
- To inculcate appropriate ethical values and attitudes among students to function effectively in the work environment.
- To give knowledge on Electronic and internet banking systems and operations of Electronic fund transfers
- To give knowledge on Electronic finance and banking across borders
- To give knowledge on Dynamic forms of international financial integration
- To give knowledge on Contribution of electronic financial globalization

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the Payment Systems and Electronic Banking	Upto K3
CO 2	explain the product features and services of ATM cash deposit machine.	Upto K3
CO 3	discuss the profitability ,risk management and frauds of mobile and internet e-banking	Upto K3
CO 4	understand the Evolution of EFT System; Automated Clearing Systems; Funds Transfer Systems	Upto K3
CO 5	explain the need for E-banking products and usage of cards and various payment systems.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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E-BANKING

UNIT– I: Electronic Banking

Traditional banking vs E-banking – facets of e-banking–intranet procurement – E-banking transactions–electronic delivery channels – truncated cheque and electronic cheque – models for E-banking – complete centralized solution – Features – CCS – cluster approach–high tech. Bank with in bank – advances of e-banking – constraints in e-banking–security measures– electronic delivery channels–truncated cheque – Electronic cheque – real time gross settlement.

UNIT– II: Automated Teller Machine

Automated Teller Machine(ATM) – features–on and off –line operation–ATM types–functions–strategic importance–ATMS around the world – Overview – Features – ATM Instant Money Transfer Systems) – Various Value Added Services –ATM security, Surveillance and Fraud Prevention.

UNIT– III: Mobile & Internet Banking

Mobile & Internet Banking – Meaning–definition–features–registration and services–security issues–internet banking meaning–mechanics of internet banking–services–draw backs of internet banking–major issues.

UNIT– IV: Electronic Fund Transfer System

Meaning – steps in EFT – RBI guidelines – benefits – Electronic fund and transfer – EFT systems vs traditional system – Requirements – Electronic clearing services (ECS) – Genesis–Physical clearing system and systems.

UNIT– V: Modern Banking Operations

Introduction to Modern Banking operations – Transfer of funds under internet banking – Real Time Gross Time – NEFT (National Electronic Fund Transfer) – Call Center Banking – E–Cheques – Smart Card – Benefit of Smart Card – Use of Smart card in e-commerce – E–Money and Electronic purse and Digital cash /Single window concept – benefits of electronic clearing systems – Universal Banking – CIBIL (Credit information Bureau of India Ltd) – UPI – Methods.

TEXT BOOK:

Dr. Gurusamy. S, *Banking Theory Law and Practice*, Vijay Nicole Imprints Private Ltd., 2006

REFERENCE BOOKS:

1. Gordon E. & Natarajan S. *Banking Theory, Law and Practice*. 24th Revised Edition. Himalaya Publishing House, 2017.
2. Santahanam. B, *Banking Theory, Law & Practice*, Margham Publications, Chennai, Reprinted 2014
3. IIBF, *Digital Banking*, Taxmann Publications, 2019.
4. Maheswari, S.N. *Banking Law and Practice*. 6th Edition. Kalyani Publishers, 2011.
5. Rajesh, R. & Sivagnanasithi T. *Banking Theory: Law and Practice*. Tata McGraw–Hill Publishing Company Ltd., 2011.



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SYLLABUS

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DIGITAL TOOLS:

1. <https://governmentadda.com/digital-banking-notes/>
2. https://ebooks.lpude.in/commerce/bcom/term_4/DCOM208_BANKING_THEORY_A_NDPRACTICE.pdf
3. <http://www.himpub.com/documents/Chapter1859.pdf>
4. <http://www.ismsedu.com/E-Banking%20Management.pdf>
5. <https://www.geeksforgeeks.org/meaning-and-benefits-of-e-banking/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	2
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	2
CO5	3	3	3	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. S. S. SUGANTHY



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SYLLABUS

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PERCENTAGE OF REVISION 10%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCEC61	INCOME TAX LAW & PRACTICES – II	CORE – 15	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The course is designed to explain the various concepts of Income Tax.

COURSE OBJECTIVES:

- To introduce the term clubbing of income and set – off and carry forward of losses.
- To explain the concepts of gross qualifying income
- To define the term assessment of individual and HUF
- To illustrate the Partners, partnership and Association of Persons
- To describe the essentials of return of income and Assessment Producers.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the term clubbing of income and set-off and carry forward of losses	Upto K3
CO 2	identify the deduction of incomes under sections 80	Upto K3
CO 3	calculate the total taxable income of an individual and HUF	Upto K3
CO 4	compute the total taxable income of Partners and Association of Persons.	Upto K3
CO 5	gain knowledge of various assessment procedures and Permanent Account Number.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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INCOME TAX LAW & PRACTICES – II

UNIT – I:

Clubbing of Income: **Meaning, Income of minor child, Deemed incomes. Set-off and Carry Forward of Losses:** Introduction, meaning, schemes of Set-off and carry-forward of Losses, Inter head adjustments and Intra head adjustments.

UNIT – II:

Deductions from Gross Total Income u/s 80: Meaning, Nature of deductions, Gross qualifying amount – meaning, deductions U/S 80C, 80D; 80DD, 80E, 80G, 80GGB, 80QQB, 80U.

UNIT – III:

Assessment of Individual: meaning, total income of an individual, computation of tax liability. Assessment of Hindu Undivided Family: Meaning, Composition of Hindu Undivided Family, Schools of Hindu Law, Hindu Coparcenary, Computation of HUF total income.

UNIT – IV:

Assessment of Partnership firm: Meaning of Partnership, Kinds of Partnership firms for taxable purpose, meaning of Limited liability Partnership. Assessment of Association of persons: Meaning, Computation of AOP's Business Income and AOP's total income.

UNIT – V:

Return of Income: Meaning, Submission of return of Income–Return of Loss–Belated Return Revised Return–Procedure for assessment: Meaning, Self-assessment- Re-assessment – Best judgment assessment – Ex-party assessment – Rectification of mistakes, Permanent Account Number–Meaning.

Deduction and Collection of Tax at Source–Advance Payment–Tax Refunds–Income under “Net of Tax” – Tax credit certificate–Tax clearance Certificate, Goods and Services Tax : Meaning , percentage available to various products (latest amendments).

Note: Question Paper Pattern: 70% Problems, 30% Theory.

TEXT BOOK:

Reddy T. S and Hari Prasad Reddy Y., *Income Tax Theory Law and Practice*, Margham Publications, Chennai–17, Nineteenth edition 2021.

REFERENCE BOOKS:

1. Dr. Vinod K. Singhania , *Student Guide to Income Tax*, Taxmann Publications (P.) Ltd., New Delhi, 46th Edition.
2. Bagawathi Prasad, *Income Tax Law and Practice*, New Age International Publishers (P.) Ltd., Edition 32.

DIGITAL TOOLS:

1. <https://tax2win.in/guide/section-64-clubbing-income>
2. https://www.taxmanagementindia.com/visitor/acts_rules_chapter_provisions.asp?Ch_ID=24

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	3	3	3	3
CO2	3	3	2	3	3	2
CO3	3	3	3	2	2	3
CO4	2	3	3	3	3	3
CO5	2	3	3	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. N. M. MEKALA



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCEC63	CORPORATE ACCOUNTING – II	CORE – 17	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

The course will enable the students to gain expert Accounting knowledge & Skills applicable to Corporate Accounting, in Conformity with Indian Companies Act 1956.

COURSE OBJECTIVES:

The students will be able to

- acquire the conceptual Knowledge of the accounting standards.
- receive basic knowledge of accounting procedures of Banking Companies.
- get basic knowledge of accounting procedures of Insurance Companies.
- gain Theoretical idea and accounting treatment of Holding Companies.
- study the concepts and preparation of liquidators' final statements

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the conceptual Knowledge of the accounting standards.	Upto K3
CO 2	get basic knowledge of accounting procedures of Banking Companies.	Upto K3
CO 3	gain basic knowledge of accounting procedures of Insurance Companies.	Upto K3
CO 4	compute the accounting treatment of Holding Companies.	Upto K3
CO 5	analyze the concepts and preparation of liquidators' final statements	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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CORPORATE ACCOUNTING – II

UNIT – I: Accounting Standards

Introduction – Meaning – Objectives – Need for accounting Standards – Significance – International Accounting Standards – Accounting Standards in India – Indian Accounting Standards – AS-1 – Disclosure of Accounting Policies – AS-2 – Valuation of Inventories – AS-3 – Cash flow Statements – AS-10 – Accounting for Fixed Assets – AS-14 – Accounting for Amalgamation – AS-21 – Consolidated Financial Statements (Simple problems only) – Introduction to IFRS.

UNIT – II: Accounts of Banking Companies

Accounts of Banking Companies (New Format): Preparation of profit and loss account and balance sheet – Legal forms – Bills for collection – Acceptances and Endorsements – Branch adjustments, Adjustments of bad and doubtful debts, Rebate on bills discounted, Provision for Taxation and Depreciation.

UNIT – III: Accounts of Insurance Companies:

Accounts of Life Insurance Business (New Format) – Types of policies – Annuity business – Surrender value – Life Assurance Fund – Preparation of final accounts–Revenue account–Valuation balance sheet– Balance Sheet

Accounts of General Insurance Business (New Format) – Fire and Marine Insurance – Revenue a/c – Profit and Loss account –Balance sheet

UNIT – IV: Accounts of Holding Companies

Meaning of Holding Company and Subsidiary company – Minority interest – Cost of control or capital reserve – Treatment of Unrealised profit– Mutual Owings– Preparation of consolidated balance sheet

UNIT – V: Liquidation

Meaning – Legal provisions – Order of Payment – Preparation of Statement of affairs & Deficiency/surplus a/c (Simple problems only) – Preparation of liquidator's final statement of account.

Note: Question Paper Pattern: 70% Problems, 30% Theory.

TEXT BOOK:

Reddy T.S & Dr. Murthy A , “*Corporate Accounting*”, Margam publications

REFERENCE BOOKS:

1. Gupta R L Radhaswamy M, “*Corporate Accounting Volume II*”, Sultan chand & sons
2. Dr. Arulanandam M A, Dr. Raman K.S, “*Advanced Accountancy*”, Vol. II (corporate Accounting), Himalaya publishing house
3. Dr. Sukla S M, Dr. Gupta K L, “*Corporate Accounting*”, Sahitya bhawan Publications

DIGITAL TOOLS:

1. https://static.careers360.mobi/media/uploads/froala_editor/files/Introduction%20to%20Accounting%20Standards_7iWCuHN.pdf
2. <https://www.dynamicictutorialsandservices.org/2015/04/accounts-for-holding-companies.html>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	3	3	3
CO2	3	2	3	3	3	2
CO3	3	3	3	2	3	3
CO4	3	3	2	3	3	2
CO5	3	3	2	3	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE DESIGNER: Dr. R. R.VISHNUPRIYA

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCEE62	COMPANY LAW	ELECTIVE – 2	5	-	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The course covers the entire lifecycle of a company, from incorporation to dissolution. All the new aspects of Companies Act, 2013 are dealt with in detail. Recent amendments and case laws are also discussed in the modules.

COURSE OBJECTIVES:

- To inform the students about the elementary ideas and the logic of the corporate law.
- Students will be acquainted with the legal norms regulating the subjects of the corporate law, their legal structure and the position (status) of the trading subjects.
- To help the students understand the concept of Consent, Free Consent, Classification of contracts.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the basic tenets of Company Law regime.	Upto K3
CO 2	explain about the various flaws in existing Company Law and how the judiciary has responded to them.	Upto K3
CO 3	develop clear understanding about the practical situations faced by the various stakeholders of Indian Company Law regime in their professional life.	Upto K3
CO 4	have an awareness about the rights of affected parties (against irregular company operations) in India.	Upto K3
CO 5	develop analytical perspective about the existing Company Law framework so as to enable them to suggest necessary changes.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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COMPANY LAW

UNIT– I: Company Law – An Overview

Company – Definition–Characteristics– Lifting the corporate veil – Advantages of Incorporation –Company Law Administration – National Company Law Tribunal & Appellate tribunal.

UNIT– II: Kinds of Companies

Classification on the basis of incorporation – On the basis of members – Private and Public – Privileges of private company – private and public company distinguished – On the basis of liability – On the basis of ownership – Government company –Foreign company – On the basis of control – Holding and Subsidiary company – One Person Company (OPC).

UNIT– III: Formation of Company

Formation of company –Preliminary contracts – Certification of Incorporation –Promotion – Certificate of commencement of Business– Promoters– Functions & Legal Status – MCA 21 – Scheme for filing statutory documents& other transactions by companies through electronic mode – Features of MCA 21.

UNIT– IV: Memorandum and Articles of Association

Memorandum of Association – Nature and Contents – Alteration of memorandum – Doctrine of ultravires – Articles of Association – Purpose and Content –Alteration of articles – Doctrine of constructive notice and indoor management.

UNIT– V: Declaration of Dividend and Winding Up

Share Capital – Meaning –Kinds – Alteration of share capital– Dividend – Provisions for declaration of dividend – Winding up of companies – meaning – modes – circumstances in which company may be wound up by Tribunal – Voluntary winding up circumstances.

TEXT BOOKS:

1. Kapoor N. D, *Company Law and Secretarial Practice* , 13th Ed., Sultan Chand & Sons, New Delhi, 2020.
2. Srinivasan, *Company Law and Secretarial Practice*, Margam Publications, Chennai, 2020.

REFERENCE BOOKS:

1. Pillai R.S.N. & Bhagwathi, *Business Law*, S. Chand & Co., New Delhi, 2018.
2. Majumdar A.K and Kapoor G.K, *Company Law and Practice*, Nabhi publications, New Delhi, 2019.

DIGITAL TOOLS:

1. <https://www.indiafilings.com/learn/classification-of-companies/>
2. <https://vakilsearch.com/blog/explain-procedure-formation-company/>
3. https://en.wikipedia.org/wiki/Memorandum_of_association
4. <https://www.legalraasta.com/blog/dividend-declaration-as-per-companies-act-2013/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	3	3	3	3
CO2	3	3	2	3	1	3
CO3	1	3	3	2	3	3
CO4	3	2	3	2	3	2
CO5	3	3	1	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNER: Dr. SITHU MURALIDHARAN DEVI



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SYLLABUS

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100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCEE63	PRINCIPLES OF INSURANCE	ELECTIVE – 2	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course imparts knowledge on the principles and practices of Insurance in India.

COURSE OBJECTIVES:

To make the students

- understand the nature of insurance and principles that govern insurance
- gain an insight on the fundamental principles of life insurance
- acquire knowledge about life insurance policy condition and procedure for making claims against insurance policies.
- become familiar with the necessity of marine insurance
- receive knowledge of various aspects of fire insurance principles, managing it and risk involved.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	gain an insight into essential elements of insurance contract	Upto K3
CO 2	acquire knowledge about the principles and procedure for taking a life policy	Upto K3
CO 3	gain broader understanding of life insurance policy conditions and their claims	Upto K3
CO 4	familiarized with the legal and financial aspects of marine insurance	Upto K3
CO 5	able to identify the importance of fire insurance need	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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PRINCIPLES OF INSURANCE

UNIT– I:

Insurance – Origin – Meaning – Types of Insurance – Fundamental Principles of Insurance – Functions and importance of Insurance – IRDA.

UNIT– II:

Life Insurance – Fundamental Principles of Life Insurance – Types of Life Insurance policies – Procedure for taking a Life policy – Modes of Premium Single, annual, half – yearly, quarterly and monthly.

UNIT– III:

Life Insurance policy conditions – Lost policies – Assignment – Nomination – Settlement of claim – Lapse of Life Insurance policy – Revival of policy – Rebating – Surrender value – Loan on Life Insurance policies.

UNIT– IV:

Marine Insurance – Meaning – Types of Marine policies – Conditions of Marine policy – Marine losses – settlement of claims.

UNIT– V:

Fire Insurance – Meaning – Types of Fire Insurance policies – Conditions of Fire Insurance policy – Procedure for settlement of claim – Reinsurance– meaning of motor insurance, burglary insurance, personal accident insurance and sports insurance

TEXT BOOK:

M. N. Mishra, S. Chand and company, *Insurance – Principles and Practices*

REFERENCE BOOK:

Ghosh & Agarwal, *Principles, Practice & Law of Insurance, Life Insurance in India*

Dr. R.M. Ray

DIGITAL TOOLS:

1. <https://www.godigit.com/guides/types-of-insurance>
2. <https://cleartax.in/s/insurance>
3. <https://www.insuranceinstituteofindia.com/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	1	2	2	1	2
CO2	1	2	2	2	2	2
CO3	2	2	3	2	2	3
CO4	2	2	2	3	2	3
CO5	2	3	3	2	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. K. R. KAVITHA



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCEE64	FINANCIAL MARKETS AND SERVICES	EECTIVE – 3	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

To provide a basic knowledge of financial market and services and to familiarise the students with major financial services in India.

COURSE OBJECTIVES:

1. To familiarize the students with the concepts of Indian financial system.
2. To develop a concrete knowledge about new issue market
3. To acquaint the students with appropriate concepts of SEBI.
4. To make the students understand the latest development in investment management.
5. To develop analytical skill for creating a better portfolio for their investment.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the role and importance of Indian financial market	Upto K3
CO 2	apply and analyse the concepts relevant to new issue market	Upto K3
CO 3	evaluate the role of regulatory bodies to develop the financial market	Upto K3
CO 4	provide a comprehensive and in-depth knowledge about mutual funds and comprehend the concept of factoring.	Upto K3
CO 5	assess new venture opportunities and analyse strategic choices in relation to new ventures	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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FINANCIAL MARKETS AND SERVICES

UNIT– I: Introduction

Financial System in India – Functions of financial system – Financial concepts – Financial Assets – financial intermediaries – financial markets – classification – organize – market – capital market – important – money market – meaning – features – classifications of money market – difference between money market vs capital market.

UNIT– II: New Issue Market

Meaning – stock exchange – distinction and relationship between new iss market and stock exchange – functions of new issue market – instruments of issue – players in new issue market – recent trends – reasons for poor performance.

UNIT– III: Securities and Exchange Board of India (SEBI)

Capital issues Act – controller of capital issues – securities contract act – malpractices in the securities market – deficiencies – SEBI objectives – functions – powers – organization – SEBI and the central government – SEBI guidelines – primary and secondary market – brokers and underwriters – Investors protection.

UNIT– IV: Financial Services

Meaning – scope – features – importance – mutual funds – meaning – fund units vs share – origin of the fund – types – classification – importance of mutual fund – organisation of the fund – operations – net assets value – facilities available on investors. Factoring – meaning – definition – functions – types – benefits

UNIT– V: Venture Capital

Meaning – features – Scope of Venture capital – importance – origin – initiative in India – venture capital guidelines – method of venture financing in India – suggestions for the growth of venture capital

TEXT BOOK:

Gordon and Natarajan, *Financial Markets and Services* Himalaya Publishing House 11th Revised Edition

REFERENCE BOOKS:

1. Dr Vinod Kumar, Manmeet Kaur & Atul Gupta, *Financial Markets Institutions & Services*, Taxmann Publications (P) Ltd. 2nd Edition
2. M.Y Khan McGraw Hill, *Financial Services*, 10th Edition
3. Frederic S. Mishki, *Financial Markets and Institutions*.

DIGITAL TOOLS:

1. www.rbi.org.in
2. www.sebi.org.in
3. www.amfiindia.com
4. www.mutualfundsindia.com

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	1	2	2	3
CO2	1	2	2	2	3	3
CO3	2	3	2	3	2	3
CO4	3	2	3	3	3	3
CO5	2	2	3	2	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. K. R. KAVITHA



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCEE65	CAPITAL MARKETS	ELECTIVE – 3	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

The course is designed to enable the students to be familiar with capital market, its structure, procedures, regulatory and their powers.

COURSE OBJECTIVES:

- To introduce to students the concept of financial markets
- To teach the various aspects of regulation of Indian capital market
- To teach the working mechanism of primary market
- To enable the students to learn the working mechanism of stock exchanges
- To enable the students to learn the concept of underwriting and IPO.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	acquire knowledge in the concept of financial markets	Upto K3
CO 2	gain knowledge about various aspects of regulation of Indian capital market	Upto K3
CO 3	understand the working mechanism of primary market	Upto K3
CO 4	gain knowledge on the working mechanism of stock exchanges	Upto K3
CO 5	acquire knowledge on the concept of underwriting and IPO	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

CAPITAL MARKETS

UNIT– I: Introduction

Financial markets – Definition – Role – functions – Constituents – Financial Instruments – Indian Financial Market – Global Financial Market – Capital Market – Evolution and growth – Constituents – Capital Market Instruments – Types – Preference shares – Equity Shares – Non – voting equity shares – Company fixed deposits – Warrants – Debentures and Bonds

UNIT– II: Regulation of Indian Capital Market

Regulatory Framework – Committees on Regulatory Framework – SEBI – Objectives – Management – Powers and functions – Regulatory role – Investor Protection – Insider Trading – Rationale – Insiders – Insider information – Connected persons.

UNIT– III: Primary Market

Meaning – NIM Vs Secondary Market – Methods of New Issue – Intermediaries in the new issues market – SEBI Guidelines on Primary Market – Listing – Agreement – Benefits – Consequences of Non-listing

UNIT– IV: Stock Exchange

History – Meaning – Functions – Stock Exchange Vs Commodity Exchange – Stock Exchange Traders – Regulation of Stock Exchanges – Steps in Stock Trading – BSE and NSE – World Stock Exchanges – New York, London, Hong Kong and Tokyo Stock Exchanges.

UNIT– V: Underwriting and IPO

Underwriting – Definition – Types – Mechanics – Benefits – Book Building – Concept – Characteristics – Process – IPO including e-IPO – Reverse book – building – Depository services – Demat Account – Electronic Settlement of Trade – Role of CDSL and NSDL – Online Stock Trading

TEXT BOOK:

GURUSAMY, (2014), *Capital Markets*, Vijay Nicole Imprints, Chennai.

REFERENCE BOOKS:

1. Frank J, Fabozzi, Franco Modigliani, (2000), *Capital Markets Institutions and Instruments*, Prentice Hall, New Delhi
2. Moorad Choudhry, (2000), *Capital Markets Instruments, Analysis and Valuation*, FT Press, New York.
3. Mahesh Kulkarni & Dr. Suhas Kulkarni, (2001), *Capital Markets and Financial Services*, Nirali Publications, Mumbai.
4. Rajesh Chakraborty, Sankar D.E, (2011), *Capital Markets in India*, Sage Publications, New Delhi.

DIGITAL TOOLS:

1. <https://www.investopedia.com/terms/c/capitalmarkets.asp>
2. <https://www.elearnmarkets.com/blog/capital-market-regulators/>
3. <https://zfunds.in/m/role-of-underwriters-in-an-ipo>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	3	2	3	3
CO2	2	3	2	3	3	3
CO3	2	3	2	3	2	3
CO4	2	1	2	3	3	3
CO5	2	2	3	2	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. T. THANGA PANDI MURUGAN



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SYLLABUS

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100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCEE66	CONSUMER RIGHTS AND EDUCATION	ELECTIVE – 3	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course is designed to make the students understand the different types of consumers, responsibilities of consumers and consumer protection Act.

COURSE OBJECTIVES:

To make the students

1. understand the consumerism and different types of consumers.
2. acquire knowledge about the responsibilities of consumers.
3. gain knowledge about the consumer protection act.
4. know different prevention of food adulteration act.
5. understand different methods of creating awareness.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	recollect the Consumerism and different types of consumers.	Upto K3
CO 2	examine of the Responsibilities of consumers.	Upto K3
CO 3	have through knowledge about the consumer protection Act.	Upto K3
CO 4	gain knowledge different prevention of food Adulteration Act.	Upto K3
CO 5	get knowledge about the different methods of creating awareness.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

CONSUMER RIGHTS AND EDUCATION

UNIT– I: Consumer Movement in India

Definition of Consumer – Types of Consumers – Problems of Consumer – Consumerism – Emerging concepts in consumerism: Green Consumerism, Cyber Consumerism – effect of consumerism.

UNIT– II: Right of Consumers

Responsibilities of Consumers – unfair trade practices – Caveat emptor and Caveat Venditor – Enforcement of Consumer rights through Public Interest Litigation.

UNIT– III: Consumer Protection Act

Main provisions – Redressal forums – District Level – State Level and National Level – Powers and Function – Filing of Complaints procedure Regulatory Authorities and OMBUDSMAN

UNIT– IV: Consumer related Legislations and Organizations

Prevention of Food Adulteration Act, 1954– Standards of Weights and Measures Act, 1976– The Drugs and Magic Remedies (Objectionable Advertisement) Act 1954 – Consumer pressure groups – Voluntary consumer organizations–Consumer Protection Councils – Remedy and Redressal of Grievances.

UNIT– V: Consumer awareness and Education in India

Lack of awareness – Lack of access to information – Methods of creating awareness and promotion of Consumer rights and duties – E– Commerce and Consumer Rights– Role of media in consumer education

TEXT BOOKS:

1. Singh Avtor, (2010), *Law of Consumer Protection (Principles and Practice)*, Eastern Book Company, Luck now.
2. Aggarwal V.K, *Consumer Protection Law and practice*, Bharat Law House Pvt Ltd. New Delhi.

REFERENCE BOOKS:

1. Mohammed Kamalun Nabi(2015), *Consumer Rights and Protection in India*, New Century Publications, New Delhi
2. Mohammed Nazer(2016), *Consumer Rights and awareness*, Discover Publishing, House PVT Limited, New Delhi.

DIGITAL TOOLS:

1. <https://www.sciencedirect.com>
2. <http://www.corporate.cyrilamarchandblogs.com>
3. <https://www.researchgate.net>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	2	2	3	3
CO2	3	3	3	2	2	2
CO3	3	3	3	2	2	2
CO4	3	3	3	2	3	3
CO5	3	3	3	2	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE DESIGNER: Dr. G. VIJAYALAKSHMI

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCES61	ACCOUNTING SOFTWARE – TALLY	SBS – 6	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

On the completion of the course, the students will be able to explain the features of Tally and process transactions through tally and prepare financial reports.

COURSE OBJECTIVES:

- To impart knowledge regarding concepts of Financial Accounting. Tally is an accounting package which is used for learning to maintain accounts.
- To help students work with well-known accounting software i.e. Tally ERP.9.
- To make students capable to create company, enter accounting voucher entries including advance voucher entries, reconcile bank statement, do accrual adjustments, and also print financial statements, etc. in Tally ERP.9 software.
- Accounting with Tally certificate course is not just theoretical program, but it also includes continuous practice, to make students ready with required skill for employability in the job market.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	explain the role and need computers in accounting & creation of company	Upto K3
CO 2	create primary groups ,single group and sub groups	Upto K3
CO 3	prepare voucher entries for the given transactions.	Upto K3
CO 4	prepare budgets and controls.	Upto K3
CO 5	create purchase and sales order.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

ACCOUNTING SOFTWARE – TALLY

UNIT– I: Accounting on Computers

Introduction to accounting – role of computers in accounting – need for computerized accounting–tally features– salient features of tally

UNIT– II: Classification of Accounts (Groups and Ledgers)

Introduction – Groups – Sub-groups – Primary Groups – Creation of Groups – Deletion of Groups – Alteration – Deletion – Creation of Ledgers – Process of Creation of Ledgers

UNIT– III: Inventory Vouchers

Introduction – Stock groups – stock categories – stock item – units of measure – Creation and Alteration of stock items

Voucher – Introduction – Display of predefined voucher – types of Voucher – Creation of Voucher – Deletion – Alteration – cancellation of voucher and saving a voucher.

UNIT– IV: Budget and Controls

Introduction – Essential of budget – Budget creation and alteration – cost center – alteration of deletion of budget – budget variance reports – viewing the budget.

UNIT– V: Purchases and Sales Order

Creation of ledger masters – Purchase ledger – sales ledger – duties and Taxes ledger – direct expenses – creation of supplier account – creation of customer account – example of entering a purchase transaction through sales invoice – entering a sales transaction through sales invoice.

TEXT BOOK:

Palanivel. S. *Tally*, Margam Publications, Chennai, Reprint Edition 2014

REFERENCE BOOK:

Nellai Kannan , 2009. *Tally 9*, Nels Publications, Tirunelveli

DIGITAL TOOLS:

1. <https://tallyeducation.com/tepl/>
2. https://en.wikipedia.org/wiki/Tally_Solutions
3. <https://tallysolutions.com/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	3	3	3	3
CO2	2	3	2	3	3	3
CO3	3	2	3	2	2	2
CO4	3	3	2	3	3	3
CO5	2	3	3	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. S. S. SUGANTHY



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SYLLABUS

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B.Sc. MATHEMATICS



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SYLLABUS

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMSC52	REAL ANALYSIS	CORE – 10	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The course is designed to explain various concepts used to learn Real analysis.

COURSE OBJECTIVES:

- To discuss the concepts of sets and function
- To introduce Metric spaces
- To explain complete metric space
- To introduce and define continuity and connectedness
- To discuss compactness.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	prove theorems using relevant concepts	Upto K3
CO 2	give examples and solve problems	Upto K3
CO 3	apply definition to prove theorem	Upto K3
CO 4	discuss continuity and connectedness	Upto K3
CO 5	derive results using various concept of compactness	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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60 % MODIFIED

REAL ANALYSIS

UNIT– I:

Sets and functions – countable sets – uncountable sets – Inequalities of Holders and Minkowski. (Page No. 1 – 16, Chapter 1– 1.0 to 1.4)

UNIT– II: Metric Spaces

Definitions and examples – **bounded sets in a metric space** – Open ball in a metric space – **Open sets** – Subspaces – **Interior of a set – closed sets – closure – limit points** – Dense sets. (Page No. 17 – 77, Chapter 2 – 2.1 to 2.10)

UNIT– III: Complete metric spaces

Introduction – Completeness – Baire's Category theorem. (Page No. 80 – 101, Chapter 3 – 3.0 to 3.2)

UNIT– IV: Continuity and Connectedness

Introduction – Continuity – Homeomorphism – uniform continuity. (Page No. 102 – 128, Chapter 4 – 4.0 to 4.3) Introduction – Definitions and examples of connectedness – Connected subsets of $\mathbb{R}$ – Connectedness and continuity (Page No. 139 – 150, Chapter 5 – 5.0 to 5.3)

UNIT– V: Compactness

Introduction – compact space – compact subset of $\mathbb{R}$ – equivalent characterization for compactness – **Compactness and continuity**. (Page No. 151 – 179, Chapter 6 – 6.0 to 6.4)

TEXT BOOK:

Modern Analysis by Arumugam Issac New Gamma Publishing House, June 2017.

UNIT – I: – (Page No. 01 – 16, Chapter 1, 1.0 to 1.4)

UNIT – II: – (Page No. 17 – 77, Chapter 2, 2.1 to 2.10)

UNIT – III: – (Page No. 80 – 101, Chapter 3, 3.0 to 3.2)

UNIT – IV: – (Page No. 102 – 128, Chapter 4, 4.0 to 4.3)

(Page No. 139 – 150, Chapter 5, 5.0 to 5.3)

UNIT – V: – (Page No. 151 – 179, Chapter 6, 6.0 to 6.4)

REFERENCE BOOK:

Real Analysis by N.P. Bali, Golden series, 2005

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	3	2	3	3
CO2	2	3	2	3	3
CO3	2	1	2	2	2
CO4	2	3	3	3	2
CO5	1	1	2	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE DESIGNER: Prof. M. K. ESWARLAL

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMSSP3	OBJECT ORIENTED PROGRAMMING IN C++ – LAB	SBS – 5 LAB	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course introduces the student to object oriented programming through a study of the concepts of program specification and design, algorithm development and coding and testing using a modern software development environment. Students learn how to write programs in an object oriented high level programming language. Topics covered include fundamentals of algorithms, problem solving, programming concepts, classes and methods, control structures, arrays and strings. Throughout the semester, problem solving skills will be stressed and applied to solving computing problems. Weakly laboratory experiments will provide hands – on experience in topics covered in this course.

COURSE OBJECTIVES:

To enable the students design and implement C++ programs for simple applications.

20% MODIFIED

LIST OF PROGRAMMES:

1. Write a program to calculate Simple Interest and Compound Interest
2. Write a program for shopping list
3. Write a program to find the biggest number using class
4. Write a program to overload unary minus operator
5. Write a program to overload binary plus operator
6. Write a program to add two complex numbers using friend function
7. Write a program to add two time and hours.
8. Write a program to calculate EB charge
9. Write a program to calculate product of two complex numbers
10. Write a program for employee details
11. Write a program for bank transaction
12. Write a program for inheritances



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE DESIGNER: Dr. T. R. DINAKARAN

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMSE52	OPERATIONS RESEARCH – I	ELECTIVE	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course is designed to teach various methods of solving the problems in operations research.

COURSE OBJECTIVES:

To make the students study about the LPP, Graphical Solution, Simplex Method, Big – M Method, Transportation Problem and Assignment Problem.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	know the historical development of OR, models in OR, scientific method, limitations and features in OR	Upto K3
CO 2	understand the mathematical formulation of LPP, solving the graphical solution and simplex method (simple problems).	Upto K3
CO 3	understand the Big – M method of a LPP, Two phase simplex method and duality problems.	Upto K3
CO 4	find an IBFS of transportation problem using various methods	Upto K3
CO 5	find the optimal solution by Hungarian method for solving Assignment problem.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

OPERATIONS RESEARCH – I

UNIT– I:

Introduction – origin and development of OR – Nature and feature of OR –Scientific method – modeling in OR – limitations of OR models and decision making problem.

UNIT– II:

Introduction – Mathematical formulation of LPP – Graphical solution of a LPP – Solving the simplex method problems.

UNIT– III:

Charne's method of penalties – Two phase simplex method – Duality – Dual of the dual is primal.

UNIT– IV:

Transportation problem – formulation of the TP – finding an IBFS by using North West Corner Rule, Least Cost Entry Method – Vogel's Approximation Method – Degeneracy in TP – MODI method for solving optimum solution in TP,

UNIT– V:

Assignment problem – mathematical formulation of AP – Hungarian method for solving the optimum solution of an AP – maximization type of an AP.

TEXT BOOK:

Operations Research by Kantiswarup, P.K. Gupta and Manmohan14th edition, Sultan Chand and Sons, New Delhi.

REFERENCE BOOK:

Operations Research by Dr S. Arumugam Issac and others.

UNIT – I: – Page No: 25 to 33.

UNIT – II: – Page No: 39 to 45, 65 to 73, 79, 80, 81, 87 to 89 and 99 to 105.

UNIT – III: – Page No: 106 to 114, 129 to 134.

UNIT – IV: – Page No: 247, 253 to 275.

UNIT – V: – Page No: 295 to 310.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	2	3	3
CO2	2	1	2	3	3
CO3	2	1	1	2	3
CO4	2	2	2	2	3
CO5	3	2	2	3	3

3. Advanced Application 2. Intermediate Development 1.Introductory Level

COURSE DESIGNER: Prof. K. N. GANESH BABU



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SYLLABUS

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMSE53	NUMBER THEORY	ELECTIVE	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

Number Theory is a branch of pure Mathematics devoted to the study of the natural numbers and integers. It helps to discover interesting relationships between different sorts of numbers.

COURSE OBJECTIVES:

- To present a rigorous development of Number Theory using axioms, definitions, examples, theorems and their proofs.
- To provide a deep knowledge of number theory as this is one of the pillars of Mathematics.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	discuss the Divisibility of numbers, Prime and composite numbers, Euclid's theorem and Unique Factorisation theorem	Upto K3
CO 2	understand the theorem of Arithmetic, representation of an integer and Arithmetic functions	Upto K3
CO 3	know perfect numbers, Euclid's theorem, Euler's function and learn various theorems	Upto K3
CO 4	understand Greatest integer functions, Mobius function and Mobius Inversion Formula	Upto K3
CO 5	analyse Congruences, Residues, Residue classes, complete residue system, Reduced residue system, Linear congruence, Chinese Remainder theorem.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

NUMBER THEORY

UNIT– I:

Divisibility, Common divisor, Greatest common divisor, Least common multiple, Prime and composite numbers, Euclid's theorem, Unique Factorisation theorem.

UNIT– II:

Theorem of Arithmetic, Positional representation of an integer, Divisors of an integer, Arithmetic functions.

UNIT– III:

Perfect numbers – Euclid's theorem – Euler's function – examples only.

UNIT– IV:

Greatest integer functions – Mobius function – Mobius Inversion Formula – examples only.

UNIT– V:

Congruences – Residues – Residue classes – Complete Residue system – Reduced Residue system – Linear congruence – Chinese Remainder Theorem.

TEXT BOOK:

Kumaravelu and Suseela Kumaravelu, *Elements of Number Theory*, SKV Publications, 2002.

UNIT – I: – Chapter 3, Pg. No. 45 to 58, Chapter 4, Pg No.60 to 66

UNIT – II: – Chapter 4, Pg. No. 66 to 80

UNIT – III: – Chapter 4, Pg. No. 84 to 86, 93 to 106

UNIT – IV: – Chapter 4, Pg. No. 109 to 131

UNIT – V: – Chapter 6, Pg. No. 163 to 203.

REFERENCE BOOK:

V.K. Krishnan, *Elementary Number Theory*, Universities Press, 2017.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	2	2	2
CO2	1	2	1	2	1
CO3	2	2	1	2	2
CO4	2	2	2	1	2
CO5	1	2	2	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. G. R. SHYAMALA



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMSE54	BOOLEAN ALGEBRA AND LOGIC	ELECTIVE	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course is designed to make the students understand what Boolean algebra is all about and how it differs from elementary algebra. The students will learn about the various laws and important theorems associated with Boolean algebra. Also it is designed to help the students understand different types of Logic gates.

COURSE OBJECTIVES:

- To introduce propositions and compound propositions, basic
- logical operations and constructing a truth table.
- To introduce algebra of propositions, conditional and Biconditional statements
- To introduce propositional functions and quantifies.
- To introduce basic definitions and basic theorems on Boolean Algebra
- To introduce logic gates and circuits.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	express the verbal sentence in symbolic form and determine the truth table of the statement.	Upto K3
CO 2	determine the validity of the argument.	Upto K3
CO 3	determine the truth value of the statement and to negate the statement.	Upto K3
CO 4	write the dual of the Boolean equation and finding the number of sub algebras.	Upto K3
CO 5	express the Boolean expression as a sum of product and finding fundamental product in Karnaugh map.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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20 % MODIFIED

BOOLEAN ALGEBRA AND LOGIC

UNIT – I:

Introduction – Propositions and Compound Propositions – Basic Logical Operations – Propositions and Truth Tables – Tautologies and Contradictions.

UNIT – II:

Logical Equivalence – Algebra of Propositions – Conditional and Biconditional Statements – Arguments.

UNIT – III:

Propositional Functions, Quantifiers – Negation of Quantified Statements – Normal Forms.

UNIT – IV:

Introduction – Basic Definitions – Duality – Basic Theorems – Boolean Algebra as Lattices – Representation Theorem.

UNIT – V:

Sum – of – Products Form for Sets – Sum – of – Products Form for Boolean Algebra – Minimal Boolean Expressions – Logic Gates and Circuits – Truth Tables, Boolean Functions – Karnaugh Maps.

TEXT BOOK:

Discrete Mathematics by Seymour Lipschutz & Marc Lars Lipson – McGraw Hill Education.

UNIT – I: – Chapter 4 – 4.1, 4.2, 4.3, 4.4, 4.5

UNIT – II: – Chapter 4 – 4.6, 4.7, 4.8, 4.9, 4.10

UNIT – III: – Chapter 4 – 4.11, 4.12, 4.13

UNIT – IV: – Chapter 14 – 14.1, 14.2, 14.3, 14.4, 14.5, 14.6

UNIT – V: – Chapter 14 – 14.7, 14.8, 14.9, 14.10, 14.11, 14.12

REFERENCE BOOK:

Discrete Mathematics by Dr. M.K.Venkatraman, Dr. N. Sridharan & N. Chandrasekaran.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	2	2
CO2	2	3	2	2	2
CO3	3	2	2	3	2
CO4	2	2	2	3	1
CO5	3	3	2	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. S. K. KANCHANA



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMSE61	OPERATIONS RESEARCH – II	ELECTIVE	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The course is designed to explain various concepts and Methods used to learn Operations research II.

COURSE OBJECTIVES:

- To discuss the concepts of sequencing
- To introduce Games and strategies
- To explain inventory
- To introduce Queuing theory
- To discuss Network Scheduling.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	solve the problems based on sequencing	Upto K3
CO 2	understand the concepts of Game and strategies	Upto K3
CO 3	identify the suitable model in inventory	Upto K3
CO 4	describe the various models	Upto K3
CO 5	arrive conclusion based on PERT and CPM	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

OPERATIONS RESEARCH – II

UNIT– I: Sequencing problem

Introduction – Problems of sequencing – Basic terms used in Sequencing – Processing in Jobs through two Machines – optimum sequence algorithm – processing n Jobs through K machines – optimal sequence algorithm – processing 2 Jobs through K machines.

(page No.. 231– 243)

UNIT– II: Games and Strategies

Introduction – Two person Zero sum Games – some basic terms – the maximin and minimax principle – rule for saddle point – Games without saddle point – mixed strategies – Graphical solutions of 2 X m and m X 2 games – Dominance property.

(page No.. 313 – 338)

UNIT– III: Inventory control

Introduction – the inventory decisions – cost associated with inventories – factors affecting inventory control – Economic order quantity (EOQ) – Deterministic inventory

Problem (i) No shortages (ii) finite replacement (iii) with shortages.

(page No.. 365 – 381)

UNIT– IV: Queueing theory

Introduction – Queueing system – elements in queueing system – operating characteristics of queueing system – probability distribution in queueing system – classification of

Queueing models – Transient and steady states – poisson queueing systems – model I (m/m/1) : (∞ / FIFO), model II (m/m/1) : (∞ / SIRO), model III (m/m/1) : (N/FIFO) and model IV (generalized models : Birth death process)

(pageNo.. 414 – 436)

UNIT– V: (Network scheduling by PERT and CPM)

Introduction – Network and basic components – logical sequencing – rules of network construction – Numbering the events – Critical path analysis – PERT problems

(pageNo.. 459 – 469)

TEXT BOOK:

Operations Research by Kanti Swarup, P.K. Gupta, Manmohan Sultan Chand sons, Eleventh edition 2003, NewDelhi.

UNIT – I: – Page No: 231 to 243. UNIT – IV: – Page No : 414 – 436

UNIT – II: – Page No: 313 – 338 UNIT – V: – Page No : 459 – 469

UNIT – III: – Page No: 365 – 381

REFERENCE BOOK:

Operations Research by Dr. S. Arumugam Issac

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	2	3	2	2
CO2	2	3	2	3	2
CO3	1	2	3	2	2
CO4	2	3	2	2	3
CO5	1	2	3	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE DESIGNER: Prof. M. K. ESWARLAL

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMSE62	PYTHON PROGRAMMING	ELECTIVE	4	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course is designed to make the students acquire programming skills in core Python and basic principles of Python programming language.

COURSE OBJECTIVES:

- To introduce Python keyword and important function.
- To use operators and to translate mathematical formulae into equivalent Python expressions.
- To introduce Boolean operators, lists and to create tuples.
- To introduce decision making statements and loop control statements,
- To introduce syntax and basics of a functions and its uses.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	apply the python keywords and all the types of functions.	Upto K3
CO 2	use operators and expressions and able to change precedence and associativity of arithmetic operators.	Upto K3
CO 3	create lists and tuples and accessing elements of a list	Upto K3
CO 4	use the loop control statements and all types of functions.	Upto K3
CO 5	understand the syntax and basics of a function and its uses.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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100 % MODIFIED – NEW COURSE

PYTHON PROGRAMMING

UNIT – I:

Introduction to Python – Values and types – Python keywords – Identifier/ Variable – The print () function – The input () function – The eval () function – Commenting in Python.

UNIT – II:

Operators and Expressions – Arithmetic Operators – Operator Precedence and Associativity – Changing Precedence and Associativity of Arithmetic Operators – Translating Mathematical Formulae into Equivalent Python Expressions.

UNIT – III:

Lists – Creating Lists – Accessing Elements of a list – Negative List Indices – List Slicing – List Slicing with Step Size – Python Built – in functions for Lists – The List Operator – Introduction to Tuples – Creating Tuples – Inbuilt functions for Tuples – Indexing and Slicing – Operations on Tuples – Lists and Tuples – Sort the Tuples.

UNIT – IV:

Decision making statements – Conditional Expressions – Loop control statements – The while loop – The range () function – The for loop – Nested loop – The break statement – The continue statement.

UNIT – V:

Functions – Introduction – Syntax and Basics of a function – Use of a function – Parameters and Arguments in a function – The Return Statement – Recursive functions – The String Operators – String Operations.

TEXT BOOK:

Problem Solving and Python Programming – Ashok Namdev Kamthane & Amit Ashok Kamthane – McGraw Hill Education 2018.

REFERENCE BOOK:

Problem Solving and Python Programming – P. Radha Ganesan – Chess Educational Publishers.

UNIT – I: – Chapter 2 – 2.2, 2.6, 2.7, 2.8, 2.9, 2.12, 2.13, 2.14.

UNIT – II: – Chapter 3 – 3.2, 3.3, 3.4, 3.5, 3.6

UNIT – III: – Chapter 8 – 8.1 to 8.8, Chapter 10 – 10.1 (10.1.1 to 10.1.6)

UNIT – IV: – Chapter 4 – 4.7, 4.8 and Chapter 5 – Full Chapter

UNIT – V: – Chapter 6 – 6.1, 6.2, 6.3, 6.4, 6.6, 6.7 and Chapter 7 – 7.7, 7.8

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	2	3
CO2	2	3	2	3	2
CO3	3	2	2	3	2
CO4	3	2	3	2	2
CO5	3	3	2	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE DESIGNER: Dr. S.K. KANCHANA

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMSEP1	PYTHON PROGRAMMING LAB	ELECTIVE LAB	–	2	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This Course emphasizes the students to design, code, test and debug Python language programs.

COURSE OBJECTIVES:

This course is designed to make the students acquire programming skills in Python programming. Python Programming is intended for software engineers, system analysts, program managers and user support. The students will be able to build basic programs using fundamental programming constructs like variables, conditional logic, looping and functions.

100 % MODIFIED – NEW COURSE

LIST OF PROGRAMS

1. Write a Python program to compute addition of two numbers.
2. Write a Python program to calculate Area and Circumference of a Circle.
3. Write a Python program to calculate Simple Interest.
4. Write a Python program whether the year is leap or not.
5. Write a Python program to check whether the number is prime or not.
6. Write a Python program to print the Fibonacci series.
7. Write a Python program to check whether the number is Palindrome Number or not.
8. Write a Python program to calculate sum of the digits of a given number using function.
9. Write a Python program to calculate the factorial of a given number.
10. Write a Python program to check whether the number is Armstrong Number or not.
11. Write a Python program to operate on Lists using List Operators.
12. Write a Python program to implement Tuple Operations.

COURSE DESIGNER: Dr. S.K. KANCHANA



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMSE63	ASTRONOMY	ELECTIVE	6	-	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

Astronomy is the study of everything in the universe beyond earth's atmosphere. This includes objects we can see with our own naked eyes like Sun, Earth, Stars etc.,

COURSE OBJECTIVES:

Students will investigate and derive the interrelationship between the Earth, Sun, and planets and predict seasons using diagrams.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the concepts of spherical trigonometry by using formulas and Analogies	Upto K3
CO 2	apply the idea to represent different system of coordinates of Celestial sphere diagrammatically and study the changes in the coordinates of the Sun during the year.	Upto K3
CO 3	understand different zones of earth and duration of night and day at different zones.	Upto K3
CO 4	mathematically derive the expression for Dip of the horizon and twilight	Upto K3
CO 5	verify Kepler's law of motion and derive Kepler's law of motion from Newton's law of gravitation.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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100 % MODIFIED – NEW COURSE

ASTRONOMY

UNIT– I:

Spherical trigonometry – definitions – Theorems – problems – sine, cosine, cotangent, supplemental cosine, four parts formulae – functions of half of an angle and sides – Delambre's and Napier's analogies and Napier's rule and worked examples. (Chapter I: Pages 1 to 26 and 33 to 36)

UNIT– II:

Celestial sphere – definitions – Four system of coordinates – conversion of coordinates – relation between right ascension and longitude of the sun – changes in the coordinates of the sun in the course of the year – longitude of the sun on any day – sidereal time – theorems and worked examples. (Chapter II: pages 47 to 70)

UNIT– III:

Zone of Earth – variations in the duration of the day and night during the year at different systems – duration of perpetual day in a place of longitude greater than 90° and worked examples (Chapter III: pages 98 to 111 and 113 to 123)

UNIT– IV:

Dip of horizon – expression for dip – twilight – condition for twilight may last throughout night – the number of consecutive days having twilight throughout night – duration of shortest twilight and worked examples. (Chapter III: pages 135 to 141 and 144 to 151)

UNIT– V:

Kepler's law – verification of first and second law – Newton's deductions from Kepler's law – derive Kepler's third law from Newton's law of gravitation – fix the position of the planet in its elliptic orbit. (Chapter VI: pages 191 to 203 and 211 to 213)

TEXT BOOK:

Astronomy by Prof. S. Kumaravelu and Prof. Susheela Kumaravelu

Revised and enlarged edition – 2005.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	2	2	2	3
CO2	2	2	2	2	3
CO3	2	2	2	3	2
CO4	2	2	2	2	3
CO5	1	2	3	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. E. B. BALARAMAN



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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B.Sc. PHYSICS



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSC52	NUCLEAR PHYSICS	CORE – 8	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

REVISION- 30%

COURSE DESCRIPTION:

The main purpose of the course is to impart knowledge, skills and attitudes required to understand the information regarding the interior structure of nucleus and nuclear interaction or nuclear reactions includes radioactive decay, nuclear fusion and fission.

COURSE OBJECTIVE:

The objective of this course is to provide basic concept of nuclear theories and to study the atomic nuclei properties and their constituents and interactions. It helps to understand the various nuclear models, theory of cosmic rays and elementary particles.

COURSE OUTCOMES (COs):

On successful completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	acquire knowledge on the static properties of nuclei and to understand the background of various nuclear models	Upto K2
CO 2	identify the concept of radioactivity and to understand different modes of decay	Upto K2
CO 3	know the process of nuclear fission and fusion and its utilization	Upto K3
CO 4	illustrate the function of nuclear detectors and particle accelerators	Upto K3
CO 5	interpret the concept of cosmic rays and the basic interaction between fundamental particles	Upto K3

K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

NUCLEAR PHYSICS

UNIT – I: Properties and Structure of Nuclei

Introduction to nucleus –General properties – binding energy – **BE/A curve** –Nuclear forces – characteristics –Meson theory of nuclear forces – **Yukawa Potential** –proton electron theory– proton neutron theory — Nuclear models– liquid drop model– shell model

UNIT – II: Radioactivity

Definition– theory of radioactivity– properties of α , β and γ rays–**Fundamental laws of radio activity – radioactive decay**–Geiger law–Geiger Nuttal experiment–Alpha particle disintegration–e/m ratio of beta particle using Kaufmann experiment–Wave length of Gamma rays– neutrino and its properties– electron capture – **nuclear isomers – applications– Radio carbon dating– radio isotopes – uses.**

UNIT – III: Nuclear Reactions

Introduction–Nuclear fission — Nuclear reactor–uses – atom bomb – Nuclear fusion– hydrogen bomb –**plasma confinement –artificial transmutation–Q value of nuclear reaction –types of nuclear reaction**

UNIT – IV: Neutrons, Nuclear Detectors and Particle Accelerators

Discovery of neutrons and basic properties–classifications– Detectors–**G.M.Counter**–bubble chamber– Wilson cloud chamber–Accelerators–linear accelerators–cyclotron–**synchrocyclotron**–betatron

UNIT – V: Cosmic Rays and Elementary Particles

Cosmic rays—primary and secondary cosmic rays –latitude, altitude and azimuth effects–longitudinal effect–north –south effect–seasonal and diurnal changes –cosmic ray showers – Elementary particles– introduction–particles and antiparticles–antimatter–the fundamental interaction –conservation law

TEXT BOOKS:

1. *Atomic and Nuclear Physics* by N. Subrahmanyam and Brijlal, S Chand & Co., New Delhi (1996).
2. *Nuclear Physics* by Tayal D.C., Himalaya Publishing House, Mumbai(2006).
3. *Nuclear Physics* by R.C.Sharma, K.Nath& Co., Meerut (2000)
4. *Nuclear Physics* by Irving Kaplan, Narosa Publishing house, New Delhi.

REFERENCE BOOKS:

1. *Nuclear Physics* by R.R.Roy and B.P.Nigam, New Age International (P) Ltd., New Delhi(1997).
2. *Fundamentals of Elementary Particle Physics* by Longo, McGraw–Hill.
3. *Nuclei and Particles* by Serge., W.A. Benjamin, USA
4. *Elements of Nuclear Physics* by ML Pandya and RPS Yadav, Kedarnath Ram Nath, Meerut. State Integrated Board of Studies – Physics UG

DIGITAL TOOL:

https://www.bhattadevuniversity.ac.in/docs/studyMaterial/UpakulMahanta_Physics_6thSemNuclearPhysics.pdf

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	2	1	2	1
CO2	3	1	2	3	3	2
CO3	3	2	3	1	3	2
CO4	3	2	3	2	2	1
CO5	3	1	2	1	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSE51	ANALOG ELECTRONICS	ELECTIVE – 1	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

Revision-40%

COURSE DESCRIPTION:

The intention of the course is to impart knowledge, skills and attitudes required to understand the principles of operations of electronic circuits equipment and devices in the industries.

COURSE OBJECTIVES:

The primary objective of this course is to understand the operation of electronic semiconductor devices and its application in the construction of amplifiers and oscillators.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	apply the theorems to analyse complicated circuits and understand the basic concepts of semiconductor devices, active and passive components.	Upto K3
CO2	understand transistor biasing, describe the methods of transistor biasing and circuit analysis.	Upto K3
CO3	understand the importance of feedback in oscillators and to develop skill in constructing AC generators.	Upto K3
CO4	explain special semiconductor devices that have been developed to exercise fine control over the large blocks of power in a system.	Upto K3
CO5	understand the characteristics of operational amplifiers and to perform mathematical calculations	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

ANALOG ELECTRONICS

UNIT I: Linear circuit analysis and semiconductor diodes

Constant voltage source – constant current source – Maximum power transfer theorem – Thevenin's theorem – procedure for finding Thevenin Equivalent circuit – Norton's theorem – procedure for finding Norton Equivalent circuit – PN junction theory – V-I characteristics of a PN junction diode – Half wave rectifier – Bridge rectifier – Efficiency – filters – Shunt capacitor filter – pi filter – Zener diode – equivalent circuit – voltage regulator

UNIT II: Transistor Amplifier

Transistor – Different modes of operations – CB mode & CE mode – Two port representation of a transistor – h parameter – AC equivalent circuit using h parameters – analysis of amplifiers using h parameters (CE only) – RC coupled amplifier – transformer coupled amplifier – power amplifier – classification of amplifiers – Class A, Class B and Class C – Push pull amplifier – Emitter follower.

UNIT III: Oscillators and Multivibrator

Feedback principle – effect of negative and positive feedback – and Barkhausen criterion – Hartley, Colpitt, Phase shift and using transistors – Expression for frequency – Astable Multivibrators, using transistors – Schmitt trigger.

UNIT IV: Special Semiconductor Devices

Clipping and clamping circuits – Differentiating circuit – Integrating circuit – Field effect Transistor FET – MOSFET – UJT – SCR – characteristics – FET as a VVR – UJT relaxation oscillator – SCR as a switch and rectifier

UNIT V: Operational Amplifier

Operational Amplifier – characteristics – parameters – applications – Inverting amplifier – Non inverting amplifier – Voltage follower – Adder – Subtractor – Integrator – Differentiator – Solving simultaneous equations – comparator – square wave generator – Wien bridge oscillator

TEXT BOOKS:

1. *Principles of Electronics* – V.K. Metha S.Chand & Co., 2102
2. *Basic Electronics & Applied Electronics* – A. Ubald Raj & G. Jose Robin 20004 Indira Publications

REFERENCE BOOKS:

1. *Basic Electronics* – B.L. Theaja – S. Chand & Co. 2003.
2. *Electronics Devices & Circuits* – Salivahanan Vallavaraj. Tata McGraw Hill – 2004.

DIGITAL TOOL:

https://mrcet.com/downloads/digital_notes/EEE/AE%20DIGITAL%20NOTES.pdf

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	2	1	2
CO2	3	3	1	2	1	1
CO3	2	2	3	1	2	2
CO4	3	1	2	1	3	1
CO5	3	1	2	1	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSE52	MICROPROCESSOR	ELECTIVE – 1	5	–	5



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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	FUNDAMENTALS			

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

REVISION – 100%

COURSE DESCRIPTION:

Microprocessor is a required course for UG Students in the Physics department. The purpose of the course is to teach students the fundamentals of microprocessor. The student will be able to incorporate these concepts into their electronic designs for other courses where control can be achieved via microprocessor implementation.

COURSE OBJECTIVES:

To make the students

1. outline the history of computing devices
2. describe the architecture of 8085 microprocessor .
3. develop skill in programming techniques
4. understand the basic idea about the data transfer schemes and its applications.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	understand the basic architecture of 8085 and discuss the pin description of 8085	Upto K3
CO2	gain knowledge about the instruction set of 8085 and develop skill in programming techniques.	Upto K3
CO3	understand interfacing concepts and explain timing diagram of 8085	Upto K3
CO4	describe interfacing I/O port to 8085 and explain the operating modes	Upto K3
CO5	apply the interrupts in 8085 for data transfer and remember the types of interrupts	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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MICROPROCESSOR FUNDAMENTALS

UNIT I: Architecture

Architecture of 8085 – registers, flags, ALU, address and data bus, demultiplexing address/data bus – control and status signals – control bus, Programmer's model of 8085 – Pin out diagram – Functions of different pins.

UNIT II: Programming Techniques

Instruction set of 8085 – data transfer, arithmetic, logic, branching and machine control group of instructions – addressing modes – register indirect, direct, immediate and implied addressing modes. Assembly language & machine language – programming techniques: addition, subtraction, multiplication, division, ascending, descending order, largest and smallest (single byte)

UNIT III: Interfacing memory to 8085

Interface – Memory interfacing – I/O interfacing – Block diagram of memory and I/O interfacing – 8085 interfacing pins – Interfacing 2k x 8 ROM and RAM, Timing diagram of 8085 (MOVRd, Rs – MVI Rd, data(8)).

UNIT IV: Interfacing I/O Ports to 8085

Interfacing input port and output port to 8085 – Programmable peripheral interface 8255 – flashing LEDs – 8255A programmable peripheral interface – ports of 8255A – operating modes – features of 8255A – Architecture of 8255A

UNIT V: Interrupts

Need for Interrupts – Types of Interrupts – Interrupts in 8085 – hardware and software interrupts – RIM, SIM instructions – priorities – simple polled and interrupt controlled data transfer – Interrupt driven data transfer scheme

TEXT BOOKS:

1. *Microprocessor Architecture Programming and Application with 8085 / 8080A*. by R.S. Gaonkar, Wiley Eastern Ltd.(1992).
2. *Fundamental of Microprocessor 8085* by V. Vijayendran, S.ViswanathanPublishers, Chennai(2003).
3. *Fundamentals of Microprocessors and Microcomputers* by B.Ram – Dhanpat RAI publication.

REFERENCE BOOKS:

1. *Introduction to Microprocessor* by AdityaMathur – Tata McGraw Hill Publishing Company Ltd.(1987).
2. *Microprocessor and Digital System* by Douglas V. Hall – 2nd Edition – McGraw Hill Company (1983).

DIGITAL TOOL:

<https://vardhaman.org/wp-content/uploads/2021/03/Microprocessors-and-Microcontrollers.pdf>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	3	1	2	2
CO2	3	2	2	1	1	1
CO3	1	2	1	1	2	2
CO4	1	3	1	2	2	1
CO5	2	1	2	1	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSE53	ENERGY PHYSICS	ELECTIVE – 1	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

REVISION – 100%

COURSE DESCRIPTION:

This course intends to provide an understanding of the present energy crisis and to gain knowledge about various available energy sources.

COURSE OBJECTIVE:

This course helps the students to understand the importance of non-conventional energy sources, to gain knowledge about solar thermal, photovoltaic systems, wind and biomass energy and to learn about the necessity of energy storage.

COURSE OUTCOMES (COs):

On successful completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO 1	acquire knowledge of conventional and non-conventional energy sources	Upto K3
CO 2	classify the different types of Solar Collectors	Upto K3
CO 3	understand the photovoltaic principle and apply it in the construction of solar cell	Upto K3
CO 4	outline the importance of biomass resources and describe the working of Biomass gasifier	Upto K2
CO 5	understand the importance of wind energy and explain the necessity of energy storage	Upto K2

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

ENERGY PHYSICS

UNIT – I: Introduction to Energy Sources

Energy Consumption and Standard of Living –Oil crisis of 1973 – Classification of Energy Resources – Conventional and non-conventional sources of energy– Energy chain – Importance of Non-Conventional energy sources– merits and demerits of conventional and non-conventional energy sources.

UNIT – II: Solar Thermal Energy

Solar Collectors – Classification – Comparison of Concentrating and Non concentrating type –Basic Principles of Liquid flat plate collector —Construction and working– Solar cooker – box type, Paraboloidal Dish Type – Solar water heating systems –Solar Furnace

UNIT – III: Photovoltaic Systems

Introduction – Photovoltaic principle – Solar Cell Characteristics – Types of Solar cells– Construction of Solar cell, Module, Panel and Array – Solar PV Systems –Application of Solar PV systems

UNIT – IV: Biomass Energy

Introduction– Usable forms of Biomass, their composition and fuel properties – Biomass Resources– Biomass conversion technologies–Biomass Gasification–Working of downdraft gasifier – Biogas production from waste bio mass –Advantages and disadvantages of biological conversion of solar energy.

UNIT – V: Wind Energy and Other Energy Sources

Introduction – Origin of winds– Wind Energy Conversion systems – Environmental aspects – Energy storage– necessity of Energy storage – Ocean thermal energy conversion–tidal power, advantages and limitations of tidal power generation– Fuel cells– and application of fuel cells– batteries– advantages of battery for bulk energy storage– Hydrogen Storage.

TEXT BOOK:

B.H. Khan, *Non-Conventional Energy Resources*, Second Edition, Tata McGraw Hill Education Private Limited, 2011

REFERENCE BOOKS:

1. Kothari D.P., K.C. Singal and Rakesh Ranjan, *Renewable Energy Sources and Emerging Technologies*, Prentice Hall of India, 2008
2. Chetan Singh Solanki, *Solar Photovoltaics Fundamentals, Technologies and Applications*, 2nd Edition, PHI Learning Private Limited, 2011.
3. Rai G. D, *Non – Conventional Energy Sources*, 4th Edition, Khanna Publishers, 2010.
4. Jeffrey M. Gordon, *Solar Energy: The State of the Art*, Earthscan, 2013.
5. Kalogirou S.A., *Solar Energy Engineering: Processes and Systems*, 2nd Edition, Academic Press, 2013.
6. Zobaa A.F. and Ramesh Bansal, *Handbook of Renewable Energy Technology*, World Scientific, 2011.

DIGITAL TOOLS:

1. https://www.vssut.ac.in/lecture_notes/lecture1428910296.pdf
2. https://mrcet.com/downloads/digital_notes/ME/IV%20year/Renewable%20Energy%20Sources.pdf

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	1	3	1
CO2	3	3	2	2	2	2
CO3	3	3	3	1	2	2
CO4	3	2	1	2	2	1
CO5	3	2	2	2	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSS51	BIO PHYSICS	SBS – 3	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

Revision-10%

COURSE DESCRIPTION:

Bio Physics is the study of living systems in terms of concepts and laws of Physics. This course, at the simplest level one can apply Physics in understanding the working of organ systems.

COURSE OBJECTIVE:

To outline the structures of muscles and bones and see how they work together during animal locomotion and to study the transport of O_2 and CO_2 in blood by diffusion.

COURSE OUTCOMES (COs):

On successful completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the force exerted by the vertebra to head stationary in the erect position and to illustrate rotational equilibrium and translational equilibrium with examples.	Upto K2
CO 2	employ the pressure flow relation for laminar blood flow using Poiseuille's formula	Upto K3
CO 3	explain the dynamics of gas transport in blood cells	Upto K2
CO 4	recall the characteristics of Sound	K1
CO 5	define the light and describe the nature of light and Physiology of the eye.	Upto K2

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3– APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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BIO PHYSICS

UNIT – I: Bio– Mechanics

Introduction – Biostatics – Forces and toques – Bio Physics of Muscles– Muscle power – Mass specific Muscle Power – Strength of bones.

UNIT – II: Bio Physics and Fluid Flow

Hemodynamics – Plasma skimming – Turbulence – Pressure flow relation – Fluid in Plants – Xylem transport – Phloem transport.

UNIT – III: Physics of Audition

Transverse and longitudinal waves – Physiological Characteristics of Sound – Human Ear.

UNIT – IV: Physics of Vision

Wave nature of light – Geometrical Optics – Refraction in Human eye – Gradient index – Lens – Chromatic aberration – Spherical aberration – Refractive Power of Eye.

UNIT – V: Bio Physics and Gas transport

Connective Transport of gases – Air way resistance – Transport of O₂ in blood – Transport of CO₂ in blood – Gas exchange in lungs.

TEXT BOOK:

Elementary Bio Physics. P.K.SriVastava, Narosa Publishing House Pvt. Ltd., reprint 2006

REFERENCE BOOK:

Introduction to Bio Physics, Dr. Pranab Kumar Banerjee, Dec 2010, S.Chand & Company

DIGITAL TOOL:

<https://ia600204.us.archive.org/30/items/biophysicsconcep00case/biophysicsconcep00case.pdf>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	1	3	1
CO2	3	3	2	2	2	2
CO3	3	3	3	1	2	2
CO4	3	2	1	2	2	1
CO5	3	2	2	2	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSS52	OPTO ELECTRONICS	SBS – 4	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

REVISION – 100%

COURSE DESCRIPTION:

This course intends to provide the fundamental knowledge of optoelectronic devices and gives an idea about fibre optical communication system.

COURSE OBJECTIVE:

This course helps to give an introductory account of the basic principles of Optoelectronic devices and to acquire knowledge about the working of LASER, photo detectors, photo diodes and photo transistors, and to gain information about fibre optical communication system.

COURSE OUTCOMES (COs):

On successful completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	gain knowledge about the basic principles of LCD and LED.	K1
CO2	explain the Principle, and characteristics of laser and describe the concept of holography	Upto K2
CO3	illustrate the characteristics of photo detectors, photo diode and photo transistors.	Upto K2
CO4	summarize the basic concepts of fibre optics and elaborate the transmission of light in a optical fibre.	Upto K2
CO5	classify the types of optical fibres and discuss the advantages of fibre optic communication.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3– APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

OPTO ELECTRONICS

UNIT – I: Light Sources

Introduction – PN junction as a Light Source (LED) – LED materials – Advantages – LCD – Characteristics and working of LCD – Advantages.

UNIT – II: Laser

Laser – Introduction – characteristics of Laser– Spontaneous and stimulated emission– Einstein coefficients– condition for population inversion–construction and reconstruction of a hologram.

UNIT – III: Detectors

Photo detector – characteristics of photo detectors– PN junction photo detector – PIN photo diode – Avalanche photo diode– Photo transistor.

UNIT – IV: Optical Fibre

Introduction – principle of optical fibre – light transmission in an optical fibre – acceptance angle – Numerical aperture –Types of optical fibres (material, refractive index, and mode).

UNIT – V: Fibre Optical Communication System

Fibre optical communication system (Block diagram) – Fibre optic sensors – Advantages of fibre optical communication system.

TEXT BOOKS:

1. *Semiconductor physics and Optoelectronics* – P. K. Palanisamy, SCITECH Publication, Chennai 2002.
2. *Optical fibres and Fibre Optic Communication* – Sabir Kumar Sarkar IV Revised Edition 2003.

REFERENCE BOOK:

Opto Electronics – Wilson & Hawker, Prentice Hall of India 2004.

DIGITAL TOOLS:

1. https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SPH1312.pdf
2. https://mrcet.com/downloads/digital_notes/ECE/III%20Year/FIBER%20OPTICAL%20COMMUNICATIONS.pdf

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	2	3	1
CO2	3	3	3	2	2	2
CO3	3	3	3	3	2	2
CO4	3	1	1	2	3	2
CO5	3	2	2	2	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSCP3	ANALOG ELECTRONICS PRACTICALS	CORE PRACTICAL – 3	–	6	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	40	60	100

Revision-10%

MAJOR CORE PRACTICALS – ANALOG ELECTRONICS

LIST OF EXPERIMENTS

1. SCR Characteristics

2. FET Characteristics.

3. UJT Characteristics

4. Zener Diode Characteristics.

5. Bridge Rectifier with π section filter.

6. Zener voltage Regulator.

7. Voltage Doubler and Tripler.

8. Single Stage Amplifier – Gain and Band width

9. Hartley Oscillator.

10. Colpitt's Oscillator.

11. Astable Multivibrator.

12. Clipper and Clamper using Discrete Components.

13. Differentiator and Integrator.

14. Logic Gates – Discrete Components.

15. Two Stage amplifier without feedback.



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SYLLABUS

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSCP4	BIOPHYSICS PRACTICALS	CORE PRACTICAL – 4	–	6	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	40	60	100

Revision-20%

MAJOR CORE PRACTICALS – BIOPHYSICS

LIST OF EXPERIMENTS

1. Determination of the refractive index of different Bio-fluids using a hollow prism
2. Determination of the refractive index of Bio-fluid using laser.
3. Effect of temperature on viscosity using Ostwald viscometer.
4. Measurement of blood pressure –demonstration and interpretation.
5. Determination of velocity of Sound in Bio-fluids using Ultrasonic interferometer.
6. Draw equipotential lines for a bio fluid.
7. Polari meter experiment – Determination of specific rotatory power of glucose solution.
8. Comparison of S.T. of Bio-fluid using capillary rise method.
9. Surface Tension of a Bio-fluid using drop weight method.
10. Determination of relative density of a Bio-fluid using Melde's apparatus.
11. Interfacial S.T. of a bio-fluid by the method of drops.
12. Refractive index of a solid and a liquid using vernier microscope.
13. Specific heat capacity of a liquid using Newton's law of cooling.
14. Determination of refractive index of Bio-fluid using liquid lens.
15. Determination of Relative density of solid and liquid using sonometer.
16. Determination of specific heat capacity of liquid using Joule's calorimeter.



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SYLLABUS

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSC61	SOLID STATE PHYSICS	CORE – 9	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

Revision -10%

COURSE DESCRIPTION:

This course gives an introduction to the structure of the solids and bonding in solids, their properties particularly electrical and magnetic properties. It also deals with X-rays and its production and properties.

COURSE OBJECTIVE:

The main objective of this course is to give an introductory account of X-rays and bonding in solids along with their structural properties, electrical and magnetic properties.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	know about the structure of the solids and acquire knowledge of bonding in solids and crystal lattice.	K1
CO2	understand the production of X-rays with their properties and its application.	Upto K3
CO3	acquire the knowledge about the properties of metals and their effect	K1
CO4	study and know about the properties of magnetic materials along with the Langevin's theory of magnetism	Upto K2
CO5	acquire the knowledge about the band theory of solids and dielectric properties of materials.	Upto K2

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

SOLID STATE PHYSICS

UNIT – I:

Bonding in solids – Types of bonds – ionic, covalent, metallic and vander wall's bonds – Binding energy of ionic crystals – cohesive energy – **cohesive energy of ionic solids – application to sodium chloride crystal – evaluation of Madelung constant for sodium chloride.** – Crystal structure – crystal lattice and Unit cell – Bravais lattice – Classification of crystals – Miller indices – simple structures – packing factor – structure of diamond and zinc blende – lattice vibrations – thermal properties – Heat capacity of solids – classical theory – Limitations – **energy gap – isotope effect – London equations – AC & DC Josephson effects**

UNIT – II:

X-rays – production and properties – continuous and characteristic x-ray spectra – main features – Duane and Hunt law – Mosley's law and its importance – Compton effect – theory and experiment – X-ray diffraction – Laue pattern – Bragg's law – Bragg's x-ray spectrometer for wavelength measurement – Powder crystal method.

UNIT – III:

Free electron theory of metals – Drude-Lorentz theory – Drift, mobility, mean free path, relaxation time of free electrons – electrical and thermal conductivities of metals – Weidemann and Franz law – sources of resistivity of metals – superconductivity – Types – Meissner effect – BCS theory – applications.

UNIT – IV:

Magnetic materials – Types – properties and applications – Hard and soft magnetic materials – Different types of magnetism – dia, para, ferro, antiferro and ferri magnetism – Langevin's theory of dia and para magnetism – Weiss theory of ferromagnetism – magnetostriction materials.

UNIT – V:

Band theory of solids –classification of insulators, Semiconductors, conductors – Dielectrics – polarization – Polar and non-polar dielectrics – Different types of polarization – electronic, ionic, orientational and space charge – Polarisability – Clausius-Mossotti relation – dependence of polarization on frequency and temperature – Dielectric materials – properties and applications – active and passive materials – Ferro electric and Piezo electric materials.



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

TEXT BOOKS:

1. **Solid State Physics** by Prof. P.K. Palanisamy, Scitech Publications (India) Pvt. Ltd. Chennai. 2006
Unit– I Chapter 1: Sections (1.1, 1.2, 1.3, 1.4, and 1.7)
Chapter 6: Sections (6.1 to 6.10)
Chapter 7: Sections (7.1 to 7.3)
Unit – III Chapter 8: Sections (8.1 to 8.3, 8.9, 8.10)
Unit – IV Chapter 4: Sections (4.1 to 4.6, 4.8 and 4.8.3)
Unit– V Chapter 5: Sections (5.1 to 5.7)
2. **Modern Physics** by R. Murugesan, S. Chand and Company Ltd, RamNagar, New Delhi
Unit – II Chapter 5: Sections (5.1 to 5.14)
3. **Solid State Physics** by Saxena Gupta and Saxena from Prakati Prakashan Publications Pvt. Ltd.,
Unit – III Chapter 8: Pages from 259 to 264

REFERENCE BOOKS:

1. **Introduction To Solid State Physics** by C. Kittel V edition
2. **Solid State Physics** by V.K. Puri and Babber

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	1	2	1	1
CO2	2	1	1	2	2	2
CO3	1	1	2	1	3	3
CO4	1	3	2	1	1	2
CO5	2	1	1	1	1	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSE61	CLASSICAL AND STATISTICAL MECHANICS	ELECTIVE – 2	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

Revision- 15%

COURSE DESCRIPTION:

This course gives an introduction to the mechanics of a system of particles and helps to understand the usage of Lagrangian and Hamiltonian formulation and also deals with classical and quantum statistics.

COURSE OBJECTIVE:

The main objective of this course is to give an introductory account of mechanics of systems of particles and their equations of motion. It helps to understand the basic concepts about Lagrangian and Hamiltonian formulation and their applications and to study the concepts of classical and quantum statistics.

COURSE OUTCOMES (COs):

On successful completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	illustrate the mechanics of system of particles and their equations of motion.	Upto K2
CO2	explain the Lagrangian formulation and able to solve various mechanical problems.	Upto K3
CO3	understand the Hamiltonian formulation and adapt to various applications	Upto K3
CO4	interpret the types of ensembles and explain the basic concepts in classical statistics.	Upto K2
CO5	understand B.E. and F.D statistics and compare the classical and quantum statistics.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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CLASSICAL AND STATISTICAL MECHANICS

UNIT – I: Mechanics of a System of Particles

Mechanics of a system of particles– Conservation of linear momentum–Conservation of angular momentum – Conservation of energy – work–energy theorem Constraints – Types of constraints – Examples – Degrees of freedom–Generalized coordinates– Generalized displacement – Generalized velocities– Generalized Momentum.

UNIT – II: Lagrangian Formulations

Principle of virtual work, D'Alembert's principle, Lagrange's equation of motion from D'Alembert's principle for conservative and non conservative systems – Simple applications – simple pendulum – Atwood's machine – compound pendulum and linear harmonic oscillator

UNIT – III: Hamiltonian Formulations

Phase space– The Hamiltonian function H –Hamilton's Canonical equation of motion–Physical significance of H– Deduction of Canonical equation from a variational principle–Applications– Harmonic oscillator – simple pendulum – Compound pendulum.

UNIT – IV: Classical Statistics

Micro and macro states – The μ – space and gamma space – fundamental postulates of statistical mechanics – Ensembles – different types – Thermo dynamical probability – entropy and probability – Boltzmann's theorem – Maxwell–Boltzmann statistics – Maxwell – Boltzmann energy distributive law – Maxwell–Boltzmann velocity distributive law.

UNIT – V: Quantum Statistics

Development of Quantum statistics– Bose – Einstein and Fermi – Dirac statistics – Derivation of Planck's radiation formula from Bose – Einstein statistics – Free electrons in metal– Fermi gas– Difference between classical and quantum statistics.

TEXT BOOKS:

1. *Classical Mechanics*– Gupta, Kumar, Sharma, Thirtieth edition 2019, Pragati Prakashan Publ., Meerut. (For first 3 Units)
2. *Heat & Thermodynamics*– Brijlal & Subramaniam, Reprint 1998, S. Chand & Company Ltd. (For last 2 Units)

REFERENCE BOOKS:

1. *Classical Mechanics*– C. Upadhyaya, July 2005, Published by Himalaya Publishing House, Mumbai
2. *Classical Mechanics*– Gupta, B.D., Satyaprakash, 1991, 9th ed., Kadmernath Ramnath Publ., Meerut
3. *Theoretical Mechanics*– Murray R. Spiegel, 1981, Schaum's outline series, Mc Graw Hill Publ. Co., New Delhi.
4. *Statistical Physics*– Agarwal, S. Chand & co New Delhi 1996.

DIGITAL TOOLS:

1. <http://math.huji.ac.il/~razk/Teaching/LectureNotes/LectureNotesMechanics.pdf>
2. <http://www.jamia-physics.net/lecnotes/statmech/>
3. <http://micro.stanford.edu/~caiwei/me334/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	2	1	1
CO2	3	3	3	2	2	2
CO3	3	3	3	3	1	2
CO4	3	1	1	2	1	2
CO5	3	1	1	2	1	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSE62	SPECTROSCOPY	ELECTIVE – 2	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

REVISION – 100%

COURSE DESCRIPTION:

This course intends to provide the fundamental knowledge of atomic and molecular spectra and the instrument techniques.

COURSE OBJECTIVE:

This course helps to give an introductory account of the basic principles of atomic and molecular spectra and to acquire knowledge about the various instrumentation techniques.

COURSE OUTCOMES (COs):

On successful completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	gain knowledge about the rotation spectra and analysis by microwave spectroscopy	K1
CO2	summarize the different types of oscillators and study the analysis by Infra-red Spectroscopy	Upto K2
CO3	apply the principles to explain spectra obtained due to energy level transitions in molecules	Upto K3
CO4	illustrate the rotational fine structure of electronic vibrational transition.	Upto K2
CO5	acquire knowledge about instrumentation and techniques in IR Spectrometer.	Upto K2

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

SPECTROSCOPY

UNIT – I: Microwave Spectroscopy

Rotation of molecules – Classification of molecules – Rotation spectra of diatomic molecules – Intensities of Spectral lines – Effect of Isotopic Substitution – Non-rigid rotator – Spectrum of a Non-Rigid Rotator – Polyatomic Molecules – Symmetric Top molecules – Asymmetric Top molecules – Techniques and Instrumentation – Chemical analysis by Microwave spectroscopy.

UNIT – II: Infrared Spectroscopy

I.R. Spectroscopy – Vibrating diatomic molecules – Simple Harmonic Oscillator – Anharmonic oscillator – Diatomic vibrating rotator – IR Spectrum of carbon monoxide – Interaction of rotations and vibrations – Vibration of Polyatomic molecules – Analysis by IR techniques.

UNIT – III: Raman Spectroscopy

Raman effect: Discovery – Quantum theory of Raman effect – Classical theory of Raman Effect – Pure rotational Raman Spectra – Linear molecules – Raman Spectrum of symmetric top molecules – Vibrational Raman spectra – Rule of mutual exclusion – Overtone and Combination Vibrations – Rotational Fine Structure – Polarization of light and the Raman Effect – Structure determination from IR and Raman spectroscopy.

UNIT – IV: Electronic Spectroscopy

Born – Oppenheimer approximation – Vibrational coarse structure: Progressions – Frank–Condon principle – Dissociation energy and Dissociation products – Rotational Fine Structure of Electronic Vibration Transitions – Fortrat diagram – Pre dissociation – Diatomic molecules.

UNIT – V: Instrumentation

Instrumentation and Techniques in Infrared spectroscopy – Sources – mono chromators – Sample cells – Detectors – Single beam Infra-red spectrometer – Double beam Infra-red spectrometer

TEXT BOOK:

Fundamentals of Molecular Spectroscopy– Colin N Banwell Elaine– M Mccash Fifth Edition

REFERENCE BOOKS:

1. *Molecular Structure and Spectroscopy*– G. Aruldas, PHI Learning Pvt. Ltd, India.
2. *Hand book of Analytical Instruments*–R.S. Khandpur, Tata MC Grow Hill Ltd

DIGITAL TOOLS:

1. https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SCY1612.pdf
2. <https://www.uou.ac.in/sites/default/files/slm/MSCCH-509.pdf>

Mapping of CO with PSO

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CO3	3	3	3	1	1	2
CO4	3	1	1	2	3	1
CO5	3	2	2	2	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSE63	ASTRO PHYSICS	ELECTIVE – 2	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

REVISION – 100%

COURSE DESCRIPTION:

During the course, the students will learn about the sun and the solar systems, the star and the galaxy, distant galaxies and the beginning of the universe.

COURSE OBJECTIVE:

To make the students explore the parent star, sun and its importance for sustaining life on the earth, to make them understand the solar atmosphere and its effect on the earth and other planets and to help them gain knowledge of astronomical instruments, telescope its mounting and image defects.

COURSE OUTCOMES (COs):

On successful completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the birth of modern astronomy, Kepler's law of Planetary motion and visualize the effect of the three laws on the orbit of planets, asteroids and comets.	Upto K2
CO 2	learn theoretical and practical aspects of modern telescopes, photometry and spectroscopy.	Upto K2
CO 3	understand the temperature, atmospheric pressure of a planet. Describe solar and lunar eclipses	Upto K2
CO 4	explain theoretical evolution of stars, white dwarfs. Understand the basic physics of black holes.	Upto K2
CO 5	discuss milky way galaxy and its structure and understand Big Bang theory	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

ASTROPHYSICS

UNIT – I:

Birth of Modern Astronomy – Geocentric and Heliocentric theories — Kepler's laws of planetary motion – Newtonian gravitation – Celestial sphere – Planets – Terrestrial and Jovian planets (Planets individual description is not required in detail) – Asteroids– Meteorites – Comets.

UNIT – II:

Telescopes – Elements of telescope – Properties of images – Types of Optical telescopes – Refracting and Reflecting telescopes– Radio telescope –Spectrograph – Limitations – Photographic photometry – Photoelectric photometry – Spectrophotometry – Detectors and image processing.

UNIT – III:

Sun – Physical properties – Composition – Core – Nuclear Reactions – Photosphere – Chromosphere – Corona – Sunspots – Sunspot cycle – Solar Wind – Auroras – space weather effects – History of the Earth – Temperature of a planet – The atmosphere – Pressure and Temperature distribution – Magnetosphere – Eclipses – Solar and Lunar Eclipses.

UNIT – IV:

Classification of Stars – The Harvard Classification system – Luminosity of a Star – Hertzsprung–Russell Diagram – Stellar evolution using the HR diagram – Theoretical evolution of stars – White Dwarfs – Neutron stars–Black holes – Event horizon – Basic physics of Black Holes.

UNIT – V:

Galaxy nomenclature – Types of Galaxies – Spiral – Elliptical – irregular galaxies – Milky Way Galaxy and its structure – Rotation and Mass Distribution – Rotation curve and Doppler shift – Star clusters – Galactic clusters – Pulsars – Cosmological Models – Big bang theory – Steady state theory – Hubble's law – Olber's paradox.

TEXT BOOKS:

1. Niclolas. A. Pananides and Thomas Arny, 1979, *Introductory Astronomy*, Addison Wesley Publ. Co.
2. Mujiber Rahman, *Concepts to Astrophysics*, Scitech Publications, Chennai.

REFERENCE BOOKS:

1. Abell, Morrison and Wolf, 1987, *Exploration of the Universe*, 5th ed., Saunders College Publ.
2. Carrol and Ostlie, 2007, *Introduction to Modern Astrophysics*, 2nd ed., Pearson International.
3. William J. Kaufmann, III, 1977, *Macmillan Publishing Company*, London.
4. Abhyankar, K.D., Universities Press.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	1	3	1
CO2	3	3	2	2	2	2
CO3	3	3	3		2	2
CO4	3	2	1	2	2	
CO5	3	2	2	2	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSE64	DIGITAL ELECTRONICS AND COMMUNICATION	ELECTIVE – 3	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

Revision-40%

COURSE DESCRIPTION:

Digital electronics is the study of electronic circuits that are used to process and control digital signals. The major focus of DE course is to expose students to the design process of combinational and sequential circuits. Digital electronics is that is the foundation of modern computers and digital communication.

COURSE OBJECTIVES:

The objective of this course is to provide fundamental concepts associated with the digital logic and circuit. To introduce the basic concepts and laws involved in the Boolean algebra and logic families and digital circuits. To familiarize with the number systems, logic gates, and combinational circuit and sequential circuits utilized in different digital circuits. The objective of communication is to provide basic idea to convert data into radio waves by adding information to an electronic carrier signal.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	employ the codes and number systems converting circuits and compare different types of logic families	Upto K3
CO2	learn the minimization techniques to simplify the hardware requirements of digital circuits and implement it, design and apply for real time digital circuits.	Upto K3
CO3	understand the working mechanism and design guidelines of different combinational and sequential circuits .	Upto K3
CO4	express basic concepts of modulation and demodulation in digital communication analyse the noise characteristics of a communication system.	Upto K3
CO5	get a thorough understanding of communication and satellite systems and knowledge of satellite links .	Upto K3

K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

DIGITAL ELECTRONICS AND COMMUNICATION

UNIT– I: Digital fundamentals

Number system and conversion –BCD code –1's and 2's complement –Binary subtraction by 1's and 2's complement – Basic laws of Boolean algebra – Boolean addition –Law's of Boolean Algebra – De Morgan's theorem –Statement and proof .

UNIT– II: Logic gates and Arithmetic circuits

Basic logic gates –NAND, NOR and EX–OR, EX–NOR gates – NAND and NOR as universal building blocks –Karnaugh map (2,3,4– variables) – SOP and POS applications – HALF adder FULL adder –4 bit binary adder – HALF subtractor –FULL subtractor –4 bit parallel subtractor – BCD adder – Multiplexer – 4to1 MUX – De Multiplexer 1 to 4 DE MUX – Encoder – 8 to 3– Decoder 3to8 BCD TO seven segment decoder .

UNIT– III: Sequential logic circuit

RS FLIP–FLOP,clocked RS FLIP–FLOP , D FLIP–FLOP,JK FLIP–FLOP AND JK Master slave FLIP–FLOP – Shift Registers and Ring Counters –Digital to Analog –Analog to Digital .

UNIT– IV: Modulation and Demodulation

Amplitude Modulation Frequency Modulation –Phase Modulation and Pulse width Modulation – Detectors of AM, FM,PM, and PWM, PLL – Noice in communication systems.

UNIT– V:Digital and Satellite Communication

ASK, FSK, PSK, Modulation and Demodulation – Advantages and Disadvantages –of Digital Communication –Communication – Satellite systems –Telemetry –Tracking –and command system –Satellite links.

TEXT BOOKS:

1. *Introduction to Integrated Electronics* by V.Vijayendran ,S.Viswanathan (Printers and Publishers) PVT. Ltd., Chennai –2005
2. *Digital Electronics and Application* by Malvino LEach , Tata Mc Graw Hill , 4th edition (1992)

REFERENCE BOOKS:

1. *Integrated Electronics* by J. Millman and Halkias, Tata Mc Graw Hill,New Delhi(2001)
2. *Digital Electronicsby Practice using Integrated Circuits* –R.P.Jain Tata Mc Graw Hill ,(1996)

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	–	2	–	1
CO2	2	–	3	2	1	–
CO3	3	1	–	2	3	–
CO4	2	1	1	–	2	1
CO5	2	3	1	1	2	–

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSE65	PROBLEM SOLVING SKILL IN PHYSICS	ELECTIVE – 3	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

REVISION – 100%

COURSE DESCRIPTION:

The intention of the course is to impart knowledge, skills and approaches about solving problems in core physics. Minimum of 25 problems based on various principles of physics are required in each unit.

COURSE OBJECTIVES:

The main objective of this course is to focus on the problem solving techniques in various fields of physics. It is helpful to appear research oriented entrance examination.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	get problem knowledge about translational and rotational mechanics	Upto K2
CO2	develop the problem solving techniques in thermal physics	Upto K2
CO3	know about the concept electricity and magnetism, problem solving and its applications	Upto K2
CO4	highlight the importance of method of solving the problem in quantum mechanics	Upto K3
CO5	show the output and application of general physics and mathematics while solving the	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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PROBLEMS SOLVING SKILLS IN PHYSICS

UNIT –I: Problems in Mechanics

Newton laws of motion for various systems (1, 2 and 3 dimension), Conservation laws and collisions, Rotational mechanics, central force, Harmonic oscillator, special relativity

UNIT – II: Problems in Thermal Physics

Kinetic theory– MB distribution–Laws of thermodynamics–Ideal Gas law Various Thermodynamic process– Entropy calculation for various process–Heat engine–TS and PV diagram–Free energies various relations

UNIT – III: Problems in Electricity & Magnetism Electrostatics

Calculation of Electrostatic quantities for various Magneto statics– Calculation of Magnetic quantities for various configuration, Electromagnetic induction, Poynting vector, Electromagnetic waves.

UNIT – IV: Problems in Quantum Mechanics

Origin of Quantum mechanics– Fundamental Principles of Quantum mechanics– potential wells and harmonic oscillator– Hydrogen atom.

UNIT – V: Problems in General Physics & Mathematics

Plotting the graphs for various elementary and composite functions–Elasticity Viscosity and surface tension– fluids–Buoyancy–pressure–Bernoulli's theorem– applications–waves and oscillations, Errors and propagation of errors.

Text Book:

1. *Mechanics (in SI units)* by Charles Kittel, Walter D Knight etc. (Berkeley Physics course– volume 1), Tata McGraw Hill publication, second edition.
2. *Thermal Physics* by S.C. Garg, RM Bansal &CK Ghosh. (Tata McGraw Hill Publications), 1st edition.
3. *Electricity & Magnetism (in SI units)* by E.M. Purcell, Tata McGraw hill Publication, 2nd Edition.
4. *Quantum Mechanics* by N. Zettili, Wiley Publishers, second edition.
5. *Introduction to Quantum Mechanics* by David. J.Griffith, Pearson Publications, second edition. Tamil Nadu State Council for Higher Education 59

REFERENCE BOOKS:

1. *Fundamentals of Physics* by Halliday & Resnick, Wiley Publications, 8th Edition.
2. *Advanced Level Physics* by Nelkon and Parker, CBS publishers, 7th edition
3. *Play with Graphs* by Amith Agarwal, Arihant Publications.
4. *Properties of Matter* by D.S. Mathur,

DIGITAL TOOL:

https://www.lehman.edu/faculty/dgaranin/Introductory_Physics/Introductory_Physics-Problem_solving.pdf

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	2	1	2	3
CO2	2	3	2	1	1	3
CO3	2	3	2	2	1	2
CO4	2	3	1	1	2	2
CO5	2	3	2	1	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSE66	RADIATION SAFETY	ELECTIVE – 3	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

REVISION – 100%

COURSE DESCRIPTION:

This course reveals the types of detectors used to measure high energy radiations as well as receptiveness to different approaches to problem solving.

COURSE OBJECTIVES:

This course helps to make awareness and understanding on radiation hazards and safety measures.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	explain about Nucleus, its energy states and radioactivity principles.	K1
CO2	infer the Physics aspects of Interaction of ionizing radiation with matter.	Upto K2
CO3	understand the function of scintillation detectors and methods of detection.	Upto K2
CO4	apply radiation safety management in different situation.	Upto K3
CO5	write the applications of nuclear techniques used in different fields.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

RADIATION SAFETY

UNIT – I: Basics of Atomic and Nuclear Physics

Basic concept of atomic structure; X rays characteristic and production; concept of bremsstrahlung and auger electron, The composition of nucleus and its properties, mass number, isotopes of element, spin, binding energy, stable and unstable isotopes, law of radioactive decay, Mean life and half life, basic concept of alpha, beta and gamma decay, concept of cross section and kinematics of nuclear reactions, types of nuclear reaction, Fusion, fission.

UNIT – II: Interaction of Radiation with Matter

Types of Radiation: Alpha, Beta, Gamma and Neutron and their sources, sealed and unsealed sources, Interaction of Photons –Photo–electric effect, Compton Scattering, Pair Production, Linear and Mass –Attenuation Coefficients, Interaction of Charged Particles: Heavy charged particles– Beth–Bloch Formula, Scaling laws, Mass Stopping Power, Range, Straggling, Channeling and Cherenkov radiation. Beta Particles– Collision and Radiation loss (Bremsstrahlung), Interaction of Neutrons– Collision, slowing down and Moderation

UNIT – III: Radiation Detection and Monitoring Devices

Radiation Quantities and Units: Basic idea of different units of activity, KERMA, exposure, absorbed dose, equivalent dose, effective dose, collective equivalent dose, Annual Limit of Intake (ALI) and derived Air Concentration (DAC). Radiation detection: Basic concept and working principle of *gas detectors* (Ionization Chambers, Proportional Counter, Multi–Wire Proportional Counters (MWPC) and Gieger Muller Counter), *Scintillation Detectors* (Inorganic and Organic Scintillators), *Solid States Detectors* and *Neutron Detectors*, *Thermo luminescent Dosimetry*.

UNIT – IV: Radiation Safety Management

Biological effects of ionizing radiation, Operational limits and basics of radiation hazards evaluation and control: radiation protection standards, International Commission on Radiological Protection (ICRP) principles, justification, optimization, limitation, introduction of safety and risk management of radiation. Nuclear waste and disposal management. Brief idea about Accelerator driven Sub–critical system (ADS) for waste management

UNIT – V: Application of Nuclear Techniques

Application in medical science (e.g., MRI, PET, Projection Imaging Gamma Camera, radiation therapy), Archaeology, Art, Crime detection, Mining and oil. *Industrial Uses*: Tracing, Gauging, Material Modification, Sterilization, Food preservation



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SYLLABUS

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TEXT BOOKS:

1. W.E. Burcham and M. Jobes – *Nuclear and Particle Physics* – Longman (1995)
2. G.F.Knoll, *Radiation Detection and Measurements*.

REFERENCE BOOKS:

1. *Thermoluminescence Dosimetry*, Mcknlly, A.F., Bristol, Adam Hilger
2. W.J. Meredith and J.B. Massey, *Fundamental Physics of Radiology*. John Wright and Sons, UK, 1989.
3. Martin and S.A. Harbisor, *An Introduction to Radiation Protection*, John Willey & Sons, Inc. New York, 1981.
4. W.R. Hendee, *Medical Radiation Physics*, Year Book – Medical Publishers Inc. London, 1981.

DIGITAL TOOL:

<https://archive.org/details/nuclear-and-particle-physics-w.-e.-burcham-m.-jobes/page/14/mode/2up?view=theater>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	3	2	1
CO2	2	3	1	1	2	2
CO3	3	2	2	2	1	2
CO4	3	2	1	2	2	2
CO5	2	3	2	1	1	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSS61	MEDICAL PHYSICS	SBS – 5	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

REVISION – 100%

COURSE DESCRIPTION:

This course helps to study the application of physics in medical field. It uses physics concepts in preclusion, diagnosis and treatment of disease through bio medical instruments

COURSE OBJECTIVE:

The objective of this course is to make the students understand the basics about the biological systems in our body, their behaviour, and the diagnostic devices.

COURSE OUTCOMES (COs):

On successful completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	acquire knowledge about the structure of our body	Upto K2
CO 2	understand the hearing and visualization function of our body	Upto K2
CO 3	describe the function of bio medical instruments and its applications	Upto K3
CO 4	obtain information about X rays and scanning devices	K1
CO 5	elucidate the concept of biological recording system and its outputs	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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MEDICAL PHYSICS

UNIT – I: Anatomy

An introduction to human body–Basic Anatomical Terminology– Standard anatomical position, Planes, Familiarity with terms like – Superior, Inferior, Anterior, Posterior, Medial, Lateral, Proximal, Distal. – Forces on and in the Body – Physics of the Skeleton

UNIT – II: Bio Mechanics, Audition and Vision

Pressure system of the body– Physics of Cardiovascular system– Electricity within the Body – Sound in medicine– Physics of the Ear and Hearing– Light in medicine– Physics of eyes and vision.

UNIT – III: Transducers

Performance of Characteristics of transducer– static and dynamic active transducers – (a) piezoelectric type (b) photovoltaic type Passive transducer– (a) resistive type – effect and sensitivity of the bridge (b) capacitive transducer

UNIT – IV: X Rays and Scanning System

X–rays– Production of X–rays– X–ray spectra– continuous spectra and characteristic spectra– Coolidge tube– Computer Tomography (CT) principle– Block diagram of CT scanner.

UNIT – V: Recording System

Electro cardio graph (ECG) – Block diagram– ECG Leads– Unipolar and bipolar–ECG recording set up. Electro Encephalo Graph (EEG) – origin– Block diagram– Electro Myograph (EMG) – Block diagram– EMG recorder

TEXT BOOK:

Medical Physics – John R. Cameron and James G. Skofronick, 1978, John Willy & Sons.

REFERENCE BOOK:

Bio Medical Instrumentation – Edn II, Dr. M. Arumugam, Anuradha Agencies 1997.

DIGITAL TOOL:

<https://www.tutorialsduniya.com/notes/medical-physics-notes/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	3	1	2	2
CO2	2	2	2	2	2	2
CO3	2	3	3	1	2	2
CO4	3	3	2	2	2	2
CO5	2	3	3	2	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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SYLLABUS

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSS62	NANOPHYSICS	SBS – 6	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

REVISION – 100%

COURSE DESCRIPTION:

This course deals with the basics, characterization and importance of nanoscience and which impart the basic physics involved in nanoscience and technology.

COURSE OBJECTIVES:

This course helps to understand the basics of nanoscience and technology. Proficiency of this knowledge will be useful in technological applications.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	get the basic knowledge in nanomaterials.	K1
CO2	understand the scientific perspective of nanomaterials.	Upto K2
CO3	recognize single domain magnetic nanoparticles.	Upto K2
CO4	identify the techniques suitable for nanomaterial synthesis.	Upto K3
CO5	know the significance of nanomaterials.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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NANOPHYSICS

UNIT – I: Introduction

History of Nanoscience – Definition of Nanometer – Nanoscience and Nanotechnology – Classification of Nanomaterials – Examples of Nanostructured materials – Primitive vectors – Wigner–Seitz cell – Two dimensional lattice type – Primitive cells of three dimensional lattices.

UNIT – II: Synthesis of Nanomaterials

Bottom–up approach – Sol–Gel synthesis – Hydrothermal growth – Thin film growth (PVD and CVD) – Top–Down approach – Ball Milling.

UNIT – III: Quantum Dot and Carbon Nanotechnology

Super lattices – Quantum dots – Applications of Quantum dots – Carbon nanotechnology – carbon Allotropes – Graphene – Applications of carbon nanotubes.

UNIT – IV: Properties

Domains in magnetic materials – Single domain nature and the Superparamagnetism – Effect of size reduction on Bulk properties – Optoelectronic property of bulk and nanostructures.

UNIT – V: Applications of Nanotechnology

Introduction – Applications in Materials Science – Applications in Biology and Medicine – Applications in surface science – Applications in Energy and Environment.

TEXT BOOKS:

1. *Nanoscience and Nanotechnology: Fundamentals to Frontiers* by M.S. Ramachandra Rao, Shubra Singh, Wiley India Pvt. Ltd., New Delhi. (2013).
2. *Text book of Nanoscience and Nanotechnology* – B. S. Moorthy, P. Sankar, Baldev Raj, B. B. Rath and James Murdy University Press – IIM
3. *Nanophysics*, Sr. Geradin Jayam, Holy Cross College, Nagercoil (2010)

REFERENCE BOOKS:

1. *Nano the Essentials*– T. Pradeep, Tata Mc.Graw Hill company Ltd (2007)
2. *The Chemistry of Nanomaterials :Synthesis, Properties and Applications*, C. N. R. Rao, A. Müller, A. K. Cheetham, , Volume 1, Wiley–VCH, Verlag GmbH, Germany (2004).

DIGITAL TOOL:

https://www.researchgate.net/publication/259118068_Chapter_-_INTRODUCTION_TO_NANOMATERIALS

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	1	2	2
CO2	3	1	2	2	2	2
CO3	2	1	1	2	1	1
CO4	2	1	3	2	2	1
CO5	2	1	1	2	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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SYLLABUS

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSCP5	DIGITAL ELECTRONICS PRACTICAL	CORE PRACTICAL – 5	–	6	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	40	60	100

Revision -5%

MAJOR CORE PRACTICALS – DIGITAL ELECTRONICS

LIST OF EXPERIMENTS

Any Fourteen

1. Dual Power Supply using IC.
2. IC 7805 Regulated Power Supply.
3. Op–Amp– Integrator and Differentiator.
4. Op–Amp – Adder and Subtractor.
5. Astable Multivibrator using Op–Amp.
6. Astable Multivibrator using IC– 555 timer.
7. Schmitt Trigger using IC–555.
8. Universality of NAND and NOR.
9. Half Adder and Full Adder.
10. Four Bit Binary Adder and Subtractor.
11. Shift Register.
12. Ring Counter.
13. **D/A Converter.**
14. Verification of De Morgan's theorem.
15. BCD Counter.



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SYLLABUS

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSCP6	GENERAL PRACTICAL	CORE PRACTICAL – 6	–	6	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	40	60	100

Revision 25%

MAJOR CORE PRACTICALS – GENERAL

LIST OF EXPERIMENTS

Any Fourteen

1. Spectrometer – Small angled prism
2. Spectrometer – i-d curve
3. Spectrometer – Grating minimum deviation
4. Spectrometer – Cauchy's constants
5. Spectrometer – i-i' curve
6. Spot Galvanometer – Comparison of Mutual inductances
7. Rayleigh bridge – Self inductance
8. Maxwell's bridge – Self inductance
9. De-sauty's bridge – Comparison of capacities
10. Impedance and Power factor – LR circuit
11. Impedance and Power factor – CR circuit
12. Spot Galvanometer – comparison of emfs
13. Spot Galvanometer – Thermo emf
14. Potentiometer – Thermo emf
15. Spot Galvanometer – determination of Mutual Inductance
16. Potentiometer – Resistance of a coil
17. Potentiometer – High range voltmeter



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

B.Sc. CHEMISTRY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Revision - 5%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYC51	ORGANIC CHEMISTRY – II	CORE – 9	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course imparts detailed knowledge in aliphatic carbonyl compounds, aromatic carbonyl compounds. It also helps to know the synthesis and characteristics of organic acids and understand about stereo chemistry, symmetry elements optical activity and geometrical isomerism of organic molecules.

COURSE OBJECTIVES:

- ❖ To know the methods of synthesis of aliphatic aldehydes and ketones, mechanism of nucleophilic addition, oxidation and reduction reactions
- ❖ To learn the general behavior of organic reactions with mechanism of aromatic carbonyl compounds
- ❖ To understand the general preparation and properties of aliphatic and aromatic carboxylic acids.
- ❖ To analyse the preparation and properties of substituted carboxylic acids, aromatic sulphonic acids and dicarboxylic acids.
- ❖ To get hold of the knowledge of stereochemistry of carbon compounds.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	explain the preparation and mechanism of aliphatic aldehydes & ketones.	Upto K3
CO2	spell the chemistry of aromatic aldehydes and ketones.	Upto K3
CO3	explain the preparation and chemical properties of aliphatic and aromatic carboxylic acids.	Upto K3
CO4	comprehend the preparation and properties of substituted carboxylic acids, aromatic sulphonic acids and dicarboxylic acids	Upto K3
CO5	identify the stereo chemical aspects of organic molecules	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

ORGANIC CHEMISTRY – II

UNIT –I:Aliphatic Carbonyl Compounds

(15 hrs)

a)Preparation by oxidation, hydrolysis, reduction reactions and from 1,3-dithianes& organometallics (magnesium, cadmium and lithium) – reactivity of carbonyl group and acidity of α -hydrogens – nucleophilic addition reactions (HCN, Grignard Reagent, ammonia and its derivatives)–condensation reactions (aldol, Cannizaro, Mannich and Tischenko) with their mechanisms –oxidation (including haloform reaction) – reduction reactions (MPV, Clemmensen, Wolf–Kishner, catalytic and metal hydrides) and polymerisation reactions – Distinguishing reactions between aldehydes and ketones

b) Preparation, properties and uses of crotonaldehyde, glyoxal and acetone.

UNIT –II:Aromatic Carbonyl Compounds

(15 hrs)

a)Preparation from carboxylic acids, Grignard Reagent, nitrile (Stephen reaction) and electrophilic substitutions of aromatic hydrocarbons (Gattermann, Gattermann–Koch, Reimer–Tiemann, Friedel–Crafts and Houben – Hoesch reactions) – reactivity of carbonyl group and its comparison with aliphatic counterparts – nucleophilic addition reactions – condensation reactions (Cannizaro, Claisen–Schmidt, Perkin, Benzoin, Knoevenagel and Stobbe) with their mechanisms – electrophilic substitution reactions – oxidation and reduction reactions.

b) Preparation, properties and uses of cinnamaldehyde, vanillin and acetophenone.

UNIT – III:Organo Acids –I

(15 hrs)

a) **Aliphatic carboxylic acids:** Preparation by oxidation, hydrolysis, carboxylation and haloform reactions –acidic character – effect of substituents on acidic strength –chemical properties: reaction involving acidic hydrogen (reactions with bases, diazomethane), replacement of –OH groups (formation of acid halides, amides, esters, acid anhydrides and ketone),reactions involving –COOH group (formation of alcohol, alkane and carbonyl compounds) and HVZ reaction.

b) **Aromatic carboxylic acids:** Preparation by oxidation, hydrolysis, carboxylation and haloform reactions – acidic character – effect of substituents on acidic strength – chemical properties: reactionsinvolving acidic hydrogen of –COOH, reactions involving –OH group (formation of acid chlorides, amides, esters&acid anhydrides), reactions involving –COOH group (Hunsdiecker reaction),reduction and electrophilic substitution reactions.

UNIT – IV:Organo Acids –II

(15 hrs)

a) **Substituted Carboxylic acids:** Preparation and properties of chloroacetic acid,lactic acid and pyruvic acid – distinction between among various halo acids, hydroxy acids and keto acids –preparation, properties and uses of salicylic acid.

b) **Aromatic Sulphonic acids:** Preparation and properties of benzene sulphonic acid – comparison of acidity with carboxylic acid – electrophilic and nucleophilic substitution reactions – preparation and properties of benzene sulphonyl chloride and sulphanilic acid – preparation and uses of saccharin and chloramine–T.

c) **Dicarboxylic acids :** Preparation and properties of aliphatic saturated dicarboxylic acids (upto glutaric acid) – preparation and properties of maleic acid and fumaric acid – preparation and properties of phthalic acid.



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SYLLABUS

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UNIT –V: Stereochemistry

(15 hrs)

a) **Optical isomerism:** Concept of chirality – chirality in organic molecules– enantiomers and diastereomers –distinguishing between them –optical activity – definition and its determination –dissymmetry –relative specification of configuration D and L notation–absolute configuration: R and S notation – racemisation– resolution : methods – asymmetric synthesis – Walden inversion – a brief study about the stereochemistry of allenes, spirans and biphenyl systems.

b) **Geometrical isomerism:** Condition for existence – *cis&trans* system and *syn &anti* system – determination of configuration present in maleic acid and fumaric acid, aldioximes and ketoximes – E and Z nomenclature.

TEXT BOOKS:

1. *Modern Organic Chemistry* by M. K. Jain and S. C. Sharma –Vishal Publishing Co. 4th Edn. (2014)
2. *Organic Chemistry* by Bhupinder Mehta and Manju Mehta –Eastern Economy Edition,(2010)

REFERENCE BOOKS:

1. *Organic Chemistry* by I.L.Finar (Vol. I & Vol.II) – Pearson Education Ltd. (2012)
2. *Stereochemistry of Organic Compounds* by Eliel etal – Wiley India , reprint (2008)
3. *Advanced Organic Chemistry* by Arun Bahl and B.S.Bahl,S.Chand Publishing Co. Ltd.,(2017)
4. *Organic Chemistry* by Morrison Boyd Pearson Education Ltd. Seventh Edition(2010)

DIGITAL TOOLS:

1. <https://www.youtube.com/watch?v=oui5g4vcd6M>
2. https://www.youtube.com/watch?v=2K_rn3YQglY&list=PLi6oabjl6coxYqpiAGd55GYguyTINjsHp&index=11
3. <https://www.youtube.com/watch?v=sTaI7Hir1CE>
4. <https://www.youtube.com/watch?v=QjPoY0cCneM>
5. https://www.youtube.com/watch?v=qiKJqdJK_t8

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	2	3	3
CO2	3	2	2	1	3
CO3	3	2	2	1	3
CO4	2	1	2	3	3
CO5	2	1	1	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr.V. SATHIYENDIRAN



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Revision - 60%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYE51	COORDINATION CHEMISTRY, BIO-INORGANIC CHEMISTRY AND ORGANOMETALLIC COMPOUNDS	ELECTIVE – 1	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

To get the information of mono and poly dentate ligand are coordinate with transition metal ions. To study about the isomerism, geometry and hybridization of complexes. To learn the bio-comfortable metal ions and metal complexes in living system. To have an idea about the organometallic compounds.

COURSE OBJECTIVES:

- ❖ To learn about the basic nomenclature of complex and isomerism
- ❖ To gain information about the geometry and hybridization of complex.
- ❖ To study the importance of metal ion in biological system.
- ❖ To discuss the structure and function of metalloporphyrins and metalloenzymes.
- ❖ To deal with the industrial catalyst of organometallic compounds.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	gain the importance of basic idea of coordination chemistry	Upto K3
CO 2	understand the properties of metal complexes	Upto K3
CO 3	realize the significance of bioinorganic chemistry	Upto K3
CO 4	know the function of hemoglobin, myoglobin and chlorophyll	Upto K3
CO 5	understand the preparation and properties of organometallic compounds.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COORDINATION CHEMISTRY, BIO– INORGANIC CHEMISTRY AND ORGANOMETALLIC COMPOUNDS

UNIT – I: Coordination Chemistry –I

(12 hrs)

Double salts and coordination compounds – terminology: coordination sphere, coordination number, ligand and its types – nomenclature of coordination compounds – Werner's coordination theory: postulates and experimental evidence. Chelates: classification and application of the formation of chelated complexes in analytical chemistry.

UNIT – II: Coordination Chemistry –II

(12 hrs)

Isomerism: structural isomerism and stereo isomerism ($[Ma_2b_2]$, $[Mabcd]$, $[M(AB)_2]$ $[Ma_4b_2]$ $[Ma_3b_3]$ $[Ma_2b_2c_2]$ $[M(AB)_3]$) – Preparation of complexes, stability constant – thermodynamic and kinetic stability – factors affecting the stability of metal complexes – Experimental determination of composition of complexes by Job's method. Sidgwick's concept: EAN rule, calculation and its applications

UNIT – III: Coordination Chemistry –III

(12 hrs)

Valence Bond Theory: assumptions and illustration to 4– and 6– coordination ions ($[Ni(NH_3)_4]^{2+}$, $[Cu(CN)_4]^{2-}$, $[Co(NH_3)_6]^{2+}$, $[Fe(CN)_6]^{3-}$, $[FeF_6]^{3-}$)– hybridization, magnetic properties and geometry – limitations – Crystal Field Theory: salient features – orbital splitting as applied to octahedral, tetrahedral and square planar complexes – CFSE and its calculation – spectrochemical series– magnetic moments and color of transition metal complexes.

UNIT – IV: Bioinorganic Chemistry

(12 hrs)

Essential and trace elements: Introduction and their classification – Metalloporphyrins: definition – hemoglobin and myoglobin – structure and function – cooperative and non-cooperative binding – Bohr effect – CO poisoning of Hb – chlorophyll–structure and its functions – metalloenzymes.

Role of Na^+ and K^+ ions in biological system – Na–K pump– role of calcium in biology – rickets – osteoporosis – hypercalcemia and hypocalcemia – comparison of biochemistry of Ca^{2+} and Mg^{2+} .

UNIT – V: Organometallic Compounds

(12hrs)

Introduction–general preparation and properties of organometallic compounds– preparation, properties and uses of organometallic compounds such as alkali metal, beryllium, magnesium and olefine. Metallocenes: ferrocene –preparation and properties– metal carbonyls– preparation and properties of $Ni(CO)_4$, $Fe(CO)_5$



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SYLLABUS

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TEXT BOOKS:

1. *Principles of Inorganic Chemistry* by B.R.Puri, L.R. Sharma and K.C.Kalia – Milestone Publishers, 48thEdn. (2019).
2. *Modern Inorganic Chemistry* by R. D. Madan and Satya Prakash – S. Chand and Co, 3rd Edn. (2014).
3. *Bioinorganic Chemistry* by K. Hussain Reddy, New age international, (2007).

REFERENCE BOOKS:

1. *Inorganic Chemistry* by J. E. Huheey et. al. – Pearson Education Pvt. Ltd., 4th Edn. (2004).
2. *Advanced Inorganic Chemistry (Volume-II)* by Satya Prakash, G. D. Tuli, S.K. Basu and R. D. Madan – S. Chand and Co, 4thEdn. (2020).
3. *Bioinorganic Chemistry* by Asim K. Das, Books and allied Ltd, (1999).
4. *Concise Coordination Chemistry* by R.Gopalan et al. – Vikas publishing house Pvt. Ltd. Revised Edn. (2012).

DIGITAL TOOLS:

1. <https://www.youtube.com/watch?v=TF3r9JT83Ss>
2. <https://www.youtube.com/watch?v=XIvB-G57AiI>
3. <https://www.youtube.com/watch?v=8lT2lwKoXyQ>
<https://www.youtube.com/watch?v=s0dJHwBVFcI>
4. [https://chem.libretexts.org/Bookshelves/Inorganic_Chemistry/Book%3A_Inorganic_Chemistry_\(Saito\)/08%3A_Reaction_and_Physical_Properties/8.02%3A_Bioinorganic_chemistry](https://chem.libretexts.org/Bookshelves/Inorganic_Chemistry/Book%3A_Inorganic_Chemistry_(Saito)/08%3A_Reaction_and_Physical_Properties/8.02%3A_Bioinorganic_chemistry)
5. [https://chem.libretexts.org/Bookshelves/Inorganic_Chemistry/Organometallic_Chemistry_\(Evans\)](https://chem.libretexts.org/Bookshelves/Inorganic_Chemistry/Organometallic_Chemistry_(Evans))

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	2	2	3
CO2	1	2	2	2	3
CO3	2	2	2	3	3
CO4	2	2	3	3	3
CO5	1	1	2	2	3

3. Advanced Application

2. Intermediate Development

1. Introductory Level

COURSE DESIGNER: Dr. M. RAJASEKARAN



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Revision -100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYE53	FORENSIC CHEMISTRY	ELECTIVE – 1	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

This course imparts detailed knowledge in forensic science.

COURSE OBJECTIVES:

- ❖ To acquire knowledge about the concept of chemistry as related to forensic science.
- ❖ To understand the use of chemicals in criminal investigation.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	learn the collection of samples and preservation of evidences.	Upto K3
CO2	understand the examination and identification of drugs	Upto K3
CO3	gain the knowledge of finger print and forensic serology.	Upto K3
CO4	identify the types of crime detection	Upto K3
CO5	find the forgery in various fields.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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FORENSIC CHEMISTRY

UNIT – I: Collection and Preservation of Evidences (12 hrs)

Introduction– historical development of forensic science; types of physical evidence– importance of physical evidence– collection and preservation of physical evidence– identification of physical evidence– Forensic characteristics of glass and soil – Forensic examination of hair, fibre and paints.

UNIT – II: Examination and Identification of Drugs, Alcohol and Poisons (12 hrs)

Drug abuse– effects of marijuana and LSD– Alcohol–effect of the amount of alcohol consumed–analysis of alcohol by breathalyzer – Poisons– types and classification of poison – diagnosis of poisons in the living and the dead– clinical symptoms– identification of phenol, chloral, HCN, alkaloids and arsenic poisons.

UNIT – III: Finger Print and Forensic Serology (12 hrs)

Finger prints– principles– detection and preservation of developed finger prints– Forensic Serology–blood types–characterization of blood strains– preservation of blood evidence – Analysis of seminal stains.

UNIT – IV: Crime Detection (12 hrs)

Document and voice examination–hand writing comparison– collection of hand writing exemplars– typewriting comparisons– voice examination–sound spectrograph– Human bombs– possible explosives (gelatin sticks and RDX) – metal detector devices

UNIT – V: Forgery and Counterfeiting (12 hrs)

Detecting forgery in bank cheques/drafts and educational records like mark sheet, certificate using UV light. Alloy analysis using AAS to detect counterfeit coins – Checking silver line water mark in currency notes – Detecting of gold purity in 22 carat ornaments and detecting gold plated jewels.

TEXT BOOKS:

1. *Forensic Sciences* by James T.H., Stanley Thornes Ltd, New York, (2005)
2. *Textbook of Forensic Chemistry* by S. A. Iqbal (2011)

REFERENCE BOOKS:

1. *Criminalistics– A Introduction to Forensic Science* by Richard Saferstein 8th Edition, Prentice Hall, U.K., (2000)
2. *Introduction to Forensic Chemistry* by Elkins & Kelly M (2019)

DIGITAL TOOLS:

1. <https://www.youtube.com/watch?v=TF3r9JT83Ss>
2. <https://www.youtube.com/watch?v=XIvB-G57AiI>
3. <https://www.youtube.com/watch?v=hlndGPRUDfM>
4. <https://www.youtube.com/watch?v=aWIAW1K4Abs>
5. <https://www.thecriminallawteam.ca/counterfeiting-forgery/>

Mapping of CO with PSO

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CO2	2	3	2	2	3
CO3	3	3	3	3	3
CO4	2	3	3	3	3
CO5	2	3	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. N.P. KRISHNAN



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Revision -25%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYE54	ANALYTICAL CHEMISTRY AND COMPUTER APPLICATIONS IN CHEMISTRY	ELECTIVE- 2	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

To acquire the knowledge of data and their analysis with different formats, to study the theory and handling operations of various analytical instruments and to have an idea about C language and its applications in Chemistry.

COURSE OBJECTIVES:

- ❖ To learn about the prediction and analysis of data
- ❖ To gain information about the estimation of various ions
- ❖ To provide the principles of gravimetric analysis, methods and characteristic features of precipitation techniques.
- ❖ To study the analytical techniques and their applications in chemistry
- ❖ To get knowledge about basic C language and its applications in chemistry

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	interpret the data and errors in chemistry.	Upto K3
CO 2	understand the applications of colorimetric techniques.	Upto K3
CO 3	get the knowledge of precipitation and purification using gravimetric techniques.	Upto K3
CO 4	understand the role of polarimetric techniques and radioactive tracers.	Upto K3
CO 5	demonstrate the steps involved in 'C' program and 'C' programs in Chemistry using C language.	Upto K3

K1– KNOWLEDGE (REMEMBERING),K2–UNDERSTANDING,K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

ANALYTICAL CHEMISTRY AND COMPUTER APPLICATIONS IN CHEMISTRY

UNIT – I: Data Analysis

(12 hrs)

Analysis of experimental results: Graphical method – curve fitting – method of least squares – problems involving straight line graphs.

Error analysis: significant figures – Errors & its classification – methods used for minimisation of errors – precision & accuracy – **distinguishing between them** – confidence limits: Q-test, F-test & t-test.

UNIT – II: Colorimetry

(12 hrs)

Colorimetry: Principle – Beer – Lambert law – methods of colour comparison – standard series method – colorimetric titration – Duboscq colorimeter – photoelectric colorimeter – spectrophotometers – criteria for satisfactory colorimetric estimations – Estimation of Iron, Nickel and Chromium.

UNIT – III: Gravimetric analysis

(12 hrs)

Principle – methods to obtaining the precipitate – conditions for precipitation – types of precipitants: inorganic and organic precipitants – sequestering agents – theories of precipitation – co precipitation – post precipitation – digestion – precipitation from homogeneous medium – filtration – washing – drying.

UNIT – IV: Polarimetry & Radiometry

(12 hrs)

a) Polarimetry: Theory – instrumentation – Optical Rotatory Dispersion – plain curves & cotton effect curves – applications of optical rotation method in the determination of rate constant: acid – catalyzed, mutarotation of glucose – inversion of cane sugar.

b) Radiometry: Radioactive tracer – tracer technique – applications of tracer technique: structure investigation – radiocarbon dating – activation analysis – advantages of activation analysis – radiometric analysis – isotopic dilution analysis.

UNIT – V: C-Programming in Chemistry (12 hrs)

C language : Introduction – Basics of 'C' program – steps involved in 'C' program – operators and header files – control statements – C programs in Chemistry : Half-life period calculation, normality, molality and molarity calculations, calculation of RMS velocity, pH calculation from H^+ concentration and finding acidic, basic or neutral nature.



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SYLLABUS

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TEXT BOOKS:

1. *Elements of Analytical Chemistry* by R. Gopalan, P. S. Subramanian, & K Rangarajan – Sultan Chand & Sons – reprint of 6th Edition (2017)
2. *Computers in Chemistry* by K. V. Raman, Tata McGraw–Hill Publishing company Ltd. (2005)

REFERENCE BOOKS:

1. *Analytical Chemistry* by Gurdeep R. Chatwal – Himalaya Publishing House, 1st Edn (2015)
2. *Analytical Chemistry* by Gary D. Christian, Purnendu K. Dasgupta & Kevin A. Schug – Wiley 6th Edn (2020)
3. *Computers for Chemists* by Pundir and Bansal – Pragati Prakashan Publishers (2007)

DIGITAL TOOLS:

1. <https://study.com/academy/lesson/accuracy-vs-precision-in-chemistry-definitions-comparisons.html>
2. <https://www.youtube.com/watch?v=2MW-qc1ABss>
3. <https://www.youtube.com/watch?v=1mhcLO8LLoI>
4. <https://www.youtube.com/watch?v=YtX3SuHqKOo>
5. <https://www.youtube.com/watch?v=nvsJ6Hs4b3c>
6. <https://www.youtube.com/ZRARhYLPKE>

Mapping of CO with PSO

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CO1	2	2	3	1	2
CO2	3	2	2	1	3
CO3	3	3	2	1	3
CO4	2	2	2	1	3
CO5	3	1	2	1	2

3. Advanced Application

2. Intermediate Development

1. Introductory Level

COURSE DESIGNER: Dr. T. S. MANIKANDAN



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Revision -100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYE55	MEDICINAL CHEMISTRY	ELECTIVE– 2	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

This course enables the students to gain knowledge on fundamentals of Medicinal Chemistry

COURSE OBJECTIVES:

- ❖ To acquire basic knowledge in the field of Medicinal Chemistry.
- ❖ To understand the drugs for various diseases and their mode of action.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	tell the theory of pharmacokinetics model	Upto K3
CO2	summarize the theory of drug design and discovery	Upto K3
CO3	explain the relationship between physical parameters and drug activity	Upto K3
CO4	study the psychoactive and cardiovascular drug	Upto K3
CO5	apply the synthetic methodologies of various types of drugs	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

MEDICINAL CHEMISTRY

UNIT – I: Absorption, Distribution, Metabolism, and Excretion (12 hrs)

- a) ADME Properties – The pharmacokinetics phase – Adsorption–Distribution, Metabolism–Elimination. Bioavailability of drug, pharmacokinetics models, Intravascular and Extravascular administration. The use of pharmacokinetics in Drug design.
- b) Pharmacodynamics–Stereo electronic structure.

UNIT – II: Drug Discovery by Design (12 hrs)

- a) Stereochemistry and Drug Design–Structurally rigid Groups – procaine, Acetylcholine. Conformation Syn and Anti Acetylcholine, Phenylethanoate methiodides. Configuration Variations in the biological activities of stereoisomers

b) Structural–Activity–Relationship (SAR)

Changing the size and shape. Changing the degree of unsaturation. Introduction or removal of rings system. Introduction of new substituents–methyl group, Halogens, hydroxyl groups, Basic groups, carboxylic and sulphonic acid groups. Changing the existing substituents of lead isosteres, bioisosteres.

UNIT – III: QSAR & Combinatorial Chemistry (12 hrs)

a) Quantitative structural Activity Relationship (QSAR)

Partition parameters partition coefficients (p), Lipophilic substituents constant s (π) Electronic parameters The Hammett constants Steric parameters The Taft Steric Parameters (E_s), Molar refractivity (MR), Hansch analysis Craig plots, The Topliss decision tree. Computer-aided drug design Modelling Drug Receptor Interaction.

b) Combinatorial Chemistry

Basic concepts The design of combinatorial syntheses. The general technique used in Combinatorial synthesis i) Solid support method parallel synthesis–Furka's mix and split Techniques sequential chemical tagging methods Still's binary code Tag system computerized tagging. ii) Combinatorial synthesis in solution iii) Screening and deconvolution

UNIT – IV: (12 hrs)

a) Antineoplastic Agents: Introduction, cancer chemotherapy, special problems, role of alkylating agents and anti-metabolites in treatment of cancer.

b) Psychoactive drugs–The chemotherapy of Mind:

Introduction, neurotransmitters, CNS depressants, general anaesthetics, mode of action of hypnotics, sedatives, neurochemistry of mental diseases

c) Cardiovascular Drugs and Local Anti-infective Drugs:

Introduction, Cardiovascular diseases, drug inhibitors of peripheral sympathetic function, central intervention of cardiovascular output.

UNIT – V: Synthesis of Drugs (12 hrs)

a) Synthesis of Antineoplastic agents

Mechlorethamine, Cyclophosphamide, uracil, mustards and 6-mercaptopurine

b) Synthesis of cardiovascular drugs

Amyl nitrate, sorbitrate, Verapamil.

c) Synthesis of Psychoactive drugs

Synthesis of Diazepam, Chlorazepam, oxazepam, Alprazolam, Phenyltucinor

Diphenyl hydantoin, Barbitol, Phenobarbital.

TEXTBOOKS:



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

1. *Introduction to Medical Chemistry* by Gringuage, Wiley–VCH, (2004)
2. *Text Book of Organic Medicinal & Pharmaceutical Chemistry* by Wilson and Gisvold's, Ed., Robert F. Dorge, (2003)
3. *An Introduction to Drug Design* by S.S. Pandeya and J. R. Dimmock, New Age International, (2006)

REFERENCE BOOKS:

1. *Strategies for Organic Drug Synthesis & Design* by D. Lednicher, John Wiley & Sons, 2nd edition (2008).
2. *Medicinal Chemistry: An introduction* by Gareth Thomas, John Wiley & Sons, (2004)
3. *Medicinal chemistry Lectures on Drug design and Synthetic Drugs* by M.L. Gangwal Student Publishing House, (2007)

DIGITAL TOOLS:

1. <https://www.xenotech.com/nonclinical-studies/adme/>
2. <https://www.youtube.com/watch?v=3Gl0gAcW8rw>
3. <https://www.youtube.com/watch?v=dOi8KwcecoM>
4. <https://www.youtube.com/watch?v=DKB4DtOasv0>
5. <https://humanbiology.pressbooks.tru.ca/chapter/10-8-psychoactive-drugs/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	2	2	3
CO2	3	2	2	2	3
CO3	3	1	2	2	3
CO4	3	2	1	2	3
CO5	3	1	2	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr.N.P.KRISHNAN



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Revision -100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYE56	POLYMER CHEMISTRY	ELECTIVE – 2	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course will focus on importance of polymers and its applications

COURSE OBJECTIVES:

In this course the students are exposed to various polymer studies and the techniques that are used in the preparation and properties.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	understand polymerization–forms of polymers – co–polymerization.	Upto K3
CO2	gain knowledge the types of polymers– addition	Upto K3
CO3	gain knowledge the types of polymers– condensation	Upto K3
CO4	understand the properties of co–polymerization	Upto K3
CO5	learn about the applications of polymers	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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POLYMER CHEMISTRY

UNIT – I: Introduction

(12Hrs)

Historical Introduction – Natural and Synthetic polymer – Polymerization – Forms of polymers – Co-polymerization.

UNIT – II: Condensation polymerization

(12 Hrs)

Introduction – Types of condensation polymer – kinetic of linear condensation polymerization – Some linear condensation polymers – Three – dimensional polymers – Inorganic polymers – Ring opening polymerization.

UNIT – III: Addition polymerization

(12 Hrs)

Introduction – Addition polymerization – Inhibition and retardation – Various polymerization techniques – Ionic addition polymerization – Coordination polymerization – Some addition polymers – Ion exchange resin – Condensation polymerization versus addition polymerization.

UNIT – IV: Co-polymerization

(12 Hrs)

Introduction, Co-polymerization composition equation – block and graft co-polymers – Polymer blends – Step co-polymerization – Some important co-polymer.

UNIT – V: Applications of Polymers

(12 Hrs)

Elastomeric materials – introduction – structure property relationships in polymers, natural rubber, raw rubber – vulcanization of rubber – synthetic rubber buna rubber – buna rubber S(Sbr, Grs) rubber, neoprene rubber (Gr-M), Thiokol, poly butanes and butyl rubbers.

Fiber-forming polymers – rayon's proteins nylons – polyesters – vinyls – spinning – Fabrication of polymers – moulding of thermosetting resins, moulding of thermoplastics, extrusion moulding, casting of films – calendaring – Naturally occurring polymer

TEXT BOOKS:

1. *Industrial Chemistry* by B. K. Sharma, Goel Publishing House (2008)
2. *Text book of Polymer Chemistry* by Dr.M.S.Bhatnagar, S.Chand and Co Ltd., First edition (2004)

REFERENCE BOOKS:

1. *Fundamental Concepts of Applied Chemistry* by Jeyashree Ghosh, S. Chand & Co. Ltd.(2008)
2. *Polymer Chemistry* by P.V.Anil Kumar, Vishal Publishing Co., first edition (2021)
3. *Polymer Science* by V.R.Gowarikar, N.V.Viswanathan & Jayadev Sreedhar, New age International Publishers, 4th edition (2021)

DIGITAL TOOLS:

1. <https://www.youtube.com/watch?v=newNCml5DN0>
2. <https://www.youtube.com/watch?v=-d14DmSBuAQ> <https://www.toppr.com/ask/question/explain-addition-polymerization-with-an-example/>
3. <https://www.doubtut.com/question-answer-chemistry/what-is-copolymerization-explain-with-examples-639457806>
4. <https://study.com/learn/lesson/what-are-polymers-properties-applications-examples.html>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	2	3
CO2	3	1	1	2	3
CO3	2	1	1	2	3
CO4	3	1	2	2	3
CO5	3	1	2	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNER: Dr.M.RAJASEKARAN



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Revision - 40%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYS51	APPLIED ORGANIC SPECTROSCOPY	SBS – 3	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

- ❖ Spectroscopy deals with the interaction of electromagnetic radiation with atoms and molecules. It also talks about quantization of energy, relative population of energy levels, transition probability, etc.
- ❖ The aim of the course is also to highlight the significance of principles, absorption laws, Woodward–Fieser rule for structural elucidations.
- ❖ The principles behind the transitions and instrumentation techniques in various branches of spectroscopy will be dealt with.
- ❖ This course will focus on interpretation of spectra and application of these tools to address questions of structures.

COURSE OBJECTIVES:

- ❖ To understand the importance of quantization of energy, relative population of energy levels, transition probability, etc.,
- ❖ To learn the significance of absorption laws and the influence of chromophores and auxochromes.
- ❖ To infer their importance in the structural elucidation of molecules in IR spectroscopy.
- ❖ To make use of the analysis of various IR spectra and to predict the structures of organic compounds.
- ❖ To get knowledge about the analysis of organic molecules using NMR Spectroscopy

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	recognize the significance of the principles, laws, approximations, etc., to understand the transitions in atoms and molecules.	Upto K3
CO 2	learn the significance of absorption laws and the influence of UV visible to organic molecules	Upto K3
CO 3	compare the spectral pattern and evaluate the parameters essential for structural determinations.	Upto K3
CO 4	analyze scientifically the various spectra and identify the appropriate structure of chemical compounds.	Upto K3
CO 5	understand the various aspects in NMR spectroscopy	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

APPLIED ORGANIC SPECTROSCOPY

UNIT – I: Electromagnetic spectrum (6 hrs)

Wavelength, wave number, frequency, energy units – problems – absorption spectroscopy – molecular absorption of energy in various regions of the electromagnetic spectrum.

UNIT – II: UV-Visible Spectroscopy (6 hrs)

Introduction – types of electronic transitions – bathochromic, hypochromic, hyperchromic and hypsochromic shifts – applications of UV-visible to organic molecules – Woodward– Fieser rule for conjugated diene and alpha, beta unsaturated carbonyl compounds.

UNIT – III: IR Spectroscopy (6 hrs)

Introduction – principles – theory of molecular vibrations – number of fundamental vibrations – selection rules – finger print region – factors influencing vibrational frequencies – coupled vibrations and fermi resonance – electronic effects – instrumentation – sampling techniques. (solids, liquids, gases and solutions)

UNIT – IV: Applications of IR Spectroscopy (6 hrs)

Analysis of the following IR spectra:

- Alcohols and phenols – Ethanol, phenol and benzyl alcohol.
- Aldehydes and ketones – Benzaldehyde and ethyl methyl ketone.
- Amines – Propyl amine, dimethyl amine and toluidine.
- Nitro compound – Nitro benzene.

UNIT – V: NMR spectroscopy (6 hrs)

Principle – instrumentation – solvents and reference chemicals – number of signals – chemical shift : definition and factors affecting chemical shift – shielding, deshielding, resonance and anisotropy effects – proton counting – splitting of signals – spin-spin coupling and coupling constant – Interpretation of PMR spectra of the following molecules : n-propanol, p-anisidine, benzaldehyde and ethylacetate

TEXT BOOKS:

- Fundamentals of Molecular Spectroscopy* by Banwell, C. N ,4th edition, McGraw–Hill Education,(2017)
- Elementary Organic Spectroscopy – Principles and Chemical Applications*, by Sharma, Y. R., ChandS. publications,5th edition (2013)
- Spectroscopy of Organic Compounds* by Kalsi, P. S., 8th edition, New Age International Publishers, (2020)



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SYLLABUS

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REFERENCE BOOKS:

1. *Introduction to Spectroscopy* by Pavia, D. L. Lampman, G. M. Kriz, G. A. Vyvyan, J. R. 5th edition, Cengage Learning. (2009)
2. *Spectroscopic Identification of Organic Compounds* by Silverstein, R. M. Webster, F. X. Kiemle, D. J. Bryce, D. L., 8th edition, Wiley and Sons, (2014)
3. *Introduction to Magnetic Resonance Spectroscopy* by Sathyanarayana, D. N., 3rd edition, Tech Press., (2020)

DIGITAL TOOLS:

1. https://science.nasa.gov/ems/01_intro
2. <https://byjus.com/chemistry/uv-vis-spectroscopy/>
3. https://www.youtube.com/watch?v=WTmj_9VT5oE
4. <https://www.bruker.com/en/products-and-solutions/infrared-and-raman/ft-ir-routine-spectrometer/guide-to-applications-of-ir-spectroscopy.html>
5. <https://www.khanacademy.org/science/organic-chemistry/spectroscopy-jay/proton-nmr/v/introduction-to-proton-nmr>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	2	3
CO2	3	3	2	2	3
CO3	3	3	3	2	3
CO4	3	3	2	2	3
CO5	3	3	2	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr.N.P. KRISHNAN



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Revision -25%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYS52	APPLIED CHEMISTRY	SBS – 4	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

To acquire the knowledge of data and their analysis with different formats, to study the theory and handling operations of various analytical instruments and to have an idea about computer software and their utilization in Chemistry.

COURSE OBJECTIVES:

- ❖ To study about the agrochemicals
- ❖ To get a knowledge of match industries, pyrotechniques and explosives
- ❖ To understand the various industries such as silicate, paints and pigments
- ❖ To know the chemistry of polymers and their application in various fields.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the role of fertilizers, pesticides and insecticide	Upto K3
CO 2	get the knowledge of Match Industry, Pyrotechnology & Explosives	Upto K3
CO 3	relate the cement, silicate and zeolites	Upto K3
CO 4	understand the concepts of manufacture of paints and pigments	Upto K3
CO 5	construct the basic concepts of rubber and designing new type of polymer products.	Upto K3

K1– KNOWLEDGE (REMEMBERING),K2–UNDERSTANDING,K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

APPLIED CHEMISTRY

UNIT – I: Agrochemicals

(6 hrs)

Fertilizers: Role of macro nutrients in plant growth – requisites of a good fertilizer – manufacture and uses of urea, superphosphate of lime, muriate of potash and –NPK fertilizers – adverse effects of fertilizer on the environment.

Pesticides: Definition– classification – safety measures to handle pesticide.

Insecticides: Manufacture and uses of Bordeaux mixture, calcium arsenates, sodium fluoride, malathion, parathion and carbaryl

UNIT – II: Match Industry, Pyrotechny & Explosives

(6 hrs)

Match Industry: classification – match head and striking surface – manufacture of safety matches – chemistry of lighting of match stick.

Pyrotechny: Composition of fireworks – coloured smokes – coloured matches.

Explosives: Classification – preparation and uses of gun powder, smokeless powder, TNT, picric acid, GTN and dynamite

UNIT – III: Silicate Industry

(6 hrs)

Cement – portland cement – manufacture – glass: raw materials – manufacture–ceramics: classification – manufacture

UNIT – IV: Paints and Pigments

(6 hrs)

Paints:Composition– manufacture–characteristics of good paint

Pigments: Classification – elementary study of zinc white, lithophone, ultramarines, carbon black, red lead and chrome green –lacquers – varnishes and their types.

UNIT – V: Polymers

(6 hrs)

Rubber: Natural and synthetic rubbers – composition of natural rubber– neoprene –SBR

Synthetic polymers: Preparation and uses of polyethylene, PVC, Teflon, Nylon 6,6, Bakelite– Urea formaldehyde resin and dacron.

TEXT BOOKS:

1. *Industrial Chemistry* by B. K. Sharma, Goel Publishing House (2014)
2. *Applied Chemistry* by K. Bhagavathi Sundari, MJP publishers (2019)
3. *Text book on Inorganic Chemistry* by P. L. Soni and M. Katyal 20th Edn., Sultan Chand & Sons (2013)

REFERENCE BOOKS:

1. *Fundamental concepts of Applied Chemistry* by Jeyashree Ghosh, S. Chand & Co. Ltd.(2008)
2. *Principles of Inorganic Chemistry* by Puri, Sharma and Kalia, milestone Publisher &Distributor, (2008)
3. *Advanced Organic Chemistry* by Arun Bahl and B.S.Bahl, S.Chand Publishing Co.,Ltd.,(2017)

DIGITAL TOOLS:

1. <https://youtu.be/TOEusBA6G04>, 2. <https://youtu.be/2MW-qc1ABssl>
3. <https://youtu.be/uMsHGBG-HQYA>, 4. <https://youtu.be/ZRARhYLPKE>
5. <https://youtu.be/2gDjpM3NY>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	2	2	3
CO2	2	1	1	2	3
CO3	3	1	2	3	3
CO4	3	1	2	3	3
CO5	3	2	2	3	3

3. Advanced Application

2. Intermediate Development

1. Introductory Level



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE DESIGNER: Dr. T. S. MANIKANDAN

Revision -5%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYCP5	GRAVIMETRIC ESTIMATION AND INORGANIC COMPLEX PREPARATION	CORE –15 PRACTICAL	–	6	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This practical helps to improve the advanced skill of students regarding the estimation of elements and synthesis of inorganic complexes.

COURSE OBJECTIVES:

- ❖ To practice the estimation of metal by gravimetric technique.
- ❖ To gain the knowledge of preparation of inorganic complexes.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO	estimate the barium, lead and calcium by gravimetric methods and prepare the coordination number 4 & 6 metal complexes.	Upto K3

K1– KNOWLEDGE (REMEMBERING),K2–UNDERSTANDING,K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

I. GRAVIMETRIC ESTIMATION

1. Estimation of Lead as lead chromate
2. Estimation of Barium as barium chromate
3. Estimation of Calcium as calcium oxalate monohydrate
4. Estimation of Nickel as Ni–DMG complex.
5. Estimation of Copper as cuprous thiocyanate.

II. INORGANIC COMPLEX PREPARATION

1. Preparation of ammonium hexachlorostannate(IV)
2. Preparation of Sodium nitroprusside.
3. Preparation of Tetraamminecopper(II) sulphate
4. Preparation of Potassium trioxalatochromate(III)
5. Preparation of Potassium trioxalatoaluminate (III).

Distribution of Marks

Internal – 40 Marks

External – 60 Marks

External Examination

Record Note book – 10 marks

Viva voce – 5 marks

Gravimetric Estimation – 30 marks

Procedure – 05 marks

Estimation – 25 marks

Crude sample – 10 marks

< 2% Error – 25 marks

2–3% Error – 20 marks

3–4% Error – 15 marks

4–5% Error – 10 marks

> 5% Error – 08 marks

Inorganic Preparation – 15 marks

Procedure – 05 marks

TEXT BOOK:

Basic Principles of Practical Chemistry by V. Venkateswaran, R. Veeraswamy and A. R. Kulandaivelu S. Chand and Co. Ltd. (2017).

REFERENCE BOOK:

Vogel's Textbook of Quantitative Inorganic Analysis 4th edition. (1978)

DIGITAL TOOLS:

1. <https://www.youtube.com/watch?v=cT1rxDA13As> (Barium)
2. <https://www.youtube.com/watch?v=AquLTtaiH68> (Lead)
3. <https://www.youtube.com/watch?v=peMyqdJ57dA> (Nickel)
4. <https://www.youtube.com/watch?v=TWYu4d6-xj8>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO	3	3	3	3	3

3. Advanced Application

2. Intermediate Development

1. Introductory Level

COURSE DESIGNER: Dr. M. RAJASEKARAN



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Revision -100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYE62	BATTERY AND FUEL CELLS	ELECTIVE – 3	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

The aim of this subject is to give the knowledge of electrode, electrolytic, electrochemical cell, battery and fuel cells.

COURSE OBJECTIVES:

- ❖ To impart fundamental knowledge on electrochemical energy storage systems considering the operation and design of various battery technologies.
- ❖ To make the students understand the requirement of batteries and fuel cells for automotive application
- ❖ To teach construction and working of battery
- ❖ To teach the development in battery system
- ❖ To teach the basic concepts of fuel cell and E– vehicle system.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	compare and classify the various energy storage systems	Upto K3
CO2	analyze concepts of thermodynamics and kinetics involved in electrochemical reactions	Upto K3
CO3	develop components and processes of various battery systems	Upto K3
CO4	identify the recent developments in battery systems including electrode and electrolyte materials	Upto K3
CO5	utilize fuel cells and E–vehicle system	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

BATTERY AND FUEL CELLS

UNIT – I:Energy demands and Energy sources(15 hrs)

World Energy consumptions–Energy in developing countries Indian Energy Sources.–Non–conventional renewable energy resources. Potential of renewable energy sources–Solar energy types, wind energy, wave, Tidal energy sources

UNIT – II:Introduction to Electrochemical energy storage system(15 hrs)

Introduction to battery system– Electromotive force– Reversible cells– Relation between electrical energy and energy content of a cell–Free energy changes and electromotive force in cell–Single Electrode potential

UNIT – III:Classification of Batteries (15 hrs)

High energy density and Power density batteries–Operational characteristics –Primary cell– Voltaic cell, Dry cell, Alkaline cell –. Secondary batteries– Lead acid Batteries Lithium battery–Nickel metal hydride battery Construction and its application.

UNIT – IV:Recent development in battery system(15 hrs)

Recent development of electrode materials in lithium ion batteries– Recent development of solid electrolytes and their application to solid state batteries–Polymer solid electrolytes for lithium ion conduction Metal air batteries (principle only) Thin Film solid state Batteries

UNIT – V:Fuel Cells and E–vehicle system(15 hrs)

Fuel cells Basic concept and types Proton exchange membrane FC–Methanol FC–solid oxide FC– (principle only)– Advantages and Disadvantages of fuel cell–Hydrogen Economy– Hydrogen storage Super capacitors.

TEXT BOOKS:

1. *Textbook of Engineering Chemistry* by Jain, P.C., Jain M, A, Dhanpat Rai publications, New Delhi, 16 edition, (2015)
2. *A text book of Engineering Chemistry* by ShashiChawla, Dhanpat Rai & Co.(pvt) Ltd, 3rd Edition, reprint (2013)
3. *Electrochemical Methods: Fundamentals and Applications* by Bard Allen J., and Larry, Faulkner.R 2nd ed. Wiley and sons (2000)

REFERENCE BOOKS:

1. *Lithium ion Batteries Fundamental and Performance* by Wakihara. M, Yamamoto. O, Published by Wiley VCH Verlag G mbH, (1999)
2. *Electrochemical Power Sources: Batteries Fuel Cell And Supercapacitors* by Skundin, M.L, Bagotski, V.S, Wiley and sons (2015)
3. *Industrial Chemistry* by Sharma. B.K. –, Goel Publishing House, New Delhi, (1994)



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SYLLABUS

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DIGITAL TOOLS:

1. https://en.wikipedia.org/wiki/Electric_battery
2. <https://www.britannica.com/technology/battery-electronics>
3. <https://www.batterysolutions.com/recycling-information/battery-types>
4. https://en.wikipedia.org/wiki/Fuel_cell
5. <https://americanhistory.si.edu/fuelcells/basics.html>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	2	1	3
CO2	3	2	1	2	3
CO3	2	2	2	1	3
CO4	2	2	1	1	3
CO5	3	2	2	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr.V.SATHIYENDIRAN



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Revision -100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYE63	FOOD CHEMISTRY	ELECTIVE- 3	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The course briefly outlines the basic knowledge in Food and Milk Chemistry and imparts the practical knowledge in food analysis.

COURSE OBJECTIVES:

- ❖ To learn about the sources, functions of foods.
- ❖ To acquire the knowledge of food adulterations.
- ❖ To know about Food Spoilage and food preservation.
- ❖ To give the detailed information about vitamins.
- ❖ To understand the basic knowledge of minerals.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	explain the basic group of foods and constituents carbohydrates	Upto K3
CO2	summarize the different types of food adulterants.	Upto K3
CO3	illustrate the food spoilage–food preservation.	Upto K3
CO4	construct the classification, functions and deficiencies of vitamins.	Upto K3
CO5	understand the mineral elements in foods.	Upto K3

K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

FOOD CHEMISTRY

UNIT – I: Food source & Constituents of foods

(15 hrs)

Food: Source, functions of foods. food groups: basic five food groups. constituents of food : carbohydrates, classification – storage of carbohydrates and its function. Proteins – classification sources and functions. fats and oils, dietary sources, uses of fat sand oils and their role in biological systems.

UNIT – II: Food Adulteration

(15 hrs)

Adulterants in different foods –milk, and milk products, vegetable oils and fats spices, cereals, pulses. Contamination with toxic chemicals –pesticides and insecticides detection and prevention of food adulteration.

UNIT – III: Food Spoilage and food preservation

(15 hrs)

Causes of food spoilage–food preservation –principle and methods of preservation –by using high temperature – sterilization, pasteurization and blanching. Low temperature food preservation methods.

UNIT – IV: Vitamins

(15 hrs)

Classification, sources, functions and deficiencies of fat soluble vitamins – A,D,E, and K, water soluble vitamins – B₁,B₂and B₆

UNIT – V: Minerals

(15 hrs)

Mineral elements in foods, principal mineral elements – sources, functions and deficiencies of Na, K, Mg, Fe, S and P.

TEXT BOOKS:

1. *Applied Chemistry* by K Bagavathi Sundari., MJP Publishers(2019)
2. *Food Chemistry* by Lillian Hoauland Meyer, CBS Publishers and Distributors, Delhi, (1987)

REFERENCE BOOKS:

1. *Engineering Chemistry* by Jain & Monika Jain, 5th edition, Dhanpat Rai & Sons, Delhi, (1990)
2. *Elements of Industrial Chemistry* by G Mahapatra, Kalyani Publishers, New Delhi, (2001)
3. *Industrial Chemistry* by B.K Sharma, Goel Publishing House (P) Ltd., (2014)

DIGITAL TOOLS:

1. <https://www.jliedu.com/blog/constituents-food-functions/>
2. https://www.youtube.com/watch?v=l0BthUI_MMA
3. <https://byjus.com/biology/food-preservation-methods-food-poisoning/>
4. <https://www.youtube.com/watch?v=ISZLTJH5IYg>
5. <https://www.youtube.com/watch?v=i3GfrZR2DUE>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	2	1	3
CO2	2	2	2	2	3
CO3	3	2	2	3	3
CO4	2	2	2	2	3
CO5	2	2	2	3	3

3. Advanced Application

2. Intermediate Development

1. Introductory Level

COURSE DESIGNER: Dr.T.S.MANIKANDAN



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Revision -75%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYS61	PHARMACEUTICAL & CLINICAL CHEMISTRY	SBS – 5	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

To know the basic biomedical terms and to acquire the knowledge of pharmaceutical aids, anaesthetics, chemotherapeutic agents and clinical studies.

COURSE OBJECTIVES:

- ❖ To teach about the basic pharmaceutical definitions, importance & classification of drugs.
- ❖ To make the students know the chemical nature and applications of pharmaceutical aids and organic diagnostic agents.
- ❖ To give the thorough knowledge about anaesthetics.
- ❖ To know the nature, classification and uses of various therapeutic agents.
- ❖ To deal the various methods of clinical analysis.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	gain the knowledge towards pharmaceutical terminologies, drugs and their importance.	Upto K3
CO 2	know the application of chemical inorganic and organic substances in pharmaceutical field.	Upto K3
CO 3	realize the characteristic and applications of various anaesthetics.	Upto K3
CO 4	know the elementary idea about the drugs: Antipyretics, Analgesics, anti-inflammatory agents, Sulphonamide, Antimalarials and Arsenical drugs.	Upto K3
CO 5	gain the knowledge blood composition, grouping and Rh factor and its clinical analysis and acquire the knowledge about urine clinical analysis.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

PHARMACEUTICAL & CLINICAL CHEMISTRY

UNIT – I: Study of drugs (6 hrs)

- a) Introduction – terminologies – micro-organisms, pharmacology, pharmacodynamics, pharmacokinetics, pharmacopoeia – importance of drugs
- b) Classification of drugs : – biological and chemical.

UNIT – II: Pharmaceutical Aids (6 hrs)

- a) Organic pharmaceutical aids: preservatives, antioxidants, emulsifying agents, colouring, flavouring and sweetening agents, stabilizing agents, ointment bases, solvents. (explanation of the above terms and examples)
- b) Organic diagnostic agents: Drugs used for X– ray contrast media (Barium sulphate, Sodium diatrizoate injection), drugs used to test organ function (Fluorescein Sodium, Sulphobromophthalein sodium).

UNIT – III: Anaesthetics (6 hrs)

- a) Anaesthetics – definition – mode of action – classification.
- b) General anaesthetics – types –inhalation anaesthetics , intravenous anaesthetics and basal anaesthetics (two examples for each category).
- c) Local anaesthetics – types –natural and synthetic local anaesthetics (two examples for each category).

UNIT – IV: Chemotherapy (6 hrs)

- a) Antibiotics –definition – classification and uses .
- b) Antipyretics, analgesics and anti-inflammatory agents.(definition– examples– therapeutic uses)
- c) Sulphonamide: sulphanilamide, prontosil – therapeutic uses
- d) Antimalarials : quinine and chloroquine – therapeutic uses
- e) Arsenical drugs : salvarsan–606 and neosalvarsan – therapeutic uses.

UNIT – V: Clinical Chemistry (6 hrs)

- a) Blood: composition – blood grouping and Rh factor– anticoagulant drugs
- b) Analysis of blood: determination of glucose and total cholesterol in blood serum
- c) Urine: routine examination of urine – determination of glucose in urine – GTT.

TEXT BOOKS:

1. *A Text book of Pharmaceutical Chemistry* by Jayashree Ghosh, S.Chand & Co. Ltd, (2012)
2. *Pharmaceutical Chemistry* by S.Lakshmi, Sultan Chand & Sons, (2004)

REFERENCE BOOKS:

1. *Industrial Chemistry* by B.K.Sharma –Goel Publishing House, (2014)
2. *Medicinal Chemistry* by Ashutosh Kar, New Age International(P)Ltd. 5th edn. (2010)
3. *Burger's Medicinal Chemistry* by J. G. Cannon, John Wiley and Sons, Inc., 5th edn. (1995)

DIGITAL TOOLS:



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

1. <https://www.youtube.com/watch?v=490LekxEKFc>
2. <https://www.youtube.com/watch?v=GZgUQ1Bn6-o>
3. https://www.youtube.com/watch?v=9DU_q7Ue8Oc
4. <https://www.youtube.com/watch?v=wzdBDB6PzaU>
5. https://www.youtube.com/watch?v=GAMHSl_ybwk

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	2	2	3
CO2	3	2	2	1	3
CO3	3	2	1	2	3
CO4	3	2	2	2	3
CO5	3	3	1	1	3

3. Advanced Application

2. Intermediate Development

1. Introductory Level

COURSE DESIGNER: Prof. K. VASUKI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

Revision -45%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYS62	GREEN CHEMISTRY AND NANO CHEMISTRY	SBS – 6	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

To know the adulterants present in the consumer products and to acquire the knowledge of green chemistry and greener methods for the synthesis of well-known compounds.

COURSE OBJECTIVES:

- ❖ To learn about the basic principles of green chemistry
- ❖ To gain information about the green solvents.
- ❖ To study the importance of green synthesis.
- ❖ To discuss the introduction of nanochemistry
- ❖ To deal with the application of nanoparticles.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	gain the importance of basic idea of principle of green chemistry	Upto K3
CO 2	understand the role of green solvents	Upto K3
CO 3	realize the significance of green approach in synthesis of compounds	Upto K3
CO 4	know the basic idea of nanochemistry	Upto K3
CO 5	understand the application of nanoparticles	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

GREEN CHEMISTRY AND NANOCHEMISTRY

UNIT – I: Green chemistry –I

(6 hrs)

Need for green chemistry – goals of green chemistry – limitations/obstacles – the progress of green chemistry – twelve principles of green chemistry – concepts of atom economy (rearrangement reactions, addition reactions, substitution reactions and elimination reactions)

UNIT – II: Green Chemistry–II

(6 hrs)

Green solvents (supercritical carbon dioxide, ionic liquids, water and organic synthesis in solid state) – mode of supplying energy to a reaction (use of microwaves and sonication) – basic concepts in designing a green synthesis (choice of starting materials, reagents, catalysts and solvents). synthesis of adipic acid

UNIT – III: Green Chemistry – III

(6 hrs)

Microwave assisted reactions in water (Hofmann elimination, hydrolysis of benzyl chloride, hydrolysis of benzamide, hydrolysis of methyl benzoate, oxidation of toluene and oxidation of alcohols) – ultrasound assisted reactions (esterification, saponification, substitution reactions) – future trends in green chemistry

UNIT – IV: Nano technology – I

(6 hrs)

Introduction of nanomaterials – properties of nanomaterials –characterization of nanomaterials – nanomaterials synthesis techniques: top–down approach – bottom–up approach.

UNIT – V: Nano technology–II

(6 hrs)

Preparation, properties and applications of CNT, gold and silver nanomaterials –applications of nanomaterials in the fields of electronics (quantum dots, sensors, optoelectronic devices), catalysts, medicine, consumer products, textiles, paints, defence and space applications.

TEXT BOOKS:

1. *Green Chemistry: A Textbook* by V. K Ahluwalia– Alpha Science International, (2012)
2. *Green Chemistry: An Introductory Text* by Mike Lancaster– Royal Society of Chemistry (2012).
3. *Introduction to Nanotechnology* by Charles P Poole and Frank J Owens – Wiley India Pvt. Limited (2007).
4. *Textbook of Nanoscience and Nanotechnology* by B.S. Murty, James Murday, P. Shankar, Baldev Raj, Springer Berlin Heidelberg (2013).

REFERENCE BOOKS:

1. *An Introduction to Green Chemistry* by V.Kumar, Vishal Publishing Co ltd., (2015).
2. *Introduction to Green Chemistry* by Albert S. Matlack, CRC press (2022).
3. *Nano–technology* by Richard Booker & Earl Boysen, Wiley Publishing Inc. (2006)

DIGITAL TOOLS:

1. https://www.youtube.com/watch?v=vbgzfcM_P0
2. <https://www.youtube.com/watch?v=NYWWtxI7dFY>
3. <https://www.youtube.com/watch?v=Dam3cyRyGrI>
4. <https://www.youtube.com/watch?v=PNElByWIGNc>
5. https://www.youtube.com/watch?v=ebO38bbq0_4&list=PLbMVogVj5nJTdeiLvuGSB_AE8hloTAHWJ

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	2	3	3
CO2	2	2	3	3	3
CO3	2	2	2	3	3
CO4	2	2	2	3	3
CO5	2	2	2	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNER: Dr. M. RAJASEKARAN



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

B.Com.

CORPORATE

SECRETARYSHIP



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

PERCENTAGE OF REVISION 40%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCPC51	COST AND MANAGEMENT ACCOUNTING	CORE – 7	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course aims to enlighten the students on the various methods of costing and Management accounting practices.

COURSE OBJECTIVES:

To enable the students to

- be aware of meaning and elements of cost.
- be aware of material control as a tool for cost control.
- be aware of how to account Labour cost and Overhead.
- be aware of practical application of Marginal and Standard Costing.
- be aware of Budgeting and its application.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge level (According to Blooms Taxonomy)
CO 1	know about meaning, methods, types and element of cost.	Upto K3
CO 2	learn on the various techniques of material control.	Upto K3
CO 3	have through knowledge on control procedure of labor and Overhead cost.	Upto K3
CO 4	learn on the practical application of Marginal and Standard Costing.	Upto K3
CO 5	have thorough knowledge on Budgeting.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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COST AND MANAGEMENT ACCOUNTING

UNIT – I: Introduction

Cost accounting – Meaning – Objectives and Scope – Concept – Classification – Preparation of Cost Sheet.

Management accounting – Meaning – Objectives and Scope – Tools and Techniques of Management accounting – Relationship of Cost and Management accounting.

UNIT – II: Material

Material control – Concepts – Techniques – Methods of Pricing of materials – FIFO, LIFO. Inventory Management – Techniques – Minimum – Maximum – Reorder – Economic Order level.

UNIT – III: Labour and Overhead cost

Labour cost – Meaning – classification – efficiency rating procedures – Remuneration system – Incentive systems – Time Rate, Piece Rate, Taylor's Differential Piece Rate, Halsey and Rowan schemes.

Overheads – Meaning – Nature – Classification – Treatment of Direct and Indirect Expenses.

UNIT – IV: Marginal and Standard Costing

Marginal Costing – Meaning – Breakeven analysis – Cost volume ratio – Margin of Safety analysis.

Standard costing – Meaning – various types of standard variance analysis for material – labour and Overhead.

UNIT – V: Budgeting

Budgeting – Meaning – Concepts – Various types of Budget – Fixed budget and flexible budget.

TEXT BOOK:

T.S. Reddy and Dr.Y. Hariprasad Reddy, *Cost Accounting*, Margam publications, Chennai, 7th Revised Edition 2009.

REFERENCE BOOKS:

1. S.P. Jain and K.L.Narang, *Cost Accounting*, Kalyani Publications. New Delhi. Edition. 2011
2. R.S.N. Pillai and V. Bhagavathi, *Cost Accounting*, S Chand And Company Ltd., New Delhi. Edition. 2004.
3. S.P. Iyyengar, *Cost Accounting Principles And Practice*, Sultan Chand, New Delhi. 2005
4. B.S. Kanna, I.M. Pandey, G.K. Ahuja, M.N. Arora, *Practical Costing*, Sultan Chand & sons. Edition 2009.
5. Bhattacharya. *Principles and Practices of Cost Accounting*, PHI Publications, Third Edition – 2010.



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

DIGITAL TOOLS:

E Books	http://bookboon.com/
Audio Books	http://www.learnoutloud.com/
E-Content for Learning	http://nptel.ac.in/
Digital Libraries	http://www.loc.gov/
MOOCs – Massive Open On-line Courses	https://www.coursera.org/

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	3	2	2	2
CO2	3	2	3	2	2	2
CO3	3	2	3	2	2	2
CO4	3	2	3	2	2	2
CO5	3	2	3	2	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. G. CHINNA DURAI & Dr. K. SUBBULAKSHMI



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

NEWLY INTRODUCED 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCPC52	BUSINESS ENVIRONEMENT AND LEGISLATION	CORE – 8	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☐	Entrepreneurship ☒

COURSE DESCRIPTION:

This course provides an over view of business environment and economic legislation.

COURSE OBJECTIVE:

To provide an overview of Business Environment & its types and economic legislations in India

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge level (According to Blooms Taxonomy)
CO 1	understand an overview of Business Environment in India	Upto K3
CO 2	analyze, and appreciate, the importance of key environmental factors and to study the impact of environmental factors on the Business Policies and Decisions	Upto K3
CO 3	understand the concept of Foreign Exchange and Management act & to study the concept of Securities contract, act its functions	Upto K3
CO 4	study the concept of Trade Mark Act.	Upto K3
CO 5	understand the concept of Consumer Protection Act and Competition Act.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

BUSINESS ENVIRONEMENT AND LEGISLATION

UNIT – I: An Overview of Business Environment

Introduction to Business Environment – Nature and Scope of Business – Concept and Characteristics of Business – Types of Business Environment – Micro Environment – Macro Environment–Environment Analysis–Managing Diversity–Liberalization, Privatization and Globalization of Indian Economy

UNIT – II: Types of Business Environment

Political and Legal Environment– meaning, functions& role – Social and Cultural Environment–Demographic Environment – Culture & Business – Business and Society – Social Responsibilities of Business – Economic Environment– Economic Planning – Economic Parameters – Economic Policies – Natural and Technological Environment– Natural Environment–Meaning – Impact of Natural Environment on Business – Technological Environment: Meaning, Factors Governed and Impact of Technological Environment on globalization.

UNIT – III: Foreign Exchange Management Act, 1999 & The Securities Contract (Regulation) Act, 1956

FEMA–Title, definition, regulation, Management of Foreign exchange, authorized person, types of bank accounts–Securities contract act– Objectives, recognition of stock exchange, bye-laws of stock exchange–Listing & de-listing, NSE, OTCEI.

UNIT – IV: The Trade Marks Act, 1999

Trade Marks Act– Objective, definition, registration, advantages of registration, qualities of good Trade Mark, Use of Trade Mark, Assignment and Transmission permitted to use, infringement, passing off.

UNIT – V: Consumer Protection Act and Competition Act, 2008

Consumer Protection in India–Rights of Consumers–Consumer Dispute Redressal Forums– Competition Policy–Anti–Competitive Agreements; Abuse of Dominant Position–Competition Advocacy; Competition Commission of India–Appellate Tribunal.

TEXT BOOK:

Gupta C.B., *Essentials of Business Environment*, Sultan & Chand Publications, New Delhi. First Edition, 2018.



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

REFERENCE BOOKS:

1. Cherunilam, F. (2013). *Business Environment: Text and cases*. New Delhi: Himalaya Publishing House Pvt. Ltd.
2. Dhanabhakiam. M & Kavitha. M., *Business Environment*, Vijay Nicole Imprints Private Ltd., Chennai., 2014.
3. Sloman, J. & Sutcliffe, M. (2004). *Economics for Business (3rd Edition.)*. New Delhi: Pearson Education.
4. Dhingra, I. C. & Dhingra, N. (2014). *Concise Business Environment (1st Ed.)*. New Delhi: Book Age Publications.
5. Bosch, F. & Man, A. (1994). *Government's Impact on the Business Environment and Strategic Management*. Journal of General Management, Vol. 19 No. 3.

DIGITAL TOOLS:

E Books	https://www.free-ebooks.net/
Audio Books	http://www.openculture.com/
E-Content for Learning	http://webcast.berkeley.edu/
Digital Libraries	http://library.clark.edu/
MOOCs – Massive Open On-line Courses	https://www.edx.org/

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	2	3	3
CO2	2	2	2	3	3	3
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CO4	3	3	2	3	3	3
CO5	3	3	2	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. G. NALINA & Dr. K. SUBBULAKSHMI



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

PERCENTAGE OF REVISION 60%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCPC53	INCOME TAX LAW AND PRACTICE	CORE – 9	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course provides and enables the students to know the provisions of the income tax law and to calculate income tax for individual and companies.

COURSE OBJECTIVES:

- To make the students understand the concept of Income tax.
- To describe how to arrive taxable salary and house property income.
- To teach the students how to measure the taxable income of business / Profession, Capital Gain and Other source income.
- To guide them exercise the set off and carry forward and deductions from gross total income
- To compute tax liability of Individual and Company income.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge level (According to Blooms Taxonomy)
CO 1	understand the basic concepts of income tax.	Upto K3
CO 2	understand and know the calculation procedure of income from salary and house property income.	Upto K3
CO 3	understand the concept and computation of gain on Business or Profession, Capital gains and Other Sources income	Upto K3
CO 4	understand the method of set off and carry forward and deductions from gross total income.	Upto K3
CO 5	know the assessment procedure of Individual and Company.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

INCOME TAX LAW AND PRACTICE

UNIT – I: Introduction

Basic concepts – Definition – Previous year – Assessment year – Person – Assessee – Income – Total Income – Casual income – Capital and Revenue – Residential status and incidence of tax – incomes exempt under Section 10.

UNIT – II: Salary and House Property Income

Salary – Basis of charge – Different forms of salary – allowances – gratuity – pension – perquisites and their valuation – deduction from salary – computation of taxable salary. House property – basis of charge – determination of GAV and NAV – income from let – out property – deductions – computation of House property income.

UNIT – III: Business / Profession, Capital Gain and Other source Income

Profits and gains of business and profession – basis of charge – methods of accounting – deductions – allowable expenses and disallowable expenses – computation of taxable income. Income from Capital Gains – Income from other sources.

UNIT – IV: Set – off & carry forward of losses

Income of other persons included in assessee's total income – Aggregation of income; Set – off or carry forward and set off of losses – Deductions from gross total income u/s 80 C, D, E, G, H, TTA & U.

UNIT – V: Individual and Company Assessment

Computation of total income and tax payable; Assessment of Individual– Assessment of Company.(Simple Problems Only)

TEXT BOOK:

Gaur and Narang, *Income Tax Law and Practice*, Kalyani Publishers, New Delhi.

REFERENCE BOOKS:

1. Dr.Vinod K.Singhania, *Taxmen's Direct Taxed Law & Practice*. Taxman Publications, New Delhi.
2. Dr. A. Murthy, *Income Tax Law and Practice*, Vijay Nichole Publications, Chennai.
3. Dr. T.S. Reddy & Dr. Hariprasad, *Income Tax Law and Practice*, Margam publications, Chennai.
4. Dr. H. C.Mehrotra, *Income Tax Law and Accounts*, Sahithya Bhavan Publishers, Agra.
5. R. G. Shaha, *Income Tax Law and Practice (Direct Tax)* Himalaya Publications, Mumbai.

DIGITAL TOOLS:

E Books	http://www.bookrix.com/
Audio Books	https://librivox.org/
E-Content for Learning	http://cosmolearning.org/
Digital Libraries	http://www.dli.ernet.in/
MOOCs – Massive Open On–line Courses	http://ocw.mit.edu/

Mapping of CO with PSO

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CO4	3	3	3	3	2	3
CO5	3	3	3	3	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNERS: DR.G.CHINNA DURAI & DR. K. SUBBULAKSHMI



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

PERCENTAGE OF REVISION 20%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCPC54	CORPORATE ACCOUNTING	CORE – 10	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course provides and enables the students to know the methods, procedures and preparations of Corporate Accounting.

COURSE OBJECTIVES:

- To impart knowledge on Accounting for Share Capital to the students
- To enable the students to understand the Accounting for Debentures
- To enable them to develop skills in the preparation Accounting for Underwriting
- To guide the students gain the knowledge about Final Accounts of the Company
- To make them acquire the knowledge about Financial Statement Analysis.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge level (According to Blooms Taxonomy)
CO 1	understand and prepare the Accounting for Share Capital	Upto K3
CO 2	prepare the Accounting for Debentures	Upto K3
CO 3	prepare the Accounting for Underwriting	Upto K3
CO 4	understand and prepare the Final Accounts of the Company	Upto K3
CO 5	understand the concept and component of Financial Statement Analysis	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

CORPORATE ACCOUNTING

UNIT – I: Accounting for Share Capital

Issue of shares – Forfeiture and Reissue of shares – Accounting treatments of premium and Discount – Pro-rata allotment – Buyback of shares – Issue of Right Shares – Issue Bonus shares.

UNIT – II: Accounting for Debentures

Debentures – Issue and redemption – Purchase of own debentures and Sinking fund methods only – Accounting Treatments – Debentures Redemption reserve.

UNIT – III: Accounting for Underwriting

Underwriting – Meaning – Types of Underwriting – Underwriting of shares – Open Underwriting – Firm Underwriting.

UNIT – IV: Preparation of Final Accounts

Preparation of Final Accounts of Companies – New format of Profit & loss account and Balance Sheet as per the Companies Act, 2013.

UNIT – V: Financial Statement Analysis

Ratio Analysis – Significance – utility – limitations of ratio analysis– Profitability ratio – Turnover ratios – Solvency ratios and Liquidity ratios.

TEXT BOOK:

Reddy, T.S. and Murthy, A. 2015. *Corporate Accounting*. Revised Edn. Margham Publications, Chennai.

REFERENCE BOOKS:

1. Pillai.R.S.N, Bagavathi and Uma.S, *Fundamentals of Advanced Accounting*, Third Revised Edition 2014, S.Chand & Company Private Limited, New Delhi.
2. Gupta R.L. and Radhaswamy 2009. *Advanced Accountancy*. 13th Revised Edn. Sultan Chand & Sons, New Delhi.
3. Jain, S.P. and Narang, K.L. 2014. *Advanced Accountancy*. 20th Edn. Kalyani Publishers, Ludhiana
4. Pillai, R.S.N.and Bagavathi. 2012. *Advanced Accountancy*. 5th Edn. Chand, S. & Co. Ltd., New Delhi.
5. Rajasekaran, V. and Lalitha, R. 2011. *Advanced Accounts*. 1st Edn. Pearson. New Delhi.

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E-Content for Learning	http://nptel.ac.in/
Digital Libraries	http://www.loc.gov/
MOOCs – Massive Open On-line Courses	https://www.coursera.org/

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	2	3
CO2	3	3	3	3	2	3
CO3	3	3	3	3	2	3
CO4	3	3	3	3	2	3
CO5	3	3	3	3	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNERS: Dr. G. CHINNA DURAI & Dr. K.SUBBULAKSHMI



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SYLLABUS

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NEWLY INTRODUCED 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCPE51	FINANCIAL MANAGEMENT	ELECTIVE – 1	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course will provide the knowledge about the effective management of Finance of Firms.

COURSE OBJECTIVES:

- To enable the students know the principles of managing the finance.
- To make the students calculate cost of capital and Leverage.
- To make the students learn about the decisions and processes of Capital Structure and Capital Budgeting.
- To make them learn determination of working capital and Dividend policy of the firm.
- To make the students acquire knowledge about the Financial Statement analysis.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge level (According to Blooms Taxonomy)
CO 1	know the basic concepts of financial management.	Upto K3
CO 2	understand the concepts of cost of capital and Leverage.	Upto K3
CO 3	understand the various approaches in Capital Structure and Capital Budgeting.	Upto K3
CO 4	gain an insight about dividend policy and working capital.	Upto K3
CO 5	analyse the Financial Statements.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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FINANCIAL MANAGEMENT

UNIT – I: Introduction

Financial Management: Meaning and scope – Objectives: Profit maximization, Wealth maximization – Functions – Financial decisions – Time value of money: Present value and Compound value.

UNIT – II: Cost of Capital and Leverage

Cost of capital – Cost of debt – Cost of preference share capital – Cost of Equity – Cost of retained earnings – Weighted average cost of capital.

Leverage – Meaning, significance and types – Operating leverage – Financial leverage – Combined leverage.

UNIT – III: Capital Structure and Capital Budgeting

Capital structure – Meaning and features – Factors determining capital structure – EBIT/EPS relationship – Indifference point of EBIT – Theories of capital structure: Net income approach, Net operating income approach, MM approach and Traditional approach.

Capital budgeting – Meaning – process – techniques – Discounted and Non discounted cash flow methods – Net present value – Payback – Profitability Index – Internal Rate of Return.

UNIT – IV: Working Capital and Dividend Policy

Working Capital Management – Determinants of working capital – Forecasting of Working Capital requirements.

Dividend policy – Determinants of dividend policy – Theories: relevance and irrelevance with value of firm – Forms of dividend – Stock dividend – Bonus issue – Stable dividend.

UNIT – V: Financial Statement Analysis

Fund flow and cash flow Analysis (Simple Problems only) – Preparation of Schedules of changes in working capital, Funds from Operation – Adjusted P & L A/C, Cash flow & fund flow Statements.

TEXT BOOK:

Financial Management by R.K. Sharma – Kalyani Publishers, New Delhi



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REFERENCE BOOKS:

1. *Theory and Problems of Financial Management* by Khan & Jain, McGraw Hill Publication, New Delhi.
2. *Financial Management* by S.P. Gupta, Sahitya Bhavan Publication, New Delhi.
3. *Financial Management* by Prasanna Chandra, Tata McGraw–Hill Education, New Delhi.
4. *Financial Management* by Dr. A. Murthy, Margham Publications, Chennai.
5. *Fundamentals of Financial Management* by S. K. Sharma, Sultan Chand & sons, New Delhi.

DIGITAL TOOLS:

E Books	https://www.free-ebooks.net/
Audio Books	http://www.openculture.com/
E–Content for Learning	http://webcast.berkeley.edu/
Digital Libraries	http://library.clark.edu/
MOOCs – Massive Open On–line Courses	https://www.edx.org/

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	3	3
CO2	3	3	2	2	3	3
CO3	3	3	2	2	3	3
CO4	3	3	2	2	3	3
CO5	3	3	2	2	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. G. NALINA & Dr. G. CHINNA DURAI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

NEWLY INTRODUCED 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCPE52	HUMAN RESOURCE MANAGEMENT	ELECTIVE – 1	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☐	Entrepreneurship ☒

COURSE DESCRIPTION:

To familiarize students with the Human Resources Management involving planning, placement and training, significance of performance appraisal and methods of compensation.

COURSE OBJECTIVE:

To acquaint students with the Techniques and Principles to manage human resource of an organisation.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge level (According to Blooms Taxonomy)
CO 1	understand the recent HRM concepts and its challenges.	Upto K3
CO 2	understand the role of Human Resource Management in the organization strategic planning	Upto K3
CO 3	gain knowledge on HR training and appraisal process.	Upto K3
CO 4	gain basic knowledge of assessing and techniques of performance appraisal	Upto K3
CO 5	know the compensation policy of the enterprises and understand recent development of wage and salary administration	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

HUMAN RESOURCE MANAGEMENT

UNIT – I: Introduction to Human Resource Management

HRM Concept and Functions, Role, Status and competencies of HR Manager–HR Policies – Evolution of HRM – HRM vs HRD – Evolution of HRM – Emerging Challenges of Human Resource Management–Workforce diversity; Empowerment–Human Resource Information System.

UNIT – II: Acquisition of Human Resource

Human Resource Planning – Quantitative and Qualitative Dimensions – job analysis–job description and job specification – Recruitment And Selection – meaning – process of requirement–sources and techniques of Recruitment–Meaning and Process of Selection – Selection Tests And Interviews – placement, induction, socialization and Retention.

UNIT – III: Training and Development

Concept and Importance – Training and development methods – Identifying Training and Development Needs – Designing Training Programmes – Role Specific and Competency Based Training – Evaluating Training Effectiveness – Training Process Outsourcing – Management Development – Career Development.

UNIT – IV: Performance Appraisal

Nature, objectives and importance – Modern Methods and techniques of performance appraisal – potential appraisal and employee counseling – job changes – transfers and promotions – Problems in Performance Appraisal – Essentials of Effective Appraisal System – Job Evaluation – Concepts, Process and Objectives – Advantages and Limitations – Methods.

UNIT – V: Compensation and Maintenance

Compensation – Concept and policies– wage and Salary administration – Methods of wage payments and incentive plans – Fringe benefits – Performance linked compensation – Employee health, welfare and safety social security – Employer – Employee relations – grievance handling and redressal.



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TEXT BOOK:

C.B. Guptha, *Human Resource Management*, Pearson Education.

REFERENCE BOOKS:

1. K. Aswathappa, *Human Resource Management Text and Cases*, Tata McGraw Hill, New Delhi.
2. P.G. Aqinas, *Human Resource Management Principles and Practice*: Vikas Publishing House Pvt. Ltd., New Delhi.
3. Gary Dessler. *A Framework for Human Resource Management*. Pearson Education.
4. DeCenzo, D.A. and S.P. Robbins, *Personnel / Human Resource Management*, Pearson Education.

DIGITAL TOOLS:

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Audio Books	https://librivox.org/
E-Content for Learning	http://cosmolearning.org/
Digital Libraries	http://www.dli.ernet.in/
MOOCs – Massive Open On-line Courses	http://ocw.mit.edu/

Mapping of CO with PSO

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CO1	1	1	2	3	3	3
CO2	1	1	2	3	3	3
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CO4	1	1	2	3	3	3
CO5	1	1	2	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. G. NALINA & Dr. K. SUBBULAKSHMI



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

NEWLY INTRODUCED 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCPE53	BUSINESS COMMUNICATION	ELECTIVE – 1	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

To develop better written and oral business communication skills among the students and enable them to know the effective media of communication. To enhance their writing skills in various forms of business letters and reports.

COURSE OBJECTIVES:

- To enable the students know about the principles, objectives and importance of communication in commerce and trade
- To develop the students skills to write business letters
- To make the students become aware about various types of business correspondence
- To develop the students competency to write business reports
- To enable the learners to update with modern trend of communication applicable to business

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge level (According to Blooms Taxonomy)
CO 1	know about the principles, objectives and importance of communication.	Upto K3
CO 2	know how to make business enquiries, place orders and write collection letters.	Upto K3
CO 3	write banking, insurance and agency letters.	Upto K3
CO 4	acquire knowledge on report preparation.	Upto K3
CO 5	gain practical knowledge in E-Communication.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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BUSINESS COMMUNICATION

UNIT – I: Introduction

Business Communication: Meaning – Objectives – Media – Barriers Importance of Effective Business Communication – Modern Communication Methods – Business Letters: Need – Functions – Kinds – Essentials of Effective Business Letters – Layout.

UNIT – II: Business Correspondence

Enquiries – Replies – offers and quotations – Order sand their Execution –Credit and Status Enquiries – Meaning – Trade and bank references – Complaints and Adjustments – Collection Letters – How to write effective Collection letters – Sales Letters – Circular Letters.

UNIT – III: Banking, Insurance and Agency Correspondence

Banking Correspondence – Introduction – correspondence with customer, Head office – Insurance Correspondence – Life insurance – Fire insurance – Marine insurance–Agency Correspondence.

UNIT – IV: Report Writing

Company Secretarial Correspondence – Agenda, Minutes and Report Writing – Types –Characteristics of good Report – Report of individuals.

UNIT – V: Technology and Business Communication

Application for Jobs: Preparation of resume – Interviews – Meaning – types of Interview –Candidates preparing for an interview – guidelines to be observed during an interview– Business Report Presentations. Strategic Importance of E–Communication. Email, Text Messaging, Slide or Visual Presentation – Internet – Video conferencing – Group Discussion – Social Networking.

TEXT BOOK:

R.S.N. Pillai and Bhagavathi. S, *Commercial Correspondence*, Chand Publications, New Delhi.

REFERENCE BOOKS:

1. N.S. Raghunathan & B. Santhanam, *Business Communication*, Margham Publications, Chennai.
2. M.S.Ramesh and R.Pattenshetty, *Effective Business English and Correspondence*, S.Chand & Co, Publishers, NewDelhi–2.
3. V.R. Palanivelu & N. Subburaj, *Business Communication*, Himalaya Publishing Pvt.Ltd, Mumbai.
4. Sathya Swaroop Debasish, Bhagaban Das, *Business Communication*, PHI Learning Pvt.Ltd., New Delhi, 2010 Edition.
5. Communication Conquer: Pushpalatha & Kumar, *A Handbook of Group Discussion and Job Interview*, PHI Learning Publisher.

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3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNERS: Dr. K. G. NALINA & Dr. K. SUBBULAKSHMI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

NEWLY INTRODUCED 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCPS51	COMPUTER APPLICATION IN BUSINESS	SBS – 5	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This Course will provide the knowledge about the computer application in business and effective management of firm by using computer.

COURSE OBJECTIVE:

The objective of this Course is to familiarize the students with the innovations of information in computer applications in business. The Course intends to give basic computer knowledge and also will enable the students to appreciate the practical details of computer.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge level (According to Blooms Taxonomy)
CO 1	know the basic concepts of computer application.	Upto K3
CO 2	understand MS word and its application	Upto K3
CO 3	gain an insight about MS Power Point and its application	Upto K3
CO 4	understand the application of MS Excel	Upto K3
CO 5	develop their understanding on internet and its usage	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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COMPUTER APPLICATIONS IN BUSINESS

UNIT – I: Computer Applications

Introduction of Computers – Computer Applications – Classification – Programming concepts – Assembly language – High level language – Operating system – Compilers – Assemblers – Packages.

UNIT – II: MS Word

MS Word – Introduction to Word – Creating Word Document – Formatting – Spell Check – Grammar Check – Working with Tables – Saving, Opening and Closing Document – Mail Merge.

UNIT – III: MS Power Point

MS Power Point – Creation – Insert Picture – Animation – Creating Multimedia Presentations – Insert Tables and Graphs.

UNIT – IV: MS Excel an Introduction

MS Excel – Introduction – Spread Sheet – Entering data in Working sheets – Editing and Formatting Work sheets – Charts – Functions like Saving, Opening and Closing Work book.

UNIT – V: Introduction to Internet

Introduction to Internet – Browsers – Search Engine – WWW – Internet Protocols – E-mail – How to create E-mail – Internet Vs Intranet – Webpage – URL.

TEXT BOOK:

Computer Applications in Business Paperback – 1 December 2010 by Parameesaran (Author) by S Sulthan Chand Publication, New Delhi.

REFERENCE BOOKS:

1. *Computer Applications in Business Paperback* – 10 March 2009 by [K Kumar](#) (Author), [S Rajkumar](#) (Author), The McGraw Hill Companies
2. *Complete Reference on MS Office* – Deitel & Deitel
3. *Computer Application in Business* – R Parameswaran, S Chand & Company Ltd.

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3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. G. NALINA & Dr. K. SUBBULAKSHMI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

PERCENTAGE OF REVISION 20%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCPC61	ADVANCED CORPORATE ACCOUNTING	CORE – 11	6	–	6

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course enables the students to know the methods, procedures and preparations of Corporate Accounting.

COURSE OBJECTIVES:

- To impart knowledge on accounts of Holding Companies to the students
- To enable the students understand the accounts of Banking Companies
- To enable them to develop skills in the preparation of Insurance Company accounts
- To make the students learn about preparation of liquidator's Final Statement.
- To help the students gain knowledge about Accounting Standards and companies' accounts.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge level (According to Blooms Taxonomy)
CO 1	understand and prepare the accounts of Holding Companies	Upto K3
CO 2	prepare the accounts of Banking Companies	Upto K3
CO 3	prepare the Insurance Company accounts	Upto K3
CO 4	prepare the liquidator's Final Statement.	Upto K3
CO 5	understand the concept and component of Indian and International Accounting Standard.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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ADVANCED CORPORATE ACCOUNTING

UNIT – I: Accounting for Holding Companies

Introduction–Advantages – Disadvantages – Wholly – owned – subsidiary Companies –Partly – owned Subsidiary Companies – Minority Interest – Cost of Control – Capital and Revenue Profit – Revaluation of Assets and Liabilities – Elimination of Common Transactions.

UNIT – II: Accounting for Accounting for Banking Companies

Introduction – Legal provisions– Statutory Reserve – CRR and SLR – Accounts – Profit and Loss Account – Balance Sheet as per new Schedules.

UNIT – III: Accounting for Insurance Companies

Types of Insurance –Annual Accounts – Life Insurance – Consideration for Annuities Granted – Balance Sheet – Determination of Profit – Accounts of General Insurance – Reserve for Unexpired Risk – Preparation of Final Accounts.

UNIT – IV: Accounting for Liquidation

Liquidation – Meaning – Types of Liquidation – Liquidators Final Statement of account as per the legal format only.

UNIT – V: Accounting Standards

Accounting Standards – Indian and International Accounting Standards – Accounting Standards 1,3,6,10,14,21 and 29 – Application – Scope – Formulation – Advantages – Disadvantages – Challenges – Inflation Accounting (Theory only).

TEXT BOOK:

Reddy, T.S. and Murthy, A. 2015. *Corporate Accounting*. Revised Edn. Margham Publications, Chennai.

REFERENCE BOOKS:

1. Pillai. R.S.N, Bagavathi and Uma. S, *Fundamentals of Advanced Accounting*, Third Revised Edition 2014, S. Chand & Company Private Limited, New Delhi.
2. Gupta R.L. and Radhaswamy 2009. *Advanced Accountancy*. 13th Revised Edn. Sultan Chand & Sons, New Delhi.
3. Jain, S.P. and Narang, K.L. 2014. *Advanced Accountancy*. 20th Edn. Kalyani Publishers, Ludhiana
4. Pillai, R.S.N. and Bagavathi. 2012. *Advanced Accountancy*. 5th Edn. Chand, S. & Co Ltd., New Delhi.

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E–Content for Learning	http://cosmolearning.org/
Digital Libraries	http://www.dli.ernet.in/
MOOCs – Massive Open On–line Courses	http://ocw.mit.edu/

Mapping of CO with PSO

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CO1	3	3	3	3	2	3
CO2	3	3	3	3	2	3
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CO4	3	3	3	3	2	3
CO5	3	3	3	3	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. G. CHINNA DURAI & Dr. K. SUBBULAKSHMI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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PERCENTAGE OF REVISION 60%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCPC62	GENERAL LAW	CORE – 12	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This Course provides knowledge about the sources of law, Indian constitution & Parliament System. This Course helps the students to face the government exams and thus creates employability.

COURSE OBJECTIVE:

The Objective of this Course is to make the students understand about the Indian constitution and the General Law.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge level (According to Blooms Taxonomy)
CO 1	understand about the sources of Indian law.	Upto K3
CO 2	explain about the Indian Constitution, its rights and duties, powers of the President, Prime Minister, Council of Ministers.	Upto K3
CO 3	gain knowledge about the concept of Indian penal code and offences relating to Documents and Property Marks.	Upto K3
CO 4	know about the criminal procedure code and powers.	Upto K3
CO 5	know about the Rights To Information Act and its role	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

GENERAL LAW

UNIT – I: Sources of Law

Sources of law – English Law, Customs, Judicial precedents, Legislation, Personal Law of parties

UNIT – II: Constitution of India

Indian Constitution – Introduction, Federal – features, pre-amble – Fundamental Rights, Fundamental Duties – Parliament – Lok Sabha, Rajya Sabha, Members – Election of President, Vice President, Prime Minister, Speaker, Council of Ministers – their responsibilities – collective – individual – Power of President – Legislative, Judiciary, Ancillary.

UNIT – III: Indian Penal Code, 1860

Introduction – Offences against Property – Criminal Misappropriation of Property, Criminal Breach of Trust, Cheating, Fraudulent Deeds and Dispositions of Property; Offences relating to Documents and Property Marks – Forgery; Defamation; Abetment and Criminal Conspiracy.

UNIT – IV: Criminal Procedure Code, 1973

Classes of Criminal Courts; Power of Courts; Arrest of Persons; Mens Rea; Cognizable and Non-Cognizable Offences; Bail; Continuing Offences; Compounding of Offences; Summons and Warrants; Searches; Summary Trial.

UNIT – V: Right to Information Act, 2005

Key Definitions – Public Authorities & their Obligations – Role of Central/ State Governments; Central Information Commission; State Information Commission.

TEXT BOOK:

N.D. Kapoor & Rajni Abbi, *General Laws and Procedures*, Sultan Chand & Sons. New Delhi

REFERENCE BOOKS:

1. M.V.K. Moorthy. *Indian Constitutions*. Bare Acts
2. Durga Das Basu, *Constitution of India*, Prentice Hall of India, New Delhi
3. G.W. Paton, *A Textbook of Juris Prudence*
4. M.P. Tandon. *Civil Procedure Code*. Allahabad Law Agency, Allahabad.
5. Ratanlal & Dhirajlal. *The Indian Penal Code*
6. Eastern Book Company, *Code of Criminal Procedure*.
7. R.V. Kelkar, *Lectures on Criminal Procedure*, 4th Edn., Revised by Dr. K.N. Chandrasekharan Pillai, Eastern Book Company, Lucknow.



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

DIGITAL TOOLS:

E Books	http://www.bookrix.com/
Audio Books	https://librivox.org/
E-Content for Learning	http://cosmolearning.org/
Digital Libraries	http://www.dli.ernet.in/
MOOCs – Massive Open On-line Courses	http://ocw.mit.edu/

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	1	2	1	2
CO2	1	1	1	2	1	2
CO3	3	3	1	2	1	2
CO4	3	3	1	2	1	2
CO5	3	3	1	2	1	2

3. Advanced Application

2. Intermediate Development

1. Introductory Level

COURSE DESIGNERS: Dr. K. G. NALINA & Dr. K. SUBBULAKSHMI



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PERCENTAGE OF REVISION 40%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCPC63	GOODS AND SERVICE TAX & CUSTOMS	CORE – 13	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course aims to provide knowledge on the Business/indirect taxes to familiarise the students with recent changes in indirect taxes in India.

COURSE OBJECTIVES:

- To make the students gain factual knowledge of the vocabulary or terminology of business / indirect taxes.
- To describe the system of Indirect taxes in India.
- To identify the reasons for the levying GST
- To identify the Structure of GST and registration procedure under GST and key dates for submission of returns.
- To identify the registration procedures and the minimum record-keeping requirements.
- To identify the compliance requirements for GST.
- To familiarise the levy and collection of Customs Duty.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge level (According to Blooms Taxonomy)
CO 1	describe the system of Indirect taxes in India and the bases for the levy of indirect taxes.	Upto K3
CO 2	identify the reasons for the levy GST Identify the Structure of GST.	Upto K3
CO 3	apply the concept of taxable supply and input tax credit and register for GST and file returns as per GST Rules	Upto K3
CO 4	apply the concept of place of supply and can determine the nature of supply.	Upto K3
CO 5	identify the taxable event of the levy of Customs duty in India and its Structure and apply the rules of classification and valuation of goods for customs purpose.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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GOODS AND SERVICE TAX & CUSTOMS

UNIT – I:

Indirect taxes – Meaning and Nature – Special features of Indirect Taxes– Contribution to government revenues – Taxation under the Constitution – Advantages and Disadvantages of Indirect Taxes.

UNIT – II:

Good and Service Tax Introduction – Meaning – Need for GST – Advantages of GST – Structure of GST in India – Dual concepts – SGST–CGST–IGST–UTGST– Types of Rates under GST – Exempted Goods and Services under Central Goods and Services Tax Act 2017. Meaning of important terms: Goods, services, supplier, business, manufacture, casual taxable person, aggregate turnover, input tax and output tax.

UNIT – III:

Levy and Collection under SGST/CGST Acts – Concept of supply – Composite and Mixed supplies – Composition Levy – Time of supply of goods and services – Value of Taxable supply. Input Tax credit – Eligibility and conditions for taking input credit– Reverse charge under the GST– Registration procedure under GST– Concept of e-way Bill – Filing of Returns.

UNIT – IV:

Levy and Collection under The Integrated Goods and Services Tax Act 2017– Meaning of important terms: Integrated tax, intermediary, location of the recipient and supplier of services, output tax. Levy and Collection of Tax– Determination of nature of Supply– Inter–State supply and Intra–State supply– Place of Supply of Goods or Services – zero–rated supply.

UNIT – V:

Introduction to Customs Laws in India – The Customs Act 1962 – The Customs Tariff Act 1975– Levy and Exemption from Custom duty – Taxable event – Charge of Custom duty– Exemptions from duty – Customs procedures for import and export of Goods. – Customs duty draw back.

TEXT BOOK:

Indirect Taxes, V.S. Datey. Taxmann Publications (P) Ltd. New Delhi.

REFERENCE BOOKS:

1. *Indirect Taxes: GST and Customs Laws*. R. Parameswaran and P. Viswanathan – Kavin Publications – Coimbatore
2. *Glimpse of Goods and Service Tax* – Sathpal Puliana
3. *Handbook of GST – Law and Practice* – Gaurav Gupta
4. *GST Law and Practice* – SS Gupta
5. *Indirect Taxation* – V. Balachandran. Sultan Chand & Co. New Delhi



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Mapping of CO with PSO

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CO1	3	3	3	3	1	2
CO2	3	3	3	3	1	2
CO3	3	3	3	3	1	2
CO4	3	3	3	3	1	2
CO5	3	3	3	3	1	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. G. CHINNADURAI & Dr. K. G. NALINA



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NEWLY INTRODUCED 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCPE61	BUSINESS MATHEMATICS	ELECTIVE – 2	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course deals with Business Mathematics and lays the foundation of the aspects of Business Mathematics.

COURSE OBJECTIVE:

The main objective of the course is to acquaint students with the features of Business Mathematics and particular emphasis is laid on the foundation aspect of Business Mathematics.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge level (According to Blooms Taxonomy)
CO 1	acquire knowledge about the Basics of theory of sets operation.	Upto K3
CO 2	understand Indices and Surds problems	Upto K3
CO 3	know the mathematical functions of simple, compound interest and annuities.	Upto K3
CO 4	become familiar with the concepts of differential and integral calculus.	Upto K3
CO 5	gain the knowledge in types of matrices	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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BUSINESS MATHEMATICS

UNIT – I: Theory of Sets

Definition – types – Venn diagram – set operations – union – intersection – complement – difference of two sets – De-Morgan's law – number of elements in a finite set.

UNIT – II: Indices and Surds

Indices – Definition – positive indices – law of Indices – zero and unity index – fractional Index – miscellaneous illustration.

Surds – Definition – classification – similar structure – conjugate – properties of biquadratic surds – square root of surds – square root of trinomial quadratics surds.

UNIT – III: Common Arithmetic

Meaning – Interest – Simple interest – compound interest – effective rate and nominal rate of interest – Depreciation – annuity types of annuities – Discount – trade discount – cash discount – present worth – discounting of bill of exchange – banker discount and gain.

UNIT – IV: Differentiation

Derivative of a function of one variable, power function, constant time of function, sum of function, product of function – maxima and minima – definition – criteria for maxima and minima.

UNIT – V: Matrices and Determinants

Matrices – Definition – types – addition, subtraction, multiplication of matrix – Determinants – minor's and Con factors – product of two determinants – adjoin of square matrix – inverse of matrices – rank matrix.

TEXT BOOK:

Business Mathematics – M. Manoharan and C. Elango, Palani Paramount Publications.

REFERENCE BOOKS:

1. *Business Mathematics* – J.K. Singh, Himalaya Publishing House, 2017.
2. *Business Mathematics* – R.S. Soni, Arneet Kaur Soni, Himalaya Publishing House.
3. *Business Mathematics* – M.L. Bhargara, Dr. Ashok Saini, Dr. Dalip Singh, Jeevan Sons Publication.

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Mapping of CO with PSO

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CO1	1	1	3	1	1	1
CO2	1	1	3	1	1	1
CO3	1	3	3	1	1	1
CO4	2	3	3	1	1	1
CO5	3	3	3	3	1	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. SUBBULAKSHMI & Dr. K. G. NALINA



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SYLLABUS

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NEWLY INTRODUCED 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCPE62	FINANCIAL MARKETS AND SERVICES	ELECTIVE – 2	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

The above course would enable the students to gain expert knowledge on the various aspects in Financial Markets and Financial Services.

COURSE OBJECTIVES:

- To make the students understand the nature of financial markets in India.
- To enable them gain an insight on the nature of financial markets
- To help them know the procedure for making transactions in the financial markets.
- To make them understand the dynamics of Financial Security of people.
- To teach the students the meaning and importance of developments in the financial markets.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge level (According to Blooms Taxonomy)
CO 1	know about the concepts and meaning of money market.	Upto K3
CO 2	know the concept of Financial Intermediaries.	Upto K3
CO 3	gain knowledge in New Issues Market and Secondary Markets.	Upto K3
CO 4	acquire knowledge on credit rating agencies.	Upto K3
CO 5	gain knowledge about merchant banking services.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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FINANCIAL MARKETS AND SERVICES

UNIT – I: Concept and Meaning of Money Market

Money Market – Call Money Market – Treasury Bills Market – Commercial Bills Market – Markets for Commercial paper and Certificates of Deposits – The Discount Market – Market for Financial Guarantee.

UNIT – II: An Introduction to Financial Intermediaries

Non-Banking Financial Intermediaries – Investment Companies – Hire Purchase Finance – Venture Capital Funds – Small Savings and Provident Funds – Unit Trust of India and Mutual Funds.

UNIT – III: New Issues Market and Secondary Market

New Issue Market – Meaning and Advantages – General Guidelines for New Issue – Methods of Floating – Players – Recent Trends. Secondary Market: Stock Exchanges – Functions – Role of Securities and Exchange Board of India – Reforms in Secondary Market.

UNIT – IV: Financial Services-I

Factoring – Meaning, Functions, Types, Cost and Benefit of Factoring – Factoring in India and Abroad – Credit Rating – Mechanism, Role of CRISI – ICRA and CIBIL.

UNIT – V: Financial Services-II

Merchant Banking – Definition, Origin of Merchant Banking – Merchant Banking in India – Merchant Banks and Commercial Banks – Services of Merchant Bankers – Qualities required for Merchant Bankers – Problems and Scope of Merchant Banking in India.

TEXT BOOK:

Gordon and Natarajan, 2011. *Financial Markets and Services*, Himalaya Publishing House. Mumbai.

REFERENCE BOOKS:

1. Bhole. L.M 2016. *Financial Institutions and Markets*, Tata McGraw Hill Publishing Company Limited, New Delhi.
2. Nalini Prava Tripathy 2015. *Financial Instruments and Services*, Prentice Hall of India, New Delhi.
3. Gurusamy. S 2015. *Financial Markets and Institutions*, S. Vijay Nicole Imprints (P) Ltd Chennai.

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Mapping of CO with PSO

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CO4	1	2	3	3	3	3
CO5	1	2	3	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNERS: Dr. K. G. NALINA & Dr. K.SUBBULAKSHMI



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SYLLABUS

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NEWLY INTRODUCED 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCPE63	RESEARCH METHODOLOGY	ELECTIVE – 2	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This above course will enable the students know Research Process & Report Writing.

COURSE OBJECTIVE:

To make the students acquire basic knowledge about the research, types, process and report writing.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge level (According to Blooms Taxonomy)
CO 1	understand the meaning of Research and process	Upto K3
CO 2	gain knowledge in types of research and methods of sampling techniques	Upto K3
CO 3	acquire knowledge in sources and collections of data	Upto K3
CO 4	know how to prepare and analyze the statistical testing procedure	Upto K3
CO 5	prepare research report	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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RESEARCH METHODOLOGY

UNIT – I: Introduction

Introduction to Business Research – Research in Business – Research Process– Research need, formulating the problem, designing, sampling, pilot testing.

UNIT – II: Research Design

Research Design– Exploratory, Descriptive, Casual, Formulation of hypothesis – types. Measurement– characteristics of sound measurement tool, Scaling methods and sampling techniques.

UNIT – III: Data Collection

Sources and Collection of Data – : Primary and secondary sources, survey observation, experimentation– details and evaluation. – Questionnaires – schedules, data entry, tabulation & cross tabulation–and Graphic presentation.

UNIT – IV: Data Analyses

Analysis and Preparation: Hypothesis testing – statistical significance, statistical testing procedure. Tests of significance – Simple Correlation – Regression.

UNIT – V: Report Writing

Presenting results and writing the report: – The written research Report.

TEXT BOOK:

Research Methodology by C. R. Kothari

REFERENCE BOOKS:

1. Donald R Cooper, *Business Research Methods* 7th Ed, McGraw Hill, 2001
2. Krishnaswami O.R, Ranganatham, M. *Methodology of Research for Social Science*, Himalaya, Mumbai, 2001.
3. Anderson J. et.al, *Thesis and Assignment Writing*, Wiley Eastern

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Mapping of CO with PSO

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CO1	1	2	2	2	2	3
CO2	1	2	3	3	3	3
CO3	1	2	3	3	3	3
CO4	1	2	3	3	3	3
CO5	1	2	1	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K.G.NALINA, Dr. G. CHINNA DURAI &
Dr. K. SUBBULAKSHMI.



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NEWLY INTRODUCED 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCPEV1	PROJECT WORK	ELECTIVE – 3	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course helps to prepare the students Industry Compatible.

COURSE OBJECTIVES:

- To develop analysing skills among students.
- To understand the Work Environment and prepare final report.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge level (According to Blooms Taxonomy)
CO 1	receive job related knowledge	Upto K3
CO 2	develop skills systematically so that they may learn quickly	Upto K3
CO 3	align to the work environment	Upto K3
CO 4	analyze the data and prepare final report	Upto K3
CO 5	meet the demands of getting jobs in the industry	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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PROJECT WORK

RULES GOVERNING FIELD STUDY:

1. Each student or Two students should undergo 4 weeks field study in any area during middle of the VI semester outside the college.
2. The student has to submit the field study report in **two copies in not exceeding 50 pages**.
3. The student must decide the topic, construct the questionnaire in any and **get the approval of the guide before leaving for field work**.
4. The field study report will be evaluated by the faculty guide, the Head and another faculty. The student has to appear for a Viva Voce that will be conducted before the end of the Semester.
5. If the student fails to make the field study and fails to submit the report, he will not be permitted to appear for the 6th semester examinations.
6. The field study project report must contain the following:
 - a. Introduction
 - b. Objectives
 - c. Methodology
 - d. Data analysis
 - e. Findings
 - f. Suggestions
7. The report submitted will be evaluated as follows:

Report writing	40 marks
Viva –Voce	60 marks
Total marks	100 Marks

- 40% of the aggregate (Project evaluation + Viva voce) is passing minimum.
- No separate pass minimum for the Viva–Voce examination.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	1	3	1	3	3
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CO3	1	1	3	1	3	3
CO4	1	1	3	1	3	3
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3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. G. NALINA & Dr. G. CHINNA DURAI



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NEWLY INTRODUCED 100%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCPS61	ENTREPRENEURSHIP DEVELOPMENT	SBS – 6	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course will provide the knowledge about the Entrepreneurship Development.

COURSE OBJECTIVES:

- To enable the students to understand the concept of Entrepreneurship and to learn the professional behavior about Entrepreneurship
- To identify significant changes and trends which create new business opportunities
- To make the students analyse the environment for potential business opportunities
- To provide conceptual exposure on converting ideas to an entrepreneurial firms

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge level (According to Blooms Taxonomy)
CO 1	know the basic concepts of Entrepreneurship.	Upto K3
CO 2	understand and develop the business idea	Upto K3
CO 3	gain an insight about startup of business	Upto K3
CO 4	understand the finance offering to the new startup industries.	Upto K3
CO 5	develop skill on application of Electronic Commerce	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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ENTREPRENEURSHIP DEVELOPMENT

UNIT – I: Entrepreneurship

Entrepreneur – Entrepreneurship – Women Entrepreneurship – Rural Entrepreneurship – Factors affecting Entrepreneurial Growth – Entrepreneurial Motivation – Entrepreneurial Competencies – Entrepreneurial Mobility – Challenges to Entrepreneurship – Ethics and Entrepreneurship – Social Responsibility in Entrepreneurship – Entrepreneurial Development Programmes.

UNIT – II: Developing Successful Business Ideas

Opportunity Analysis – Ideation Techniques – Ideation Catalysts and Inhibitors – Idea to Opportunity Maps – Evaluation of Idea to Opportunity Maps – Business Model – Functions of a Business Model – Business Modelling – Benefits of Business Modelling – Business Models to Business Plans.

UNIT – III: Start – Up

Small Enterprises: An Introductory Framework – Project Identification and Selection – Project Formulation – Project Appraisal – Legal, Regulatory and Statutory Body – Clearance Approvals and NOC – Compliance – Financing of Enterprise – Boot Strapping – Ownership Structures.

UNIT – IV: Support

Institutional Finance to Entrepreneurs – Lease Financing and Hire–Purchase – Institutional Support to Entrepreneurs – Taxation Benefits to Small–Scale Industries – Government Policy for Small–Scale Enterprises.

UNIT – V: Development

Accounting for Enterprises – Break–Even Analysis – Elements of Financial Statements– Growth Strategies – Intellectual Property – Innovation – Knowledge Management – Leadership and Governance – Sickness and Rehabilitation – Application of Electronic Commerce.

TEXT BOOK:

Gupta C. B., Srinivasan N P, *Entrepreneurial Development*, Sultan Chand and Sons.

REFERENCE BOOKS:

1. Khanka . S.S., *Entrepreneurial Development*, S. Chand & Co. Ltd., New Delhi. 2017
2. Raj Shankar. *Essentials of Entrepreneurship*, Vijay Nicole Imprints Private Ltd., Chennai. 2013.
3. Gupta. C.B. & Khanka S.S., *Entrepreneurship and Small Business Management*, Sultan Chand & Sons, 7th Revised Edition– 2017.
4. Weihrich Heinz, Canice Mark V and Koontz Harold, *Management – A Global and Entrepreneurial Perspective*, Tata McGraw Hill Education Pvt. Ltd., 3rd Edition, 2011.
5. Desai Vasant, *Entrepreneurial Development and Management*, Himalaya Publishing House, 2007.



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Audio Books	http://www.openculture.com/
E-Content for Learning	http://webcast.berkeley.edu/
Digital Libraries	http://library.clark.edu/
MOOCs – Massive Open On-line Courses	https://www.edx.org/

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CO4	1	3	3	1	3	3
CO5	1	3	3	1	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. G. NALINA & Dr. K. SUBBULAKSHMI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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**B.Sc. COMPUTER
SCIENCE**



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSCP5	OPEN SOURCE PROGRAMMING USING PHP & MYSQL	CORE – 12 LAB – VII	–	6	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course is intended to provide knowledge necessary to design and develop dynamic web pages using open source technology PHP and MySQL and also enhance the skill to connect and develop programs and applications using Database in XAMPP

COURSE OBJECTIVES:

- To develop an ability to design and code server side scripting
- To create dynamic and interactive web pages connecting with server
- To get knowledge about various objects , features and apply it
- To develop skill for state management of a web page using cookies and session
- To manage dynamic content and databases

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	design, code and debug in PHP using basic features	Upto K3
CO 2	design and develop codes using GET and POST request	Upto K3
CO 3	design and develop programs for state management using session and cookies	Upto K3
CO 4	design and implement programs that uses various objects, features in PHP	Upto K3
CO 5	design and develop applications that connects with the database	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

OPEN SOURCE PROGRAMMING USING PHP & MYSQL

(PERCENTAGE OF REVISION : 100%)

- 1) Write a PHP program to check given number is Armstrong number
- 2) Write a PHP program to find Factorial of a number using function
- 3) Write a PHP program to generate Prime numbers
- 4) Write a PHP program to reverse the given number
- 5) Write a PHP program to generate Fibonacci Series
- 6) Write a PHP program to Display Star Triangle
- 7) Write a PHP program to Generate Password
- 8) Write a PHP program to Split sentence into Words
- 9) Write a PHP program to check the given data is Palindrome or not
- 10) Write a PHP program to accessing indexed, associative multidimensional array
- 11) Write a PHP program to calculate EB Bill calculation
- 12) Write a PHP program to Handle Exception
- 13) Write a PHP program to convert Decimal number to Binary, Octal and HexaDecimal
- 14) Write a PHP program to find common elements of two arrays
- 15) Write a PHP program to sort given array
- 16) Write a PHP program to create and display Cookies.
- 17) Write a PHP program to create and display Session Variables
- 18) Write a PHP program to perform simple arithmetic calculations
- 19) Write a PHP program to create and access objects
- 20) Write a PHP program to implement basic banking transactions
- 21) Write a PHP program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.
- 22) Write a PHP program to insert a new record (bookinfo) in a table in MySQL
- 23) Write a PHP program to retrieve records (student) from table in MySQL (student)
- 24) Write a PHP program to update a record (customer contact) in a table in MySQL
- 25) Write a PHP program to delete a record (patient) in a table in MySQL (patient)

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	2	3	2	1
CO2	3	3	3	2	2	2
CO3	2	3	2	2	2	3
CO4	3	2	3	1	2	2
CO5	2	3	2	2	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. D. V. JEYANTHI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSE52	PHP PROGRAMMING	ELECTIVE – 1	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course is intended to provide knowledge necessary to design and develop dynamic web pages using open source technology PHP and MySQL. Also enhances the skill to connect and develop programs and applications using Database in XAMPP.

COURSE OBJECTIVE:

- To develop an ability to design and code server side scripting
- To create dynamic and interactive web pages connecting with server
- To get knowledge about various objects , features and apply it
- To develop skill for state management of a web page using cookies and session
- To manage dynamic content and databases

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the basic concepts of PHP and using variables, operators, data types and creating scripts	Upto K3
CO 2	identify the conditional control statements in PHP Working with String and Numeric Functions	Upto K3
CO 3	understand the concepts of Data in Arrays and Processing Arrays with Loops and Iterations Working with Dates and Times	Upto K3
CO 4	describe the procedures for Working with Files and Directories in PHP	Upto K3
CO 5	understand the basics of using MySQL ,Simple XML and DOM Extension	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

PHP PROGRAMMING

(PERCENTAGE OF REVISION : 100%)

UNIT – I:

Basic development Concepts – Creating first PHP Scripts – Using Variable and Operators – Storing Data in variable – Understanding Data types – Setting and Checking variables Data types – Using Constants – Manipulating Variables with Operators.

UNIT – II:

Writing Simple Conditional Statements – Writing More Complex Conditional Statements – Repeating Action with Loops – Working with String and Numeric Functions.

UNIT – III:

Storing Data in Arrays – Processing Arrays with Loops and Iterations – Using Arrays with Forms – Working with Array Functions – Working with Dates and Times.

UNIT – IV:

Creating User-Defined Functions – Creating Classes – Using Advanced OOP Concepts. Working with Files and Directories: Reading Files– Writing Files Processing Directories.

UNIT – V:

Introducing Database and SQL– Using MySQL–Adding and modifying Data– Handling Errors – Using SQLite Extension and PDO Extension. Introduction – XML – Simple XML and DOM Extension.

TEXT BOOK:

Vikram Vaswani – *PHP A Beginner's Guide*, Tata McGraw–Hill

REFERENCE BOOK:

The PHP Complete Reference – Steven Holzner – Tata McGraw–Hill Edition.

DIGITAL TOOLS:

1. <https://www.w3schools.com/php/>
2. <https://www.tutorialspoint.com/php/index.htm>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	2	1	1
CO2	2	2	1	2	2	2
CO3	3	2	1	2	2	2
CO4	2	3	2	2	1	1
CO5	2	2	2	2	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. K. P. GNANESH



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSE53	PYTHON PROGRAMMING	ELECTIVE – 1	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course enables the students to understand and use the basic, history and features of python.

COURSE OBJECTIVES:

1. Interpret the use of procedural statements like assignments, conditional statements, loops and function calls.
2. Infer the supported data structures like lists, dictionaries and tuples in Python.
3. Illustrate the application of matrices and regular expressions in building the Python programs.
4. Discover the use of external modules in creating excel files and navigating the file systems.
5. Describe the need for Object-oriented programming concepts in Python.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	learn the syntax and semantics of Python Programming Language.	Upto K3
CO 2	write Python functions to facilitate code reuse and manipulate strings.	Upto K3
CO 3	illustrate the process of structuring the data using lists, tuples and dictionaries.	Upto K3
CO 4	demonstrate the use of built-in functions to navigate the file system.	Upto K3
CO 5	appraise the need for working on web scraping.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

PYTHON PROGRAMMING

(PERCENTAGE OF REVISION : 100%)

UNIT – I:

Introduction, Python Basics: Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Your First Program, Dissecting Your Program. Flow control: Boolean Values, Comparison Operators, Boolean Operators, Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules, Ending a Program Early with sys. exit().

UNIT – II:

Functions: def Statements with Parameters, Return Values and return Statements, The None Value, Keyword Arguments and print(), Local and Global Scope, The global Statement, Exception Handling. Lists: The List Data Type, Working with Lists, Augmented Assignment Operators, Methods.

UNIT – III:

Dictionaries and Structuring Data: The Dictionary Data Type, Pretty Printing, Using Data Structures to Model Real-World Things.

Manipulating Strings – Working with Strings, Useful String Methods.

UNIT – IV:

Pattern Matching with Regular Expressions: Finding Patterns of Text without Regular Expressions, Finding Patterns of Text with Regular Expressions, More Pattern Matching with Regular Expressions, Greedy and Nongreedy Matching, The findall() Method, Character Classes, Making Your

Own Character Classes, The Caret and Dollar Sign Characters, The Wildcard

Character, Review of Regex Symbols, Case-Insensitive Matching, Substituting Strings with the sub() Method, Managing Complex Regexes, Combining re.IGNORECASE, re.DOTALL, and re.VERBOSE.

Reading and Writing Files: Files and File Paths, The os.path Module, The File Reading/Writing Process, Saving Variables with the shelve Module, Saving Variables with the pprint. pformat() Function.

Organizing Files: The shutil Module, Walking a Directory Tree, Compressing Files with the zipfile Module.

UNIT – V:

Web Scraping: Project: MAPIT.PY with the web browser Module, Downloading Files from the Web with the requests Module, Saving Downloaded Files to the Hard Drive, HTML.

Working with Excel Spreadsheets: Excel Documents, Installing the openpyxl Module, Reading Excel Documents, Project: Reading Data from a Spreadsheet, Writing Excel Documents, Project: Updating a Spreadsheet, Setting the Font Style of Cells, Font Objects, Formulas, Adjusting Rows and Columns, Charts.



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

TEXT BOOK:

Al Sweigart, *Automate the Boring Stuff with Python*, William Pollock, 2015, ISBN: 978–1593275990.

REFERENCE BOOKS:

1. Allen B. Downey, *Think Python: How to Think Like a Computer Scientist*, 2nd Edition, Green Tea Press, 2015, ISBN: 978–9352134755.
2. Charles Dierbach, *Introduction to Computer Science Using Python*, 1st Edition, Wiley India Pvt Ltd. ISBN–13: 978–8126556014.
3. Wesley J Chun, *Core Python Applications Programming*, 3rd Edition, Pearson Education India, 2015. ISBN–13: 978–9332555365.

DIGITAL TOOL:

<https://infytq.infosys.com/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	1
CO2	2	3	3	3	2	2
CO3	2	3	3	2	2	3
CO4	2	2	2	2	2	3
CO5	2	2	1	1	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. T. D.VENKATESWARAN



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSE54	ARTIFICIAL INTELLIGENCE	ELECTIVE – 1	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

Artificial intelligence is the simulation of human intelligence processes by machines, especially computer systems. Specific applications of AI include expert systems, natural language processing, speech recognition and machine vision.

COURSE OBJECTIVES:

The objective is to educate students about the concepts, techniques and applications of Artificial Intelligence.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand what an AI technique is and define AI problems as state space search problem	Upto K3
CO 2	learn Heuristic search techniques: Generate – and – test – Hill climbing – Best–first search – Problem reduction – Constraint satisfaction – Means–ends analysis	Upto K3
CO 3	learn to represent knowledge using predicate logic	Upto K3
CO 4	learn to solve AI problems using Resolution. Also learn to represent knowledge using rules	Upto K3
CO 5	learn to solve Gaming problems using minimax procedure and learn to identify the characteristics of an expert system	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

ARTIFICIAL INTELLIGENCE

(PERCENTAGE OF REVISION : 100%)

UNIT – I:

What is Artificial Intelligence?: The AI problems – The underlying assumptions – What is an AI technique? – The Level of the model – Criteria for Success Problems, Problem spaces and search: Defining the problem as a state space search – Production systems

UNIT – II:

Problem characteristics – Production system characteristics – Issues in the design of search programs – Additional problems, Heuristic search techniques: Generate – and – test – Hill climbing – Best-first search – Problem reduction – Constraint satisfaction – Means-ends analysis

UNIT – III:

Knowledge representation issues: Representations and mappings – Approaches to knowledge representations – Issues in knowledge representations – The frame problem

Using predicate logic: Representing simple facts in logic – representing Instance and Isa relationships – Computable functions and predicates

UNIT – IV:

Resolution – Natural deduction – Representing knowledge using rules: Procedural Versus Declarative knowledge – Logic programming – Forward versus Backward reasoning – Matching – Control knowledge

UNIT – V:

Game playing: Overview – The Minimax search procedure – Adding Alpha-Beta cutoffs – Additional refinements – Iterative deepening – References on specific games

Expert systems: Representing and using domain knowledge – expert system shells – Explanation – Knowledge acquisition

TEXT BOOK:

Artificial Intelligence, By Elaine Rich, Kevin Knight, Shivashankar B Nair,
Third Edition, Tata Mc Graw Hill Education Pvt.Ltd.,

UNIT – I : (Chapter-1: 1.1 to 1.5, Chapter-2: 2.1, 2.2),

UNIT – II : (Chapter-2: 2.3 to 2.6, Chapter-3: 3.1 to 3.6)

UNIT – III : (Chapter- 4: 4.1 to 4.4, Chapter –5: 5.1 to 5.3)

UNIT – IV : (Chapter-5: 5.4, 5.5, Chapter –6: – 6.1 to 6.5)

UNIT – V : (Chapter –12: 12.1 to 12.5, 20.1 to 20.4)



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

REFERENCE BOOKS:

1. Stuart J Russell and Peter Norvig, *Artificial Intelligence – A Modern Approach*, 3rd Edition, Prentice Hall of India/ Pearson Education, New Delhi, 2018.
2. George F Luger, *Artificial Intelligence: Structures and Strategies for Complex Problem Solving*, 5th Edition, Pearson Education, New Delhi, 2017.
3. Nils J Nilsson, *Principles of Artificial Intelligence*, Narosa Publishing House, New Delhi, 2002.
4. Patrick Henry Winston, *Artificial Intelligence*, 3rd Edition, Pearson Education, New Delhi, 2013.

DIGITAL TOOLS:

1. <https://www.javatpoint.com/artificial-intelligence-tutorial>
2. https://www.tutorialspoint.com/artificial_intelligence/index.htm
3. <https://www.w3schools.com/ai/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	3	2	2	1
CO2	2	3	1	3	2	2
CO3	1	1	3	2	2	3
CO4	2	2	2	2	2	3
CO5	2	2	1	1	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. V. K.VIJAYAKUMAR



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSSP3	LAB : SQL AND PLSQL	SBS – 6 Lab – VIII:	–	2	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course aims at facilitating the students to understand the skill of using SQL as a tool to access database information.

COURSE OBJECTIVES:

- To introduce and implement Data base manipulation operations in Oracle SQL.
- To enhance the students to develop programs in PL/SQL.

No.	Course Outcome	Knowledge Level(According to Bloom's Taxonomy)
CO 1	demonstrate DDL,DML and DCL operations in Oracle–SQL. Managing Databases and Tables, Inserting, Updating, and Deleting Data, Querying with SQL SELECT commands.	Upto K3
CO 2	implement SQL queries using Aggregate functions, set operations and time, date and string functions by multiple tables.	Upto K3
CO 3	utilize the basic data types, Functions, Arrays, Strings, Date and Times, and Design to write PL/SQL programs using decision making and looping, functions, arrays and strings.	Upto K3
CO 4	design to write programs using triggers and procedures.	Upto K3
CO 5	write a PL/SQL Coding for packages.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

SQL AND PLSQL

(PERCENTAGE OF REVISION : 50%)

Table creation with primary key, not null, unique, foreign key and check constraints

1. Inserting record (values to selective fields), Updation and deletion of records.
2. Queries using simple select statements
3. Queries using multiple tables
4. Nested queries
5. Working with Time & Date, string functions
6. Working with Aggregate functions
7. Queries using GROUP BY.. HAVING
8. Queries using set operations (union, intersection and minus)
9. PL/SQL program using decision making with branching
10. PL/SQL program using decision making with looping
11. PL/SQL program using cursor
12. PL/SQL program using functions and procedures
13. PL/SQL program using package

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	1	2	2	2	2
CO2	2	2	1	2	2	2
CO3	3	3	1	1	2	2
CO4	2	2	2	3	1	1
CO5	2	2	2	3	1	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. K. P.GNANESH



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSC61	DATA MINING AND WAREHOUSING	CORE-13	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

It deals with data mining techniques and data warehousing techniques to extract knowledge from large data bases

COURSE OBJECTIVES:

- To give knowledge in Data Mining and Data Warehousing
- To inculcate knowledge on Association Rule mining, Clustering and Classification techniques
- To make the students learn various applications of data mining techniques

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the data mining concepts regarding types of data, knowledge, techniques and applications	Upto K3
CO 2	understand the data warehousing concepts, data cube, OLAP & OLTP and Attribute-Oriented Induction	Upto K3
CO 3	gain knowledge about Association rule mining algorithms such as Apriori, FP-Growth for extracting knowledge from large data bases	Upto K3
CO 4	learn the classification techniques using various classification algorithms such as decision tree induction, Bayesian for extracting knowledge from large data bases	Upto K3
CO 5	learn the clustering techniques using various clustering algorithms such as k-means, k-medoids, etc., for extracting knowledge from large data bases. Also learn about various data mining applications	Upto K3

K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

DATA MINING AND WAREHOUSING **(PERCENTAGE OF REVISION : 25%)**

UNIT – I: Introduction

Why Data Mining? – What Is Data Mining? – What Kinds of Data Can Be Mined? – What Kinds of Patterns Can Be Mined? – Which Technologies Are Used? – Which Kinds of Applications Are Targeted? – Major Issues in Data Mining

UNIT – II: Data Warehousing and Online Analytical Processing

Data Warehouse: Basic Concepts – Data Warehouse Modeling: Data Cube and OLAP – Data Warehouse Design and Usage – Data Generalization by Attribute-Oriented Induction

UNIT – III: Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and Methods

Basic Concepts: Market Basket Analysis: A Motivating Example – Frequent Itemsets, Closed Itemsets, and Association Rules

Frequent Itemset Mining Methods: Apriori Algorithm: Finding Frequent Itemsets by Confined Candidate Generation – Generating Association Rules from Frequent Itemsets – Improving the Efficiency of Apriori – A Pattern-Growth Approach for Mining Frequent Itemsets – Mining Frequent Itemsets Using Vertical Data Format – Mining Closed and Max Patterns

Which Patterns Are Interesting?— Pattern Evaluation Methods: Strong Rules Are Not Necessarily Interesting – From Association Analysis to Correlation Analysis – A Comparison of Pattern Evaluation Measures

UNIT – IV: Classification: Basic Concepts

Basic Concepts: What Is Classification? – General Approach to Classification –

Decision Tree Induction: Decision Tree Induction – Attribute Selection Measures – Tree Pruning – Scalability and Decision Tree Induction – Visual Mining for Decision Tree Induction

Bayes Classification Methods: Bayes' Theorem – Naïve Bayesian Classification

Rule-Based Classification: Using IF-THEN Rules for Classification – Rule Extraction from a Decision Tree – Rule Induction Using a Sequential Covering Algorithm

UNIT – V: Cluster Analysis: Basic Concepts and Methods

Cluster Analysis: What Is Cluster Analysis? – Requirements for Cluster Analysis – Overview of Basic Clustering Methods

Partitioning Methods: k -Means: A Centroid-Based Technique – k -Medoids: A Representative Object-Based Technique

Hierarchical Methods: Agglomerative versus Divisive Hierarchical Clustering – Distance Measures in Algorithmic Methods

Data Mining Applications: Data Mining for Financial Data Analysis – Data Mining for Retail and Telecommunication Industries – Data Mining in Science and Engineering – Data Mining for Intrusion Detection and Prevention – Data Mining and Recommender Systems



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

TEXT BOOK:

Data Mining: Concepts and Techniques, by Jiawei Han, Micheline Kamber, Jian Pei – Third Edition, Morgan Kaufmann Publishers is an imprint of Elsevier.

UNIT – I : (Chapter 1 – 1.1 to 1.7)

UNIT – II : (Chapter 4 – 4.1, 4.2, 4.3, 4.5)

UNIT – III : (Chapter 6 – 6.1, 6.2, 6.3)

UNIT – IV : (Chapter 8 – 8.1, 8.2, 8.3, 8.4)

UNIT – V : (Chapter 10 – 10.1, 10.2, 10.3.1, 10.3.2, Chapter 13.3)

REFERENCE BOOKS:

1. K.P. Soman, Shyam Diwakar, V.Ajay *Insight into Data Mining Theory and Practice*, Prentice Hall of India Pvt. Ltd, New Delhi
2. *Data Mining and Data Warehousing: Principles and Practical Techniques* by Parteek Bhatia, Cambridge University Press, 2019
3. *Data Mining and Data Warehousing* by [B.S. Charulatha](#) January 2018, Charulatha Publications Private Limited
4. *Principles of Data Mining*, by D.Hand, H.Mannila and P.Smyth, Second Edition, PHI Pvt.Ltd., New Delhi, 2006
5. *Data Mining: Introduction and Advanced Topics* by M.H.Dunham, Second Edition, Pearson Education Pvt. Ltd., New Delhi, 2004

DIGITAL TOOLS:

1. https://www.vssut.ac.in/lecture_notes/lecture1428550844.pdf
2. https://www.lpude.in/SLMs/Master%20of%20Computer%20Applications/Sem_1/DEC AP446 DATA WAREHOUSING AND DATA MINING.pdf
3. [https://mrcet.com/pdf/Lab%20Manuals/IT/DATA%20WAREHOUSING%20AND%20DATA%20MINING%20\(R18A0524\).pdf](https://mrcet.com/pdf/Lab%20Manuals/IT/DATA%20WAREHOUSING%20AND%20DATA%20MINING%20(R18A0524).pdf)

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	1
CO2	2	3	3	3	2	2
CO3	2	3	3	2	2	3
CO4	2	2	2	2	2	3
CO5	2	2	1	1	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. V. K. VIJAYAKUMAR



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSCP6	LAB: PYTHON PROGRAMMING	CORE – 15 LAB – IX	-	5	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

Python is highly versatile. You can use it for both small and complex tasks, and it is used across many different industries — from its more common applications in **data science and software engineering** to environments like **mobile app development, artificial intelligence, and machine learning**.

COURSE OBJECTIVES:

It deals with Programming using PYTHON in the following areas

- Data science.
- Scientific and mathematical computing.
- Web development.
- Finance and trading.
- System automation
- Computer graphics.
- Basic game development.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	learn simple programs using formulas	Upto K3
CO 2	learn simple programs to solve mathematical problems	Upto K3
CO 3	learn python programs to play simple games	Upto K3
CO 4	learn python programs to solve simple problems related to Computer graphics	Upto K3
CO 5	learn python programs to solve simple problems related to Data Science	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

PYTHON PROGRAMMING

LIST OF EXPERIMENTS

(PERCENTAGE OF REVISION : 20%)

1. Write a Python program to compute addition of two numbers.
2. Write a Python program to finding Total, Average and grade system of Student Marks.
3. Write a Python program to calculate Area and Circumference of a Circle.
4. Write a Python program to compute Temperature Conversion.
5. Write a Python program to calculate of Simple Interest (SI).
6. Write a Python program to check whether the number is Positive Number or Negative Nos.
7. Write a Python program to check whether the year is Leap Year or Not.
8. Write a Python program to calculate greatest of three numbers.
9. Write a Python program to check whether the number is Prime Number or Not.
10. Write a Python program to check whether the number is ODD or EVEN Number.
11. Write a Python program to Swapping of two numbers without using temporary variable.
12. Write a Python program to print the Fibonacci series using recursion.
13. Write a Python program to calculate Factorial of a given number using recursion function.
14. Write a Python program to calculate sum of digits of a given number using function.
15. Write a Python program to reverse the given input number using function.
16. Write a Python program to check whether the number is Palindrome Number or Not.
17. Write a Python program to check whether the number is Armstrong Number or Not.
18. Write a Python program to find the minimum and maximum of a list of numbers.
19. Write a Python program: “tuple1 = (10,50,20,40,30)”
 - i. To display the elements 10 and 50 from tuple1
 - ii. To display length of a tuple1.
 - iii. To find the minimum element from tuple1.
 - iv. To add all elements in the tuple1.
 - v. To display same tuple1 multiple times.
20. Write a Python program.
 - i. To calculate the length of a string.
 - ii. To reverse words in a string.
 - iii. To display same string multiple times.
 - iv. To concatenate two strings.
 - v. Str1= "South India" , using string slicing to display "India"
21. Python Programs to play Simple games
22. Python Programs to solve simple problems using Graphics
23. Python Programs to solve simple problems in Data Science

REFERENCE BOOKS:

1. Allen B. Downey, *Think Python: How to Think Like a Computer Scientist*, 1st Edition 2012, O'Reilly



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SYLLABUS

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-
2. Jeff McNeil , *Python 2.6 Text Processing: Beginners Guide*, 2010 ,Packet Publications

DIGITAL TOOLS:

1. <https://www.w3schools.com/python/>
2. <https://docs.python.org/3/tutorial/>
3. <https://www.tutorialspoint.com/python/index.htm>
4. <https://www.geeksforgeeks.org/python-programming-language/learn-python-tutorial/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	1	2	1
CO2	2	3	3	2	2	2
CO3	1	3	2	2	2	3
CO4	3	2	1	3	2	2
CO5	2	3	2	2	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. V. K. VIJAYAKUMAR



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSCP7	LAB: WEB DESIGN	CORE – 16 LAB – X	–	5	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course is intended to teach the basic involved in creating static, interactive web pages using HTML, analyzing a web page and identify its elements and its attributes. It also demonstrates about creating, validating dynamic web pages using JavaScript programming.

COURSE OBJECTIVES:

- To develop an ability to design static web page using HTML
- To enrich the skill of creating interactive web page using HTML Forms
- To analyze and develop web page by identifying its elements and attributes
- To implement client side validation in browser side using JavaScript
- To help the students understand and demonstrate JavaScript objects by developing dynamic web pages
-

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	develop static web page with various text formatting elements, list, tables, image, marquee using HTML	Upto K3
CO 2	develop web site with multiple web pages using Frames, links using HTML, CSS	Upto K3
CO 3	develop interactive web page using Form Elements using HTML	Upto K3
CO 4	develop dynamic web pages to implement basic logics using Java Script	Upto K3
CO 5	develop dynamic web pages with client side validation using Java Script	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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WEB DESIGN

(PERCENTAGE OF REVISION : 10%)

1. Write a html program to display your resume using various text formatting
2. Write a html program to display registration form using various form elements
3. Write a html program to display railway registration form using various form elements
4. Write a html program to display an advertisement using images
5. Write a html program to display time table using table
6. Write a html program to display college web site using frames
7. Write a html program to display restaurant menu page using external link
8. Write a html program to display syllabus using internal link
9. Write a HTML program to display Sourashtra College using CSS
10. Write a JavaScript program to perform Arithmetic Operations
11. Write a JavaScript program to reverse a given number
12. Write a JavaScript program to check palindrome
13. Write a JavaScript program to merge two arrays
14. Write a JavaScript program to search an element in an array
15. Write a JavaScript program to change the background colour of the screen
16. Write a JavaScript program to display digital clock
17. Write a JavaScript program to do Form Validation
18. Write a JavaScript program to do Student MarkSheet Processing
19. Write a JavaScript program to do String Manipulation
20. Write a JavaScript program to create WishList
21. Write a JavaScript program to create and display Cookie
22. Write a JavaScript program to do cinema ticket booking
23. Write a JavaScript program to do EB Bill Calculation

DIGITAL TOOLS:

1. <https://www.youtube.com/watch?v=uUhOEj4z8Fo>(swayam / nptel tutorial – IIT Kharagpur)
2. <https://www.youtube.com/watch?v=QEtWL4IWIL4>(swayam / nptel tutorial – IIT Kharagpur)
3. <https://www.w3schools.com/js/>
4. <https://www.tutorialspoint.com/servlets/index.htm>
5. <https://www.javatpoint.com/jsp-tutorial>
6. <https://www.youtube.com/watch?v=OuBUUkQfBYM>(Full Stack)

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	1	2	1
CO2	2	3	3	2	2	2
CO3	1	3	2	2	2	3
CO4	3	2	1	3	2	2
CO5	2	3	2	2	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNER: Prof. D. V. JEYANTHI



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSE62	CLOUD COMPUTING	ELECTIVE – 2	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course is intended to provide knowledge necessary to classify and design various architectures of cloud computing and also enhances the practical applications of cloud computing.

COURSE OBJECTIVES:

- Classify the various Cloud computing applications
- Understand the architectures of cloud computing
- Understand the basic knowledge of cloud security

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the history and Basic knowledge of Cloud computing.	Upto K3
CO 2	understand different architectures of cloud computing such as Software as a Service (SaaS) – Infrastructure as a Service (IaaS) – Platform as a Service (PaaS)	Upto K3
CO 3	describe about applications of cloud computing by using case studies	Upto K3
CO 4	understand about cloud data centers and CRM management	Upto K3
CO 5	understand security threats and solution in clouds	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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CLOUD COMPUTING

(PERCENTAGE OF REVISION : 100%)

UNIT – I:

History of Cloud computing – Cloud Computing Architectural Framework – Types of Clouds – pros and cons of cloud computing – difference between web 2.0 and cloud – key challenges in cloud computing – Major Cloud players – Cloud Deployment Models – Virtualization in Cloud Computing – types of virtualization – Parallelization in Cloud Computing – cloud resource management – dynamic resource allocation – Optimal allocation of cloud models

UNIT – II:

Software as a Service (SaaS) – Infrastructure as a Service (IaaS) – Platform as a Service (PaaS) – Service Oriented Architecture (SoA) – Elastic Computing – On Demand Computing

UNIT – III:

Deployment of applications on the cloud – Hypervisor – Case studies – Xen, VMware, Eucalyptus – Amazon EC2, KVM, Virtual Box, Hyper-V

UNIT – IV:

Cloud data centres – Energy efficiency in data centre – Mobile cloud computing service models – Collaboration with services and applications: CRM management – Project management – Email – on line database – calendar – schedules – Word Processing – Presentation – Spreadsheet – Databases – Desktop – Social Networks and Groupware

UNIT – V:

Cloud security – Security threats and solutions in clouds – Auditing protocols – dynamic auditing – storage security – Privacy preserving – Fully Homomorphic Encryption – big data security – Cloud availability – DoS attacks – Fault tolerance management in cloud computing – Cloud computing in India

TEXT BOOK:

Anthony T. Velte, Toby J. Velte Robert Elsenpeter, *Cloud Computing a Practical Approach*, TATA Mc-Graw – Hill, New Delhi, 2010

REFERENCE BOOKS:

1. Judith Hurwitz, Bloor.R, Kanfman. M, Halper.F, (2010), *Cloud Computing for Dummies*, Wiley India Edition.
2. Gautam Shroff, (2010), *Enterprise Cloud Computing*, Cambridge University press.
3. Ronald Krutz and Russell Dean Vines, (2010), *Cloud Security*, Wiley-India pvt. Ltd.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	2	1	1
CO2	2	2	1	2	2	2
CO3	3	2	1	2	2	2
CO4	2	3	2	2	1	1
CO5	2	2	2	2	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. K. P. GNANESH



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SYLLABUS

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSE63	MACHINE LEARNING USING PYTHON	ELECTIVE – 2	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course enables the students to understand and use the basic, history and features of python.

COURSE OBJECTIVES:

- Interpret the use of procedural statements like assignments, conditional statements, loops and function calls.
- Infer the supported data structures like lists, dictionaries and tuples in Python.
- Illustrate the application of matrices and regular expressions in building the Python programs.
- Discover the use of external modules in creating excel files and navigating the file systems.
- Describe the need for Object-oriented programming concepts in Python.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	learn the Python libraries and tools	Upto K3
CO 2	learn Supervised Machine Learning Algorithms	Upto K3
CO 3	understand Unsupervised Learning and preprocessing	Upto K3
CO 4	get knowledge on Data and Engineering Features	Upto K3
CO 5	understand Model Evaluation and Improvement - Cross-Validation - Grid Search - Evaluation Metrics and Scoring	Upto K3

K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLY



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SYLLABUS

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MACHINE LEARNING USING PYTHON

(PERCENTAGE OF REVISION : 100%)

UNIT I

Introduction - Knowing Your Task and Knowing Your Data - Python - scikit-learn - Installing scikit-learn - Essential Libraries and Tools - Supervised Learning - Classification and Regression - Generalization, Over fitting, and Under fitting.

UNIT II

Supervised Machine Learning Algorithms - k-Nearest Neighbors - Linear Models - Naive Bayes Classifiers - Decision Trees - Ensembles of Decision Trees - Kernelized Support Vector Machines - Neural Networks.

UNIT III

Unsupervised Learning and Preprocessing - Types of Unsupervised Learning - Challenges in Unsupervised Learning - Dimensionality Reduction, Feature Extraction, and Manifold Learning - Clustering.

UNIT IV

Representing Data and Engineering Features - Categorical Variables - Binning, Discretization, Linear Models, and Trees - Interactions and Polynomials - Univariate Nonlinear Transformations - Automatic Feature Selection - Utilizing Expert Knowledge.

UNIT V

Model Evaluation and Improvement - Cross-Validation - Grid Search - Evaluation Metrics and Scoring.

TEXT BOOK

Andreas C. Müller, Sarah Guido, Introduction to Machine Learning with Python, O'Reilly Media, Inc, October 2016

Unit I – Chapters 1,2

Unit II – Chapter - 2

Unit III – Chapter 3

Unit IV – Chapter 4

Unit V – Chapter 5

REFERENCE BOOKS

1. Jeremy Watt , Reza Borhani, Aggelos K. Katsaggelos, *Machine Learning Refined - Foundations, Algorithms, and Applications* , Second edition, Cambridge University Press , 2020.
2. Mehryar Mohri, Afshin Rostamizadeh, Ameet Talwalkar, *Foundations of Machine Learning*, Second Edition, The MIT Press, 2018
3. John Paul Mueller and Luca Massaron, *Machine Learning (in Python and R) For Dummies*, John Wiley & Sons, 2016

DIGITAL TOOL:

1. https://www.w3schools.com/python/python_ml_getting_started.asp
2. <https://www.geeksforgeeks.org/machine-learning-with-python/>
3. https://www.tutorialspoint.com/machine_learning_with_python/index.htm
4. <https://in.coursera.org/learn/machine-learning-with-python>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	1
CO2	2	3	3	3	2	2
CO3	2	3	3	2	2	3
CO4	2	2	2	2	2	3
CO5	2	2	1	1	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. V. K.VIJAYAKUMAR



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SYLLABUS

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSE64	CYBER SECURITY	ELECTIVE – 2	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course enables the students to learn the fundamentals of cyber security and equip students to protect and defend against cyber threats and expose students to governance, regulatory, legal, economic, environmental, social and ethical contexts of cyber security. Expose students to responsible use of online social media networks

COURSE OBJECTIVES:

- To provide a comprehensible introduction about the basic concepts of Internet, world wide web, cyber security
- To inculcate knowledge about cyber crime, offenses and laws
- To give knowledge about social media, privacy and security
- To expose with Ecommerce, digital payments and RBI guidelines
- To exposed with basic security tools available to secure computer and mobile devices

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the concept of Cyber security and issues and challenges associated with it.	Upto K3
CO 2	understand the cyber crimes, their nature, legal remedies and as to how report the crimes through available platforms and procedures	Upto K3
CO 3	appreciate various privacy and security concerns on online Social media and understand the reporting procedure of inappropriate content, underlying legal aspects and best practices for the use of Social media platforms	Upto K3
CO 4	understand the basic concepts related to E-Commerce and digital payments. They will become familiar with various digital payment modes and related cyber security aspects, RBI guidelines and preventive measures against digital payment frauds.	Upto K3
CO 5	understand the basic security aspects related to Computer and Mobiles. They will be able to use basic tools and technologies to protect their devices	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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CYBER SECURITY

(PERCENTAGE OF REVISION : 100%)

UNIT – I: Introduction to Cyber security

Defining Cyberspace and Overview of Computer and Web–technology, Architecture of cyberspace, Communication and web technology, Internet, World wide web, Advent of internet, Internet infrastructure for data transfer and governance, Internet society, Regulation of cyberspace, Concept of cyber security, Issues and challenges of cyber security

UNIT – II: Cyber Crime and Cyber Law

Classification of cyber crimes, Common cyber crimes– cyber crime targeting computers and mobiles, cyber crime against women and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks, Cybercriminals modus– operandi , Reporting of cyber crimes, Remedial and mitigation measures, Legal perspective of cyber crime, IT Act 2000 and its amendments, Cyber crime and offences, Organisations dealing with Cyber crime and Cyber security in India, Case studies

UNIT – III: Social Media Overview and Security

Introduction to Social networks. Types of Social media, Social media platforms, Social media monitoring, Hashtag, Viral content, Social media marketing, Social media privacy, Challenges, opportunities and pitfalls in online social network, Security issues related to social media, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of Social media, Case studies

UNIT – IV: E – Commerce and Digital Payments

Definition of E– Commerce, Main components of E–Commerce, Elements of E–Commerce security, E–Commerce threats, E–Commerce security best practices, Introduction to digital payments, Components of digital payment and stake holders, Modes of digital payments– Banking Cards, Unified Payment Interface (UPI), e–Wallets, Unstructured Supplementary Service Data (USSD), Aadhar enabled payments, Digital payments related common frauds and preventive measures. RBI guidelines on digital payments and customer protection in unauthorised banking transactions. Relevant provisions of Payment Settlement Act, 2007.

UNIT – V: Digital Devices Security, Tools and Technologies for Cyber Security

End Point device and Mobile phone security, Password policy, Security patch management, Data backup, Downloading and management of third party software, Device security policy, Cyber Security best practices, Significance of host firewall and Ant–virus, Management of host firewall and Anti–virus, Wi–Fi security, Configuration of basic security policy



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TEXT BOOKS:

1. *Cyber Crime Impact in the New Millennium*, by R. C Mishra ,Auther Press. Edition 2010.
2. *Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives* by SumitBelapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
2. *Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives* by SumitBelapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
3. *Security in the Digital Age: Social Media Security Threats and Vulnerabilities* by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)

REFERENCE BOOKS:

1. *Electronic Commerce* by Elias M. Awad, Prentice Hall of India Pvt Ltd.
2. *Cyber Laws: Intellectual Property & E-Commerce Security* by Kumar K, Dominant Publishers
3. *Network Security Bible*, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.
4. *Fundamentals of Network Security* by E. Maiwald, McGraw Hill.

DIGITAL TOOLS(including moocs, swayam, nptel):

1. https://www.tutorialspoint.com/data_communication_computer_network/index.htm
2. <https://www.javatpoint.com/computer-network-tutorial>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	3	2	2	1
CO2	2	3	1	3	2	2
CO3	1	1	3	2	2	3
CO4	2	2	2	2	2	3
CO5	2	2	1	1	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. D. V. JEYANTHI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

B.Sc., (BIOCHEMISTRY)



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SYLLABUS

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10% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCC31	ENZYMOLGY AND ENZYME TECHNOLOGY	CORE – 3	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	III	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course covers purification and separation of enzymes, categorization of enzymes and cofactors, enzyme kinetics and their applications in industry, medicine, and diagnostics.

COURSE OBJECTIVES:

- To provide the students a theory base and knowledge relevant to the enzymology principles including fundamental properties of enzymes, enzyme catalytic mechanisms and enzyme kinetics.
- To make the students acquire insight about the production, extraction, purification, characterisation and application of enzymes.
- To help the students understand the kinetics of enzyme-catalysed reactions as well as enzyme inhibitory and regulatory processes
- To help them execute enzyme immobilisation.
- To enable the students become acquainted with enzymes utilised in industrial and medicinal applications.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	comprehend the fundamental knowledge on enzymes and their importance in biological reactions.	Upto K3
CO 2	understand the difference between a chemical catalyst and biocatalyst and understand activation energy.	Upto K3
CO 3	characterize the enzymes in each enzymatic class, examples of such enzymes and their application in practice	Upto K3
CO 4	demonstrate the mechanism involved in the production of biosensors and immobilized enzyme systems.	Upto K3
CO 5	identify the clinical, industrial and biomedical applications of enzymes.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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ENZYMOLGY AND ENZYME TECHNOLOGY

UNIT- I:

Historical background – Nomenclature and Classification of enzymes, Active site – salient features – unit of enzyme activity– Isoenzymes – Multienzymes – Zymogens.

UNIT- II:

Enzyme Kinetics – Enzyme substrate complex, Michaelis – Menten kinetics – Determination of K_m and V_{max} – Line weaver – Burk plot, Hanes Woolf equation, Eadie – Hofstee equation, Factors affecting enzyme activity – Enzyme specificity – Stereo specificity, Structural specificity and functional specificity.

UNIT- III:

Enzyme inhibition – Reversible inhibition – Competitive, non – competitive, Uncompetitive inhibition, Irreversible inhibition, Allosteric inhibition.

UNIT- IV:

Mechanism of Enzyme action – Activation energy, Enzyme – substrate complex formation – Theories of Enzyme– substrate complex formation – Lock and Key model – Induced fit theory – Substrate strain theory – Multienzyme complex – Role of Co–enzymes in Enzyme reactions – Co enzyme A, NAD, FAD, Pyridoxal phosphate, Zymogens – Activation of Digestive Enzymes – chymotrypsinogen, Trypsinogen.

UNIT- V:

Isolation, Purification – Size based – Dialysis, Gel filtration chromatography, size exclusion chromatography – Polarity based – Ion exchange chromatography – Ligand based– Affinity chromatography– Solubility based precipitation. Enzyme immobilization – methods – Adsorption, Covalent bonding, Cross linking, Entrapment, Encapsulation, Clinical and Industrial applications of enzymes, Biosensors and their applications.

TEXT BOOKS:

1. Renuka Harikrishnan., (2007) *An Introduction to Biomolecules and Enzymes*, 5th edition, Indrajith Pathipagam, Madurai.
2. Palmer, T., Bonner, P. L. (2007). *Enzymes: Biochemistry, Biotechnology, Clinical Chemistry*. United Kingdom: Elsevier Science.

REFERENCE BOOKS:

1. Fersht, A. (1977). *Enzyme Structure and Mechanism*. United Kingdom: W. H. Freeman.
2. Voet, D., Voet, J. G., Pratt, C. W. (2002). *Fundamentals of Biochemistry 2002 Update*. United Kingdom: Wiley.
3. Jain, J. L. (2022). *Fundamentals of Biochemistry*. India: S. Chand Limited.
4. Cox, M. M., Nelson, D. L., Lehninger, A. L. (2013). *Lehninger Principles of Biochemistry*: 6th Edition. United Kingdom: Macmillan Learning.



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

DIGITAL TOOLS:

1. <https://old.amu.ac.in/emp/studym/3464.pdf>
2. <https://mgcub.ac.in/pdf/material/20200413025103dafdce701b.pdf>
3. https://www.inf.ed.ac.uk/teaching/courses/csb/CSB_lecture_enzyme_kinetics.pdf
4. <https://www.onlinebiologynotes.com/enzymes-properties-and-mechanism-of-enzyme-action/>
5. <https://www.easybiologyclass.com/enzyme-cell-immobilization-techniques/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	2	2	1
CO2	3	2	2	3	3	1
CO3	2	2	2	2	1	2
CO4	2	1	3	1	3	2
CO5	1	3	3	2	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

90% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCS31	MEDICAL LAB TECHNOLOGY	SBS – 3	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	III	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

Medical Laboratory Technology (MLT) is focused with the use of clinical laboratory tests in the diagnosis, treatment, and prevention of diseases. This course is related to medical lab technology and it contents of Haematology, Blood bank, Microbiology, serology, Clinical pathology.

COURSE OBJECTIVES:

To help the students

- learn of biological fluids such as urine, blood and their estimation.
- understand the blood disorders, its lab diagnosis and various type of laboratory test
- learn of Haematology – Rh factors and blood cell counting techniques.
- learn the basic techniques with clotting mechanism, blood banking techniques and automation.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand good laboratory practices in a chemistry/biochemistry laboratory.	Upto K3
CO 2	learn qualitative and quantitative analysis of constituents of biological fluids such as urine, blood and their estimation using standard methods	Upto K3
CO 3	get trained in performing routine microbiological practices such as sterilization, media preparation, maintenance of microbial culture, staining etc	Upto K3
CO 4	learn techniques and to learn the principles of blood typing.	Upto K3
CO 5	learn about the normal constituents of urine, blood and their significance in maintaining good health	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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MEDICAL LAB TECHNOLOGY

UNIT– I:

Blood Banking Blood grouping – ABO System, ABO Grouping, Rh typing, Coomb's test, Blood transfusion – Blood donors, donor screening, drawing of blood, compatibility testing, cross matching, blood transfusion complications.

UNIT– II:

CSF and Other body fluids Cerebrospinal fluid and the body fluids. Semen analysis, sputum examination, pregnancy test – Interpretation.

UNIT– III:

Haematology: Haematology, Estimation of Haemoglobin – Shali's method, RBC count, PCV, ESR, Total and differential WBC count, Platelet count, Clotting time, Bleeding time Serology – VDRL, CRP, RA, HIV, HBs Ag, Pregnancy test.

UNIT– IV:

Medical microbiology Culturing of organisms from various specimens. Culture media and antibiotic sensitivity test (pus, urine, Stool, sputum, throat swab, gram staining, Zielh –Neilson staining (TB, Leptra bacilli). Safety procedure in microbiological laboratory technique.

UNIT– V:

Urine and faeces analysis Collection of urine and faecal samples; Faecal analysis to detect fats, undigested food and blood; Qualitative analysis of urine for normal and pathological conditions.

TEXT BOOKS:

1. K. N. Sulochana, S. Ramakrishnan (2012) *Manual of Medical Laboratory Techniques*. India: Jaypee Brothers Medical Publishers.
2. Talib, V. H. (2019). *Handbook Medical Laboratory Technology*. India: CBS Publishers & Distributors.

REFERENCE BOOKS:

1. Gowenlock, A. H., Varley, H., Bell, M. (1976). *Practical Clinical Biochemistry*. Serbia and Montenegro: Heinemann Medical.
2. Kanai L. Mukherjee. (2010). *Medical Laboratory Technology*, Tata McGraw Hill Publication and co. ltd., Vol, I, II, III.
3. Chawla, R. (2014). *Practical Clinical Biochemistry: Methods and Interpretations*. India: Jaypee Brothers Medical Publishers Pvt. Limited.
4. Manickam, A., Sadasivam, S. (2007). *Biochemical Methods*. India: New Age International (P) Limited.
5. Plummer, D. T. (1987). *An Introduction to Practical Biochemistry*. India: McGraw–Hill.

DIGITAL TOOLS:

1. <https://scert.kerala.gov.in/wp-content/uploads/2020/06/16-mlt.pdf>
2. <https://www.slideshare.net/AvinandanJana/physiology-of-blood-134110013>
3. https://stacks.cdc.gov/view/cdc/7590/cdc_7590_DS1.pdf
4. <https://www.in.gov/health/files/l61.pdf>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	3	3	2	3	1
CO2	3	3	3	3	3	2
CO3	3	3	3	2	3	2
CO4	1	2	2	3	3	3
CO5	3	1	3	2	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

20% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCN31	HEALTH AND HUMAN DISEASES	NME – 1	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	III	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course covers topics in human health function and diseases.

COURSE OBJECTIVES:

To enable the students

- comprehend the structure and function of the human body in health; signs and symptoms of disease; the molecular basis of disease; current treatment of disease and cutting-edge therapeutics.
- understand the causes of various diseases commonly affecting human beings
- know the clinical aspects of various metabolic disorders
- describe emergency procedures and techniques of basic life support for adult, child, or infant victims of airway obstruction, respiratory arrest and/or cardiac arrest.
- understand the causes of emergency procedures and techniques

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	know about health and importance of yoga in human system	Upto K3
CO 2	comprehend the fundamental knowledge of diseases and its causes with treatment	Upto K3
CO 3	know about the importance of Vaccination and prevention of diseases.	Upto K3
CO 4	know the importance of healthy habits and disease prevention.	Upto K3
CO 5	understand the emergency procedures and techniques.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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HEALTH AND HUMAN DISEASES

UNIT– I:

Health and its significance – Physical and Mental Health – yoga – nutrition, exercise, causes of disease – environment – Longevity– living conditions – Life style – Obesity – BMI.

UNIT– II:

Human Diseases – (heart diseases, jaundice, cancer) – **Causative agent**, symptoms, diagnosis and treatment (Brief).

UNIT– III:

Communicable diseases - AIDS–Nosocomial diseases– traveling diseases– children and old age diseases – T.B – leprosy–Dengue–Bird flu.

UNIT– IV:

Diseases prevention – healthy habits, disease prevention awareness – vaccination – immunization schedule.

UNIT– V:

First aid measures – Accident care – Bleeding and Wound care – Fractures and dislocations – electrical shock – burns – breathing emergency – Allergies– pregnancy care.

TEXT BOOKS:

1. M.N. Chatterjee & Ranashinde (2006). *Text Book of Medical Biochemistry*. 6th edition Jaypee Brothers Medical Publisher (P) Ltd.
2. Fears, J. W. (2011). *The pocket outdoor survival guide: The ultimate guide for short-term survival*. Skyhorse Publishing Inc.

REFERENCE BOOKS:

1. Goering, R. V. (2020). *Mims' medical microbiology and immunology*, Elsevier.
2. Vasudevan, D. M., Sreekumari, S., & Vaidyanathan, K. (2019). *Textbook of biochemistry for medical students*. Jaypee brothers Medical publishers.
3. Handal, K. A. (1992). *The American Red Cross first aid & safety handbook*. Little, Brown, & Company.

DIGITAL TOOLS:

1. https://www.physio-pedia.com/Physical_Activity_and_Mental_Health
2. <http://kmbiology.weebly.com/human-health-and-disease—notes.html>
3. <http://download.nos.org/srsec314newE/PDFBIO.EL28.pdf>
4. <http://www.immunize.org/catg.d/p2011.pdf>
5. <http://gputtawar.edu.in/downloads/first-aid.pdf>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	2	3	2	3
CO2	3	1	3	3	1	3
CO3	3	3	3	2	3	1
CO4	2	1	1	2	3	1
CO5	1	2	1	1	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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35% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCC41	METABOLISM	CORE – 4	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	IV	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course covers the metabolic pathways and their interactions, functions of enzymes and hormones.

COURSE OBJECTIVES:

To make the students

- study about over view of metabolism have an understanding about energetics about carbohydrate and lipid metabolism have an understanding of enzymes and metabolism of fatty acids a nucleic acid
- understand the concepts of Metabolism and its importance in the proper functioning of each cell
- understand anabolic and catabolic pathways of carbohydrates, lipids.
- understand catabolic pathways of amino acids and nucleic acids and comprehend how any defect in a pathway could lead to diseases
- understand how metabolism is regulated by enzymes and hormones

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the concepts of metabolism.	Upto K3
CO 2	study about over view of metabolism – have an understanding about energetics	Upto K3
CO 3	describe the Metabolism of carbohydrates, lipids and its regulation	Upto K3
CO 4	describe the metabolism of amino acids, nucleic acids and its regulation.	Upto K3
CO 5	understand how metabolism is regulated by enzymes and hormones	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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METABOLISM

UNIT- I:

Bioenergetics: High energy and low energy **compounds** (ATP, Phosphocreatinine, Phosphoenol pyruvate, Glucose – 6 – phosphate) – **Exergonic and Endergonic reactions** – Electron transport chain and Oxidative phosphorylation. **Uncouplers of Oxidative phosphorylation.**

UNIT- II:

Carbohydrate Metabolism: Acetyl – CoA synthesis, Glycolysis – aerobic and anaerobic– Energetics of glycolysis , TCA cycle – **Amphibolic nature of TCA cycle – Energetics of TCA cycle, Glyoxalate cycle** – HMP Shunt and Gluconeogenesis, Glycogen metabolism – Glycogenesis, Glycogenolysis (Brief account only). Conversion of simple sugars (Sucrose, Maltose, Lactose) into Glucose

UNIT- III:

Lipid Metabolism: Biosynthesis of Fatty acids, β – Oxidation of Fatty acids, Energetics of Fatty acid Oxidation, Ketone bodies metabolism, Metabolism of Triacyl glycerol's, phospholipids, Cholesterol metabolism (Structure is not needed).

UNIT- IV:

Amino acid Metabolism : **Transamination, Deamination – Oxidative and non– oxidative A** brief account of Amino acid metabolism – **Glucogenic amino acids** (Glycine, Cysteine, Proline) – **Ketogenic amino acids** (Leucine, Lysine) – **Aromatic amino acids** (Phenylalanine, Tyrosine, Tryptophan).

UNIT- V:

Nucleic acid Metabolism: Purine and Pyrimidine bases – Biosynthesis of Purines and Pyrimidines – **Salvage pathway – Inhibitors of Nucleic acid metabolism.**

TEXT BOOKS:

1. Chatterjee, (2005). *Text Book of Medical Biochemistry*, 6th edition, Jaypee brother's publication.
2. Satyanarayana, U. (2017). *Biochemistry*. India: Elsevier Health Sciences.
3. Devlin (1997). *Text book of Biochemistry*, 4th edition, John Wiley & sons, INC Publications.

REFERENCE BOOKS:

1. Donald Voet & Judith Voet (2004) *Fundamentals of Biochemistry*, 3rd edition, Wiley International.
2. Cox, M. M., Lehninger, A. L., Nelson, D. L. (2013). *Lehninger Principles of Biochemistry*: 6th Edition. United Kingdom: Macmillan Learning.
3. Rodwell, V. W., Bender, D. A., Weil, P. A., Kennelly, P. J., Botham, K. M. (2018). *Harper's Illustrated Biochemistry* 31e. United Kingdom: McGraw–Hill Education.



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SYLLABUS

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DIGITAL TOOLS:

1. https://asutoshcollege.in/new-eb/Study_Material/Semester_4_Introduction_07042020.pdf
2. https://www.osmosis.org/notes/Carbohydrate_Metabolism
3. <https://aklectures.com/lecture/fatty-acid-metabolism-introduction/introduction-to-fatty-acid-metabolism>
4. <https://ocw.mit.edu/courses/7-05-general-biochemistry-spring-2020/resources/lecture-31-amino-acid-metabolism-ii/>
5. https://www.uobabylon.edu.iq/eprints/publication_4_19662_533.pdf
6. <http://www.news-medical.net/life-sciences/What-is-Metabolism.aspx>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	2	1	2	2
CO2	2	1	3	2	2	1
CO3	3	1	3	2	1	2
CO4	2	1	3	3	3	3
CO5	3	1	2	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A.R. SARANYADEVI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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10% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCS41	BIOSTATISTICS	SBS – 4	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	IV	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course helps to understand and apply the use of statistical methods and their importance in biological data analysis.

COURSE OBJECTIVES:

To enable the students

- list the various statistical methods and their applications
- infer the importance of statistics in biology
- measure dispersion
- study probability
- understand correlation and regression

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	define the basis of statistics	Upto K3
CO 2	list the different methods of representation of data	Upto K3
CO 3	classify central tendency	Upto K3
CO 4	summarize probability	Upto K3
CO 5	apply correlation and regression analysis	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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BIOSTATISTICS

UNIT– I:

Introduction: Basis of Statistics – Definition – statistical methods – kinds of Biological

Data Collection, organization and Representation of Data:

- Collection of Data – Types of data: primary data, secondary data – methods of collecting data.
- Sampling and sampling designs – Meaning and definitions – Random and Non-random sampling
- Editing the data: Definition for editing, objectives of editing, problems of Accuracy, problems of approximation and errors.
- Classification of data: Meaning, Definition, Objectives of Classification of data.

UNIT– II:

Tabulation: Meaning and definition – of parts of tables – advantages.

Representation of data: Diagrammatic: simple bar diagram, rectangles, squares, circles or pie diagram – Graphic representation: Histogram, frequency – polygon frequency curve, cumulative frequency curve or O give curve.

UNIT– III:

Measures of central Tendency: Explanation, Types of averages: 1. Arithmetic mean 2. Median 3. Mode. Explanation Problems related to: ungrouped data, Simple grouped data: continuous, discrete series.

Measures of dispersion: Explanation, Types of dispersion: 1. Range 2. Mean deviation 3. Standard deviation and Variance. Problems related to the above-mentioned dispersion taking ungrouped data.

UNIT– IV:

Probability: Definition and Explanation:

1. Theorem and probability: addition theorem and multiplication theorem.
2. Types of theoretical distribution: Binomial distribution (simple problems), Poisson distribution and Normal distribution (explanation problems not necessary).

UNIT– V:

Correlation and Regression:

Correlation Explanation

1. Types of correlation: Positive and negative correlation– Simple partial and multiple correlation– linear and non-linear correlation.
2. A method of studying correlation using Karl Pearson's co-efficient of correlation (simple problems related to correlation).

Regression analysis:

Explanation: Regression line– Regression equation: regression equation of X on Y, regression equation of Y on X.



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TEXT BOOKS:

1. Gupta, S. P. (2011). *Statistical Methods*. India: Sultan Chand & Sons.
2. Kothari, C. R. (2004). *Research Methodology: Methods and Techniques*. India: New Age International (P) Limited.

REFERENCE BOOKS:

1. Banerjee, P. K. (2007). *Introduction to Biostatistics* (A Textbook of Biometry). India: S. Chand Limited.
2. Le, C. T., Eberly, L. E. (2016). *Introductory Biostatistics*. United Kingdom: Wiley.

DIGITAL TOOLS:

1. <https://www.easybiologyclass.com/biostatistics-introduction-significance-applications-and-limitations-of-statistics/>
2. <https://testbook.com/learn/maths-tabulation/>
3. <https://statisticsbyjim.com/basics/measures-central-tendency-mean-median-mode/#:~:text=Measures%20of%20central%20tendency%20are,central%20location%20of%20a%20distribution.>
4. <https://bolt.mph.ufl.edu/6050-6052/unit-3/module-5/>
5. <https://www.studocu.com/en-us/document/washington-state-university/statistical-methods-in-research-i/lecture-notes-lecture-14-correlation-and-regression/776404>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	3	2	3	1
CO2	3	2	2	1	2	3
CO3	2	1	3	2	1	3
CO4	3	3	3	3	2	2
CO5	1	2	2	1	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

20% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCC51	MOLECULAR BIOLOGY	CORE – 5	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The Molecular Biology course imparts candidates the basic understanding of biological aspects of DNA, RNA and Protein and their mechanisms.

COURSE OBJECTIVES:

- To introduce the type of DNA sequences and chromosome structure to the students
- To emphasize the molecular mechanisms of DNA replication, mutation, repair and gene regulation in different organisms.
- To introduce the type of DNA sequences and chromosome structure.
- To make the students understand the molecular basis of RNA synthesis and different types of RNA.
- To discuss the genetic code, molecular basis of protein synthesis & modification.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	acquire knowledge related to discovery of DNA as genetic material, DNA replication, transcription, DNA repair and translation.	Upto K3
CO 2	have a basic knowledge related to processes of transcription and translation in prokaryotes and eukaryotes.	Upto K3
CO 3	understand the Coding and non-coding regions of eukaryotic genome and their importance.	Upto K3
CO 4	develop understanding of the molecular basis of RNA processing and RNA splicing.	Upto K3
CO 5	comprehend the ways in which the biological processes are regulated and the significance of regulation in maintaining different life forms.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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MOLECULAR BIOLOGY

UNIT-I:

Origin of Molecular biology and chemical basis of heredity: Prebiotic origin of Biomolecules, self-replicating Biomolecules, chromatin structure and composition, structure of DNA and **different forms of DNA**, RNA and **its types**.

UNIT-II:

Nucleic acid as the genetic material: classical experiments – Griffith experiment, Mc Avery and Claud, **Hershey and chase**, **Exchange of genetic material** – Transformation, Transduction – types and mechanism, conjugation.

UNIT-III:

Replication: **initiation, elongation and termination of DNA Replication**– Enzymology of DNA replication, models of replication – Sigma replication, (σ) Theta replication, **Inhibitors of DNA replication** – DNA damage, DNA repair mechanism – Photo reactivation, Mismatch repair, Excision repair – Base excision, Nucleotide Excision.

UNIT-IV:

Transcription: initiation, elongation and termination of transcription, post transcriptional modification, **Inhibitors of Transcription**– Regulation of transcription: concepts of operon – Lac operon – Inducers and repressors.

UNIT-V:

Introduction to Genetic code – Wobble Hypothesis, Translation – role of mRNA, rRNA, tRNA, initiation, elongation and termination of Protein synthesis, **Inhibitors of Protein synthesis**– Post translational modification.

TEXT BOOKS:

1. David friefielder (1990). *Molecular Biology*, 2nd edition, Narosa Publishers.
2. Gardener EJ, Simmons MJ, Snustad DP (2006). *Principles of Genetics*, 8th edition, John Wiley and Sons Pvt. Ltd.
3. Becker, Wayne, Kleinsmith, Lewis, Hardin, Jeff, Bertoni ,Gregory Paul (2009) *The World of Cell* , 7th Edition, Pearson Education Inc.

REFERENCE BOOKS:

1. Benjamin Lewin (2003). *Gene VIII*, Benjamin Cummins Publishers, United States edition.
2. Geoffrey M. Cooper, (2000). *The Cell: A Molecular Approach*, 4th edition, ASM Press.
3. Lodish *et al.*, (2003). *Molecular Cell Biology*, Scientific American press
4. Watson JD et al. (2004) *Molecular Biology of the Gene*, 5th edition, Pearson Education.
5. Gerald Karp, (1996). *Cell and Molecular Biology*, 1st edition, John Wiley & sons.

DIGITAL TOOLS:

1. <https://microbenotes.com/category/molecular-biology/>
2. <https://www.studocu.com/en-gb/document/university-college-london/biochemistry-and-molecular-biology/cell-molecular-biology-notes/10045497>
3. https://www.fmed.uniba.sk/uploads/media/Introduction_to_Medical_and_Molecular_Biology.pdf
4. <https://thebiologynotes.com/category/molecular-biology/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	3	3	1	1
CO2	3	2	3	2	2	2
CO3	3	3	3	3	2	3
CO4	3	2	2	2	2	3
CO5	3	2	3	3	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

20% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCC52	MICROBIOLOGY	CORE – 6	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The Microbiology course helps to understand the basic principles of microbiology and its applications.

COURSE OBJECTIVES:

- To define the basic concepts of microbiology.
- To explain the basic structure of bacteria and able to identify the gram positive and negative organisms.
- To define the soil microbiology and their application in bio-fertilizer formation.
- To help the students acquire skills to handle the microscope, staining procedures.
- To make the students understand the application of the microorganisms in food and other industries.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	define the fundamentals of basic microbiology.	Upto K3
CO 2	outline the bacterial growth curve.	Upto K3
CO 3	explain the principles of microscopy technique.	Upto K3
CO 4	utilize microorganism in food industries.	Upto K3
CO 5	relate the role of microbes in agriculture.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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MICROBIOLOGY

UNIT– I: Classification and Organization

Introduction – History of Microbiology, Importance and applications of Microbiology. Outline classification of living organisms: Haeckel's, Whittaker and Carl Woese systems. Prokaryotes – General characteristics of bacteria, archaeobacteria, rickettsias, mycoplasmas, cyanobacteria and actinomycetes. Ultrastructure of a bacterial cell: cell wall, cell membrane, ribosomes, nucleoid, Capsule, flagella, fimbriae, endospore and storage granules.

UNIT– II: Nutrition, Growth and Reproduction

Microbial nutrition – nutritional requirements and uptake of nutrients by cells. Nutritional groups of microorganisms – autotrophs, heterotrophs. Bacterial growth – Growth curve, Factors influencing microbial growth. Reproduction – modes of reproduction – Binary fission, fragmentation, budding, conjugation, transformation, transduction and sporulation.

UNIT– III: Microscopy

Principles and applications, resolving power, numerical aperture, types – dark field, bright field microscopy, phase contrast microscopy, fluorescent microscopy, electron microscopy, TEM and SEM– **Staining techniques– Simple and differential staining– Sterilization techniques (Brief account only).**

UNIT– IV: Applied Microbiology

Food microbiology – spoilage, poisoning, food borne infections. Industrial microbiology – fermentation, use of microbes in industries, productions – organic acids (lactic acid and citric acid), antibiotics (penicillin and streptomycin). beer, wine. Microorganisms and milk – milk souring, alkali production, sweet curding. Fermented milk products – cheese, yoghurt, sauerkraut.

UNIT– V: Agricultural and Medical Microbiology

Plant growth – promoting microorganisms – mycorrhizae, rhizobia, Biofertilizers – Rhizobium. Plant diseases bacteria and viruses. Pathogenesis and prevention of air and water borne diseases – Typhoid, cholera, dysentery, Diarrhoea, hepatitis, amoebiasis, tuberculosis, pox diseases, diphtheria, poliomyelitis.

TEXT BOOKS:

1. Prescott, (2003) *Microbiology*, 6th edition, McGraw – Hill international.
2. Stainer, et al, (1993) *General Microbiology*, 5th edition, The Mac Milan press Ltd.

REFERENCE BOOKS:

1. Davis et al, (1990) *Microbiology*, 4th edition J.B.Lippincott Company.
2. Michael J. Pelczar I.R., C. E. (2004). *Microbiology*. 5th ed Tata McGRAW–Hill, New Delhi



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

DIGITAL TOOLS:

1. https://faculty.ksu.edu.sa/sites/default/files/140_mbio-final_notes.pdf
2. <https://www.studocu.com/en-au/document/university-of-technology-sydney/general-microbiology/general-microbiology-lecture-notes-1-21/291249>
3. http://www.dspmuranchi.ac.in/pdf/Blog/General_MicrobiologyCSP_Proof012417.PDF
4. <https://www.hccfl.edu/media/572066/microscopy.pdf>
5. <https://microbiologynotes.org/category/general-microbiology/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	3	2	1
CO2	2	3	3	2	2	2
CO3	1	3	1	3	2	1
CO4	3	3	2	2	3	3
CO5	3	3	3	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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10% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCC53	IMMUNOLOGY AND IMMUNOTECHNOLOGY	CORE – 7	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

The Immunology course introduces students to a wide range of topics in immunology starting from cells of immune system, innate and adaptive immune systems, humoral immunity, antibody structure and function, basic immunological techniques, autoimmunity, hypersensitivity and vaccine production.

COURSE OBJECTIVES:

- To impart knowledge about the types and the various determinants of immunity.
- To expose the students to different types of lymphoid organs and to the cellular basis of immunity.
- To enable them appreciate clonal selection theory, mechanism of cell mediated and humoral mediated immune responses.
- To make the students understand the diagnostic methods of immunology.
- To teach the disorders associated with immunological processes.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the overview of immune system including cells, organs and receptors.	Upto K3
CO 2	learn structure and functions of different classes of immunoglobulins, the genetic basis of antibody diversity and the importance of humoral, cell-mediated and innate immune responses in combating pathogens.	Upto K3
CO 3	understand mechanisms involved in different types of hypersensitivity and the importance of conventional vs. recombinant vaccines.	Upto K3
CO 4	get acquainted with the importance of antigen-antibody interaction in disease diagnosis.	Upto K3
CO 5	understand the principles of tolerance, autoimmunity and the role of immunity in protection against pathogens.	Upto K3

K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLY



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SYLLABUS

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IMMUNOLOGY AND IMMUNOTECHNOLOGY

UNIT- I:

Historical background – contributions of Edward Jenner, Louis Pasteur, Rodney Porter–

Definition: Immunity, host resistance, antigen, antibody, leucocytes, lymphocytes etc., principles of Innate and acquired immunity, memory specificity – self / non self–diversity – introduction to cells – [lymphocytes, monocytes, macrophages and granulocytes] and organs of the immune system – [bone marrow, thymus, spleen, lymph nodes, MALT, GALT.

UNIT- II:

Types of immunoglobulins – IgM, IgG, IgA, IgD and IgE – structure of antibody molecule – IgG only. Nature of antigens – immunogen and hapten – T dependent and T independent antigens. Complement Components: Definition, explanation and functions of complement components.

UNIT- III:

Antigen – antibody interaction – agglutination – precipitation – immunodiffusion – immuno electrophoresis – radioimmunoassay – immunofluorescence – complement fixation – ELISA – production of antisera.

UNIT- IV:

Blood group antigen – Rhesus – incompatibility – major histocompatibility complex – [type I & II and functions] autoimmune diseases (Graves, RA, Myasthenia gravis, SLE) – Vaccination – vaccines and their preparations, primary and secondary immune response, active and passive immunization, types of vaccines.

UNIT- V:

Hypersensitivity – types – mechanism – transplantation – graft rejection, tissue typing, immunosuppression, Production of monoclonal antibodies and its applications. Immunological disorder: AIDS, Severe combined immunodeficiency (SCID).

TEXT BOOKS:

1. Eli Benjamini., Richard. C., and Geoffrey S., (2003) *Immunology*, V Ed. John Wiley & Sons, Inc., Hoboken, New Jersey.
2. Kuby, J. (2004) *Immunology*, V Edition. W.H. Freeman and Company, NY.
3. Roitt, I M, (2005) *Essentials of Immunology*, ELBS, Blackwell Scientific Publication.

REFERENCE BOOKS:

1. Ian R. Tizard, (1995) *Immunology*, 4th edition, Saunders College Publication.
2. Richard M.Hyde (1997) *Immunology*, 3rd edition, B.I. Waverly Pvt. Ltd.
3. Abul K.Abbas (1998) *Cellular and Molecular Immunology*, 3rd edition, Harcourt Brace & Company.



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SYLLABUS

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DIGITAL TOOLS:

1. <https://microbenotes.com/category/immunology/>
2. <https://ocw.mit.edu/courses/hst-176-cellular-and-molecular-immunology-fall-2005/pages/lecture-notes/>
3. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/med_lab_tech_students/ln_imm_serology_final.pdf
4. https://www.researchgate.net/publication/320623534_Immunology_and_Immunotechnology

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	1	2	1
CO2	3	2	2	2	3	2
CO3	3	3	3	2	2	3
CO4	2	3	3	3	3	2
CO5	3	2	1	2	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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5% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCCP3	LAB IN MICROBIOLOGY & IMMUNOLOGY	CORE PRACTICAL	–	5	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

The Lab in Microbiology & Immunology course introduces the theoretical and practical elements of microbiology and immunology, with an emphasis on microbiological methods and interactions at the interface between antigen and antibodies for the immune system.

COURSE OBJECTIVES:

To enable the students

- understand the basic concepts of microbiology with an emphasis on sterile technique, microscopy, isolation and cultivation of microorganisms.
- learn and understand the identification and characterization of microbes.
- learn and understand the separation techniques.
- receive an introduction to experimental design and basic techniques commonly used in immunology research laboratories.
- take up jobs in Diagnostic laboratories.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	isolate microbes from provided samples and to perform bacterial cultures in different media.	Upto K3
CO 2	get trained in performing routine microbiological practices such as sterilization, media preparation, maintenance of microbial culture, staining etc.	Upto K3
CO 3	acquire expertise to culture and screen microbes for antibiotic resistance.	Upto K3
CO 4	get acquainted with the importance of antigen–antibody interaction in disease diagnosis.	Upto K3
CO 5	obtain hands–on training in basic separation techniques in biochemistry like chromatography.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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LAB IN MICROBIOLOGY & IMMUNOLOGY

1. Sterilization techniques and cleaning of glass wares.
2. Preparation of simple culture media.
3. Selection of suitable culture medium.
4. Gram's staining, motility – Hanging drop method.
5. Isolation of microbes from soil – serial dilution, plating techniques
6. Enumeration of *E.coli* in milk and ice cream.
7. Water quality analysis – presence of Coliform test.
8. RBC, WBC count.
9. Blood grouping.
10. Immunodiffusion
11. ESR – Erythrocyte sedimentation rate.
12. Hemagglutination
13. Identification of nucleic acids by Agarose Gel Electrophoresis.
14. Separation of amino acids by Paper Chromatography, TLC

TEXT BOOKS:

1. Hudson, L., Hay, F. C., & Hudson, L. (1989). *Practical Immunology* (Vol. 3). Oxford: Blackwell scientific publications.
2. Cappuccino, J. G., & Welsh, C. T. (2017). *Microbiology: A Laboratory Manual*. Pearson Education.

REFERENCE BOOKS:

1. Gunasekaran.P,(2009) *Lab Manual in Microbiology*. New age International Pvt Ltd Publishers, U.S.A .
2. Benson, H.J. (2002) *Microbiological Applications: Laboratory Manual in General Microbiology*. 8th Edition, McGraw Hill, New York.
3. Palanivelu, P. (2019). *Analytical Biochemistry and Separation Techniques*. 6th Ed., 21st Century Publications.

DIGITAL TOOLS:

1. <https://www.youtube.com/watch?v=ujzSmsmg7ok>
2. <https://www.youtube.com/watch?v=y1CHEytZr0>
3. <https://www.youtube.com/watch?v=w2wAYViQBXM>
4. <https://www.medicofem.com/index.php/microbiology/microbiology-practical-aspects/culture-media/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	1	2	2	1
CO2	3	3	2	2	1	2
CO3	2	3	2	3	3	2
CO4	3	3	2	3	3	3
CO5	3	3	3	3	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



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SYLLABUS

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100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCE51	HUMAN PHYSIOLOGY	ELECTIVE – 1	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

The Human physiology course introduces students to the physiology of the human body.

COURSE OBJECTIVES:

- To impart knowledge about Blood composition and function and mechanism of respiration
- To make the students study about the circulatory system.
- To enable the students appreciate about the components of excretory system and mechanism of Urine formation.
- To help the students understand the structure and function and different components of Digestive system.
- To introduce the organization of Nervous system.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	gain a complete knowledge in the physiology of life Gaining a complete knowledge in the physiology of life.	Upto K3
CO 2	be aware of the functional relationships between various organ systems of the body.	Upto K3
CO 3	classify blood groups so as to identify the blood groups of patients and donors for the purpose of safe blood transfusion.	Upto K3
CO 4	understand various systems of the body which support life viz. Circulatory, digestive, respiratory, nervous and excretory systems.	Upto K3
CO 5	explain the structure and functions of neuron, transmission of nerve impulse and understand neuromuscular coordination.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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HUMAN PHYSIOLOGY

UNIT– I:

Blood composition and function, types of blood cells, morphology and function. Blood groups – ABO and Rhesus system. Composition and function of lymph and lymphatic System. Respiratory system– structure & function of different components of respiratory units. mechanism of respiration – Acid base balance in lungs.

UNIT– II:

Circulatory System – heart – structure, properties of cardiac muscle. overview of systemic and pulmonary circulation, conducting system of the heart, heart rate, cardiac cycle, cardiac output, Systolic and Diastolic pressure.

UNIT– III:

Digestive systems: Structure of different components of digestive system, digestion and absorption of carbohydrates, lipids and proteins, role of bile salt in digestion of lipids, Gastric secretion in stomach, role of various enzymes and hormones involved in digestive process.

UNIT– IV:

Excretory system–Structural components of urinary system: Kidney structure and its function – Structure of Nephron. Mechanism of urine formation– Glomerular filtration rate (GFR), Tubular Secretion and reabsorption – Acid base balance in kidneys.

UNIT– V:

Brief outline of nervous system–brain (parts and ventricles), spinal cord, nerve fibres, synapses, chemical and electrical synapses, Transmission of nerve impulses, action potential and neurotransmitters–Cholinergic and Adrenergic Neurotransmitters. Muscles–Types of muscles and their functions: myofilamentation and contraction and relaxation of skeletal muscles.

TEXT BOOKS:

1. Sembulingam, K. S. (2019). *Essentials of Medical Physiology*. Jaypee Brothers Medical Publishers.
2. Derrickson, G. J. (2017). *Principles of Anatomy and Physiology*. John Wiley & Sons, Inc., Hoboken, New Jersey.
3. Hall, G. A. (2019). *Text book of Medical Physiology*. Elsevier india.

REFERENCE BOOKS:

1. D. Venkatesh, H. H. (2018). *Textbook of Medical Physiology*. Wolters Kluwer India Pvt. Ltd.
2. H. S. Ravi Kumar Patil, H. K. (2009). *A Textbook of Human Physiology*. I K International Publishing House Pvt. Ltd .

DIGITAL TOOLS:

1. https://laney.edu/rebecca_bailey/wp-content/uploads/sites/10/2017/07/Human-Physiology-Lecture-Notes-update-2017.pdf
2. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/nursing_students/ln_human_anat_final.pdf
3. <https://drnaitiktrivedi.com/index.php/notes/anatomy-physiology-notes/>
4. <https://www.docsity.com/en/subjects/human-physiology/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	3	3	2
CO2	2	3	3	3	3	2
CO3	2	3	2	2	3	1
CO4	2	2	2	2	2	1
CO5	2	2	2	2	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



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SYLLABUS

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100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
2IUBCE52	BIOETHICS, BIOSAFETY AND INTELLECTUAL PROPERTY RIGHTS	ELECTIVE – 1	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

The Bioethics, Biosafety and Intellectual Property Rights Course introduces basic concepts of ethics and safety that are essential for different disciplines of science and procedures involved and protection of intellectual property and related rights.

COURSE OBJECTIVES:

- To instil bioethical values in students
- To create awareness on our rights and to respect others rights
- To impart standard and safety practices in biomedical field
- To sensitize the students to ethical issues in research
- To inculcate knowledge on intellectual property rights

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the ethics, realize rights and responsibilities in society.	Upto K3
CO 2	be ethical in biomedical research.	Upto K3
CO 3	follow standard guidelines in laboratory and clinical trials	Upto K3
CO 4	follow ethical practices in biomedicine.	Upto K3
CO 5	identify intellectual property in research and apply for patents.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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BIOETHICS, BIOSAFETY AND INTELLECTUAL PROPERTY RIGHTS

UNIT- I:

Ethics – Introduction; Types – Meta ethics, Applied ethics, Moral ethics, Descriptive ethics, Normative ethics; Principles – Beneficence, Non – Maleficence, Respect to Autonomy, Justice.

UNIT- II:

Ethical issues in Biotechnology and Biomedical Research: ICMR guidelines for Biomedical Research; Consent – Types, consent from minors; Cloning; stem cells, Gene Therapy, GMO.

UNIT- III:

Biosafety – Definition, Containment facilities, levels of Biosafety; Biomedical waste Management – segregation, collection, transportation, disposal; International guidelines– GLP, GCP.

UNIT- IV:

Ethical issues concerning birth, life and death: Reproductive technologies – Gamete donation, In Vitro Fertilisation, Embryo transfer, surrogacy, prenatal diagnosis, sex–selection; withholding and withdrawing medical treatment; abortion, euthanasia.

UNIT- V:

Intellectual property rights– Basic concepts and need for Intellectual Property rights – Patents, Copyrights, Geographical Indications, Trademarks, designs; Plagiarism, Basis of patentability; Non patentable inventions, Methods for patent application.

TEXT BOOKS:

1. Shaleesha. A. Stanley, (2008) *Bioethics*, Wisdom Educational Service.
2. S. Ignacimuthu. (2009) *Bioethics*, Alpha Science International Ltd.
3. S V Satakar. (2002) *Intellectual Property Rights and Copyrights* – ESS Publication, New Delhi.

REFERENCE BOOKS:

1. Nancy S. Jecker, (2007). *Bioethics: Introduction to History, Methods and Practice*, Second edition, Jones & Bartlett Publishers.
2. Kshitij Kumar Singh, (2015). *Biotechnology and Intellectual Property Rights*, Springer Nature.

DIGITAL TOOLS:

1. <https://www.onlineethics.org>
2. <https://www.ethics.org>
3. <http://ethics.iit.edu>
4. <http://research-ethics.org>
5. <http://www.ipindia.nic.in>

Mapping of CO with PSO

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CO1	1	3	1	3	1	3
CO2	2	2	2	2	3	3
CO3	3	3	2	3	3	2
CO4	2	2	2	2	2	2
CO5	3	2	2	3	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



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SYLLABUS

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100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCE53	ECOLOGY AND ENVIRONMENTAL TOXICOLOGY	ELECTIVE – 1	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The Ecology and Environmental Toxicology Course includes the principles of ecology and methods of biological testing for toxicity and health.

COURSE OBJECTIVES:

- To enable the students to understand ecosystem structures and functions.
- To provide deep understanding of incredible diversity of life, interactions between different ecosystem services and impacts of natural disturbances on ecosystem.
- To impart knowledge on harmful effects and disposal of radioactive wastes.
- To enable the students to understand inorganic and organic pollutants, their entry into the environment and transformation within the environment.
- To impart knowledge on various bioremediation methods.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	utilize the knowledge in understanding the ecosystem.	Upto K3
CO 2	discuss and explain the interaction between various ecosystem and impact of natural disturbances on ecosystem	Upto K3
CO 3	explicate the harmful effects of radioactive pollutants and their waste.	Upto K3
CO 4	apply the knowledge in executing preventive measures on understanding toxic metals, organic and inorganic pollutants into environment.	Upto K3
CO 5	apply the knowledge in the disposal of waste by various bioremediation methods.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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ECOLOGY AND ENVIRONMENTAL TOXICOLOGY

UNIT- I:

Introduction to Ecology–Definition, Branches and relation of ecology with other disciplines– Significance of ecology for man. Structure of Ecosystem–Abiotic and biotic components. Examples of ecosystem, Productivity of ecosystem, food chain in ecosystem, ecological pyramids.

UNIT- II:

Ecosystem–fresh water communities– physiochemical nature, Lentic–biotic communities, distribution of oxygen and dissolved nutrients. Estuaries –Types of estuaries, physiochemical aspects of estuaries. Marine – physiochemical stratification, currents, marine communities (biotic) coral reef as a specialized oceanic ecosystem. Terrestrial Ecosystems–Classification, biomes, tundra, alpine, forest, grassland, desert, wetland biomes and tropical savanna biomes.

UNIT- III:

Radioactive pollution– Radioactivity and kinds of radiation. Sources of radioactive pollution. Effect of radioactive pollution, protection and control from radiation, disposal of radioactive waste.

UNIT- IV:

Chemical toxicology–Toxic metals–toxic effects of Pb, Cd, Hg, Ar, Cr and Ni. Estimation of toxic metals. Toxicity of pesticides–toxic effects of organochlorines, halogenated hydrocarbons, heterocyclic compound, organophosphates and amides in urea.

UNIT- V:

Bioremediation – Insitu engineered bioremediation, intrinsic bioremediation and natural attenuation and bio barriers .Ex situ–Bioremediation, phytoremediation, microbial degradation of xenobiotics.

TEXT BOOKS:

1. Verma, P.S. and Agarwal, V.K. (2005) *Environmental Biology: Principles of Ecology*. S. Chand and Company Limited, New Delhi.
2. H. Sharma and B. K. Kaur (1995). *Environmental Chemistry*, Goel Publishing House, Meerut.

REFERENCE BOOKS:

1. Walker, C.H. et al. (1996). *Principles of Ecotoxicology*. Taylor & Francis. Inc. Shaw, I. and J. Chadwick. (1998). *Principles of Environmental Toxicology*. Taylor & Francis. Inc.
2. Sharma, P.D. (2003) *Ecology and Environment*. 7th Edition, Rastogi Publication, Meerut.
3. A. Wallace Hayes, Claire L. Kruger. Hayes (2014) *Principles and Methods of Toxicology*, 6th Edition, CRC Press, London.



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SYLLABUS

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DIGITAL TOOLS:

1. [https://bio.libretexts.org/Bookshelves/Ecology/Environmental_Science_\(Ha_and_Schleiger\)/04%3A_Humans_and_the_Environment/4.04%3A_Environmental_Health/4.4.04%3A_Environmental_Toxicology](https://bio.libretexts.org/Bookshelves/Ecology/Environmental_Science_(Ha_and_Schleiger)/04%3A_Humans_and_the_Environment/4.04%3A_Environmental_Health/4.4.04%3A_Environmental_Toxicology) <https://www.ethics.org>
2. http://envirotox.hu/wp-content/uploads/2017/10/Environmental-toxicology_lecture-notes_part1.pdf <http://research-ethics.org>
3. https://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S000035ZO/P000891/M020628/ET/1519034453M41AppliedEcologyEcotoxicologyQuad1.pdf
4. <https://www.conserve-energy-future.com › radioactive-pollution-causes-effects-solution>

Mapping of CO with PSO

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CO1	3	1	2	2	1	2
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CO4	2	2	2	2	2	2
CO5	3	2	2	3	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

10% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCE54	BIOINFORMATICS	ELECTIVE – 2	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The Bioinformatics course provides an introduction to the application of computational methods to biological data analysis and for discovery.

COURSE OBJECTIVES:

- To impart knowledge about the basics of Internet communication
- To expose the students to the principles and applications of Bioinformatics & databases
- To enable the students understand the concept of Sequence alignment & gene prediction
- To enable the students understand protein structural organization and prediction
- To make the students understand the basics of Phylogenetics analysis

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	recall the basic concepts of internet.	Upto K3
CO 2	define bioinformatics and its applications.	Upto K3
CO 3	summarize the biological databases.	Upto K3
CO 4	compare sequence alignment methods.	Upto K3
CO 5	apply sequence alignment for phylogeny analysis.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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BIOINFORMATICS

UNIT- I:

Basics of internet, Computing and Information networks: Browsing, web, online journals – Pubmed. Brief account on database management system, HTTP, HTML and VRLS.

UNIT- II:

Introduction to Bioinformatics – Definitions and basic concepts, Genome projects, the role and applications of bioinformatics.

UNIT- III:

Biological databases: Sequence databases, sequence assembly, submission of sequence, Database browsers and search engines.

UNIT- IV:

Sequence Alignment: Pair wise Alignment – Dot matrix, dynamic programming algorithms, BLAST and FASTA, similarity searches, Multiple sequence Alignment.

UNIT- V:

Homology and diversity: Phylogeny – evolutionary basis of sequence alignment. Methods of Phylogeny analysis: Distance and character-based methods.

TEXT BOOKS:

1. David Mount. W, (2003) *Bioinformatics*, CBS Publishers & Distributors.
2. Attwood, T.K. and Parry – Smith .D.J, (2002) *Introduction to Bioinformatics*, Pearson Education private Ltd., Singapore.

REFERENCE BOOKS:

1. Arthur M. Lesk, (2008) *Introduction to Bioinformatics*, Oxford University Press.
2. Howard Parish J., Richard M. Twyman, (2002) *Instant Notes in Bioinformatics*, Bios Scientific publishers Ltd.

DIGITAL TOOLS:

1. https://bioboot.github.io/bioinf525_w16/class-material/lecture1-1_525_W16_large.pdf
2. <https://www.biologydiscussion.com/biodiversity/bioinformatics/notes-on-bioinformatics-genetics/38224>
3. <https://thebiologynotes.com/category/bioinformatics/>
4. <https://www.biotechnologynotes.com/bioinformatics/notes-on-bioinformatics/693>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	1	2	1	3
CO2	3	3	2	3	2	3
CO3	1	3	2	3	3	3
CO4	2	3	2	3	3	2
CO5	2	2	3	3	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

C COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCE55	HOSPITAL MANAGEMENT	ELECTIVE – 2	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The Hospital Management Course revolves around imparting knowledge about the managerial and administrative roles at a hospital or a healthcare institute.

COURSE OBJECTIVES:

To enable the students

- understand the role of administration in patient care, planning and management.
- understand the importance of information system in hospitals.
- understand the policy and procedures in clinical services.
- understand the legal and safety aspects in health care services.
- understand the aspects of counselling and its importance in hospital management.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	know and understand the importance and role of various departments, support services in hospitals.	Upto K3
CO 2	confer about information system in hospitals and Quality assurance.	Upto K3
CO 3	communicate about Ethics governing various clinical aspects like blood transfusion, transplantation.	Upto K3
CO 4	comprehend various legal and safety aspects in hospital administration.	Upto K3
CO 5	discuss counselling and recognize the role of counsellors in Hospital management.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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HOSPITAL MANAGEMENT

UNIT– I:

General features of a hospital, various departments –Outpatient department, Casualty and Emergency services, General surgery department, ICU, Obstetrics department, Clinical laboratory. Supportive services– Admission department, Medical records department, Pharmacy, Food services, Housekeeping department, Volunteer department.

UNIT– II:

Information system in hospital: Communication, Delegation, Decision making, Monitoring, Evaluation, Meetings and Negotiations; Quality assurance.

UNIT– III:

Biomedical research: Ethics; Ethics pertaining to blood transfusion, transplantation; Bio–medical waste management.

UNIT– IV:

Hospital Administration, Hospital ethics, Challenges in hospital administration, Legal aspects, Environmental Safety, Health services, National Health Policy.

UNIT– V:

Counseling– Types, Techniques, Function, Development of counselling services, Duties of a counselor.

TEXT BOOKS:

1. K.J. Kundurs. (2008) *Hospitals–Facilities Planning and Management*, Tata McGraw Hill, New Delhi,
2. R.C. Goyal. (2005) *Hospital Administration and Human Resource Management*, 4th Edition, Prentice Hall of India Pvt Ltd.

REFERENCE BOOKS:

1. R. Kumar S.L. Goel, (2009) *Hospital Administration and Management: Theory and Practice*, Jaypee Brothers, Medical Publishers Pvt. Limited,
2. Joydeep Das Gupta, (2009) *Hospital Administration and Management: A Comprehensive Guide*, Jaypee Brothers, Medical Publishers Pvt. Limited.
3. K. V. Ramani, (2011) *Hospital Management*, Pearson Education India.

DIGITAL TOOLS:

1. https://shodhganga.inflibnet.ac.in/bitstream/10603/43767/10/10_chapter%201.pdf
2. <https://www.asianhnm.com/facilities-operations/environmental-safety-hospitals>
3. <http://ncert.nic.in/vocational/pdf/keda101.pdf>
4. <https://www.scribd.com/document/332414371/BM-Sakharkar-Principles-of-Hospital-Administration-and-Planning-2nd-Edition-pdf>
5. <https://www.pdfdrive.com/hospital-administration-books.html>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	2	3	3	3
CO2	2	2	2	2	2	2
CO3	3	2	3	3	2	2
CO4	2	3	1	2	2	3
CO5	1	2	2	3	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

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SYLLABUS

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCE56	PHARMACEUTICAL BIOCHEMISTRY	ELECTIVE – 2	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The Pharmaceutical Biochemistry Course introduces basis for understanding of the chemistry of pharmaceuticals and other pharmacologically active compounds, their mode of action, and their turnover in the human body, and how this contributes to health benefits.

COURSE OBJECTIVES:

- To provide an in-depth knowledge about sources of drugs, pharmacokinetics and pharmacodynamics.
- To give an outline on routes of drug administration.
- To give knowledge on drug receptor metabolism.
- To teach adequate scientific knowledge about pharmaceutical manufacturing process.
- To make the students gain a better understanding of drug discovery, design and its development.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand drug dosage, routes of administration and about bioavailability of drugs.	Upto K3
CO 2	understand about basic principles involved in pharmacokinetics.	Upto K3
CO 3	understand about the drug receptor interactions and gain knowledge on metabolism.	Upto K3
CO 4	describe the general principles of adverse drug reactions and acute poisoning.	Upto K3
CO 5	advance the knowledge on drug discovery process and ethical issues in drug discovery process and in preclinical toxicological studies.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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PHARMACEUTICAL BIOCHEMISTRY

UNIT– I:

Introduction – Sources of drugs, routes of drug administration, dosage forms, drug dosage. Bioavailability – Bioavailability of drugs, Factors affecting bioavailability, Bioequivalence. Combined effect of drugs – Synergism, antagonism.

UNIT– II:

Pharmacokinetics – Absorption, distribution of drugs, half-life, c_{max} , t_{max} , factors influencing drug absorption and distribution. Drug elimination – Renal excretion, fecal excretion, biliary excretion, pulmonary excretion and other routes of excretion.

UNIT– III:

Pharmacodynamics – Drug receptors – Concept and theory, Drug – receptor interactions, Receptor mediated and non – receptor mediated drug action, Mechanism of phase I and Phase II metabolic reactions, factors affecting drug metabolism, significance of drug metabolism. Placebo effects, Factors modifying drug action.

UNIT– IV:

Adverse Drug Reactions and Toxicology – Pharmacologic ADRs, Non – pharmacological ADRs, disease – related ADRs, multiple drug reactions. Acute poisoning – General principles and management. Drug dependence, drug tolerance and intolerance.

UNIT– V:

Drug Discovery and Development – Random screening, serendipity, molecular modification of a known drug, rational approaches in drug designing. Preclinical research, clinical research, overview of DCGI, NPPA, CDSCO, FDA, ICMR and FSSAI.

TEXT BOOKS:

1. R.S. Satoskar, S. B. (2017) *Pharmacology and Pharmacotherapy*. Elsevier.
2. Tripathi, K. (2018) *Essentials of Medical Pharmacology*. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
3. Katzung, B. G. (2015) *Basic and Clinical Pharmacology*. Tata McGraw Hill Education Private Limited, New Delhi.

REFERENCE BOOKS:

1. S C Metha and Ashutosh Kar (2011). *Pharmaceutical Pharmacology*, New age International publishers.
2. Padmaja Udayakumar (2009), *Text book of Medical Pharmacology* – 2nd Edition, CBS Publishers & Distributors, New Delhi.

DIGITAL TOOLS:

1. https://www.carewellpharma.in/B_Pharmacy/Notes/2nd_Sem/Biochemistry/Unit_2
2. <https://www.studocu.com/in/course/jawaharlal-nehru-technological-university-anantapur/pharmaceutical-biochemistry/3890078>
3. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/health_scienc_e_students/medicalbiochemistry.pdf

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	3	2	2
CO2	2	3	3	3	3	2
CO3	3	3	2	2	3	1
CO4	3	3	2	2	2	2
CO5	3	2	2	2	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCS51	FOOD PROCESSING TECHNOLOGY	SBS – 5	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

The Food Processing Technology Course covers the techniques and ideas involved in the processing and preservation of food.

COURSE OBJECTIVES:

- To impart knowledge about food processing and various unit operations – storing and preservation.
- To make the students understand the advanced principles of food processing and to choose a method of preservation in relation to food composition.
- To make the students understand about milk, milk processing methodologies.
- To create awareness about the processing of major cereals.
- To make the students know about processing technology of meat, fish and eggs.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	explain major food groups and bio-fortification.	Upto K3
CO 2	know about cereals and pulses milling techniques which To develop entrepreneurial skills.	Upto K3
CO 3	understand the processing of fruits and vegetables.	Upto K3
CO 4	understand the various milk processing methods.	Upto K3
CO 5	gain knowledge on the processing of meat, fish and eggs products and egg products.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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FOOD PROCESSING TECHNOLOGY

UNIT – I: Introduction

Definition – function of food – food groups – Bio-fortification – Nutraceuticals – low cost nutrient supplement – Food fortification

UNIT – II: Cereals and Pulses

Grain characteristics and plant products – Wheat milling process – products of wheat – Rice processing. Pulses – processing – Fermentation and Germination

UNIT – III: Fruits and Vegetables

Structure, composition, physiological and biochemical changes during ripening, handling and storage – processing of vegetables – citrus juice, grape juice and raisins, squashes, jam, ketchups

UNIT – IV: Milk and Milk Products

Milk processing – Pasteurization, homogenization, packing – fortified milk, skim milk – cream, butter, cheese, ice-cream, paneer, yogurt

UNIT – V: Meat, Fish and Eggs

Meat – Aging, tenderizing, freezing – storage. Fish preservation and processing. Egg – dehydrated egg powder, frozen egg – egg storage

TEXT BOOKS:

1. Sivasankar. B. (2000) *Food Processing and Preservation*, 1st edition, PHI Learning Pvt. Ltd.
2. Srilakshmi. B. (2011) *Food Science*, 5th edition, New Age International Pvt Ltd.

REFERENCE BOOKS:

1. Ramaswamy H and Marcott M, (2006). *Food Processing Principles and Applications*, CRC Press.
2. Swaminathan, M., (2010) *Advanced Text Book on Food and Nutrition*, Volume I & II, The Bangalore Printing and Publishing Co. Ltd.

DIGITAL TOOLS:

1. <https://unacademy.com/content/neet-ug/study-material/biology/biofortification/>
2. <http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=147681>
3. <https://microbiologynotes.org/milk-composition-processing-pasteurization-pathogens-and-spoilage/>
4. <https://microbenotes.com/preservation-of-meat-and-meat-products/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	2	3	3	2
CO2	1	2	2	2	2	3
CO3	2	2	1	1	1	3
CO4	1	3	3	2	2	2
CO5	1	2	1	1	1	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCC61	BIOTECHNOLOGY & GENETIC ENGINEERING	CORE – 8	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The Biotechnology & Genetic engineering course provides the outline of biotechnological techniques and their applications for the development of recombinants.

COURSE OBJECTIVES:

- To introduce the tools of genetic engineering.
- To instil the knowledge about the strategies of gene cloning method.
- To enable students understand plant Biotechnology in crop improvement and disease resistance.
- To impart knowledge on types of cell cultures and their application in medical field.
- To utilize the knowledge in understanding the application of biotechnology in various industries.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	describe the fundamental steps in genetic engineering procedures and relate the different vectors used in genetic engineering.	Upto K3
CO 2	identify various natural and artificial ways to propagate plants to increase genetic variety and infer the use of transgenic plants.	Upto K3
CO 3	outline the fundamentals of various types of animal cell cultures and identify the suitable methods for producing transgenic animals.	Upto K3
CO 4	illustrate the biotechnology-based applications of microbes and their enzymes.	Upto K3
CO 5	discuss the role of biotechnology in industrial sectors.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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BIOTECHNOLOGY & GENETIC ENGINEERING

UNIT– I:

Genetic engineering: Introduction to Gene manipulation – restriction enzymes and DNA ligases, Introduction to gene cloning, Types of cloning vectors – plasmid, phagemid, cosmid, M13 phage, BAC, YAC.

UNIT– II:

Plant biotechnology: Tissue culture – Plant tissue culture, protoplast culture, Agrobacterium mediated gene transfer, transgenic plants and its applications, crop improvement.

UNIT– III:

Animal biotechnology: Introduction to cell culture and cell lines. Viral vector system – Baculo viral vector, Methods for producing transgenic animal – Microinjection, Electroporation, Gene gun method, Invitro – fertilization and embryo transfer, Application of transgenic animals.

UNIT– IV:

Microbial biotechnology: Basic principles of microbial growth, types, design and operation of fermentors, Microbial degradation of oil spills, Biodegradable plastics – PHB production.

UNIT– V:

Protein engineering (T4-lysozyme), Site – directed mutagenesis, yeast two hybrid systems, Production of recombinant pharmaceuticals such as insulin, human growth hormone, factor VIII. Recombinant vaccines.

TEXT BOOKS:

1. Dubey, (2005). *A Text Book of Biotechnology*, 1st edition, S .Chand& Company Ltd.
2. Das H.K., (2004). *A Text book of Biotechnology*, 1st edition, Wiley Dreamtech India Pvt. Ltd.
3. Santhya Mithra (2015). *Genetic Engineering*, McGraw–Hill Publications.

REFERENCE BOOKS:

1. Balasubramanian et.al., (2003) *Concepts in Biotechnology*, Revised edition, university Press.
2. Freifelder, D., (1982) *Physical Biochemistry: Applications to Biochemistry and Molecular Biology*, 2nd edition, Narosa Publications.
3. Old R.W. and Primrose S.B., (2005) *Principles of Gene Manipulation*, 5th edition Blackwell Science.

DIGITAL TOOLS:

1. [https://bio.libretexts.org/Bookshelves/Ecology/Environmental_Biology_\(Fisher\)/08%3A_Food_Hunger/8.02%3A_Biotechnology_and_Genetic_Engineering](https://bio.libretexts.org/Bookshelves/Ecology/Environmental_Biology_(Fisher)/08%3A_Food_Hunger/8.02%3A_Biotechnology_and_Genetic_Engineering)
2. <https://www.freeexamacademy.com/biotechnology-and-genetic-engineering/>
3. <https://www.nios.ac.in/media/documents/SrSec314NewE/Lesson-30.pdf>
4. <https://opentextbc.ca/biology/chapter/10-1-cloning-and-genetic-engineering/>
5. <https://www.biologydiscussion.com/genetic-engineering/notes-on-genetic-engineering/51794>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	2	2
CO2	2	3	2	3	2	3
CO3	2	3	2	3	3	3
CO4	2	3	2	2	1	3
CO5	1	3	1	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



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SYLLABUS

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCC63	CLINICAL BIOCHEMISTRY	CORE – 10	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

The Clinical Biochemistry Course provides a solid foundation in a field that deals with the clinical study of bodily fluids and other biological material to help in illness diagnosis, treatment, and monitoring.

COURSE OBJECTIVES:

To enable the students

- learn about the scope, development, and applications of Clinical biochemistry.
- acquire knowledge on various diagnostic procedures to diagnose haematological disorders, renal and liver transport
- learn about the disorders and the inborn errors of protein, amino acid and nucleic acid metabolism.
- learn about the disorders of carbohydrate, lipid metabolism and their diagnosis.
- get an awareness on the functions of various organs and the diseases associated with them.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	determine the normal constituents of urine, blood and their significance in maintaining good health.	Upto K3
CO 2	explain the metabolic disorders of carbohydrate.	Upto K3
CO 3	become aware with the variations in the levels of triglycerides and lipoproteins and their relationship with various diseases.	Upto K3
CO 4	learn about the disorders and the inborn errors of protein, amino acid and nucleic acid metabolism.	Upto K3
CO 5	gain knowledge about the disorders and the inborn errors of nucleic acid metabolism.	Upto K3

K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLY



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CLINICAL BIOCHEMISTRY

UNIT– I:

Introduction: Scope, Development and Applications of Clinical Biochemistry, Laboratory investigation in Clinical Biochemistry – Evaluation of Laboratory test, Normal range, system of international units.

UNIT– II:

Disorders of Carbohydrates Metabolism: Glucose level in normal blood – Hypoglycemia, Hyperglycemia, glycosuria, Diabetes mellitus, obesity, galactocemia, glucose tolerance test, inborn errors of Carbohydrate metabolism – Lactose intolerance, Glycogen storage disease, Carbohydrates Metabolism in starvation.

UNIT– III:

Disorders of lipid metabolism: hypo and hyper Lipoproteinemias, Atherosclerosis, Coronary arterial disease, myocardial infarction, cardiachypertrophy, fatty liver, obesity. Inborn errors of lipid metabolism.

UNIT– IV:

Disorders of Amino acid and Protein Metabolism: Disorders of Plasma protein, urea – Uremia, Uric acid – Urecemia, Creatinine, Ammonia, Inborn errors of Amino acid metabolism – Phenylketonuria, alkaptonuria, Amino acid metabolism in starvation.

UNIT– V:

Disorders of Purine and pyrimidine metabolism – Gout – primary Gout and Secondary Gout, Lesch– Nyhan syndrome (LNS), Orotic aciduria, Xanthinuria.

TEXT BOOKS:

1. Chatterjee, (2005) *A Text Book of Medical Biochemistry*, 5th edition, JAYPEEE Brothers Publication.
2. Tietz (2003) *Fundamental of Clinical Biochemistry*, 5th edition, Saunders, An imprint of Elsevier.
3. Vasudevan (2007) *A Text Book of Biochemistry for Medical Students*, 5th Edition, Jaypee Publications.

REFERENCE BOOKS:

1. Guyton, (2008) *A Text book of Medical Physiology*, 11th edition, Elsevier Publications.
2. Harold Varley (1991) *Practical Clinical Biochemistry*, 5th edition. CBS Publications.
3. Robert K.Murray et al., (2003) *Harper's Biochemistry*, 26th edition, Mc Graw Hill company.
4. Fauci et al, (1998) *Horizon's Principles of Internal Medicine*, 14th edition, Mc Graw–Hill Health Professions Division.



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SYLLABUS

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DIGITAL TOOLS:

1. https://www.academia.edu/41197490/Clinical_Biochemistry_Lecture_Notes
2. <https://www.nios.ac.in/media/documents/dmlt/Biochemistry/Lesson-13.pdf>
3. <https://download.e-bookshelf.de/download/0003/9373/59/L-G-0003937359-0003185124.pdf>
4. <https://www.studocu.com/latam/document/universidad-de-el-salvador/bioquimica/lecture-notes-clinical-biochemistry-9th-ed-booksmedicos/11891840>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	3	2	3	1
CO2	3	1	3	3	2	2
CO3	3	1	3	3	2	2
CO4	3	2	3	3	2	2
CO5	3	1	3	3	1	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



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SYLLABUS

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100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCC64	MEDICAL DIAGNOSTICS	CORE – 11	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

The Medical Diagnostics course provides a comprehensive knowledge of medical devices classification and introduces students to the principles and application of Medical Diagnostic Systems in medical/clinical environments.

COURSE OBJECTIVES:

- To foster a better understanding of how the clinical sciences are applicable to the diagnosing of disease.
- To enable the students acquire knowledge about the pathophysiology of diseases.
- To provide a solid theoretical foundation in the healthcare-related professions.
- To demonstrate proper handling of patients/specimens and evaluate situations that may cause adverse issues.
- To correlate abnormal laboratory test results with various disease states.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	develop an understanding of the scientific basis underpinning medical diagnostic assays and technologies.	Upto K3
CO 2	understand the pathophysiological processes responsible for common biochemical disorders.	Upto K3
CO 3	understand the enzyme patterns in diseases of various organs such as pancreas, liver, bones, heart and muscle.	Upto K3
CO 4	give an overview of normal and abnormal metabolic functions, how they impact metabolic processes.	Upto K3
CO 5	detail the Clinical application of enzymes in diagnosis, differentiation of functional and non-functional plasma enzymes.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

MEDICAL DIAGNOSTICS

UNIT– I: Liver Function Tests

Liver structure and functions. Metabolism of bilirubin. Jaundice – types, clinical features and tests based on bile pigments level in blood and urine. Differentiation of three types of jaundice. Prothrombin Time. Liver function tests.

UNIT– II: Renal Function Tests

Formation of urine – Glomerular filtration and tubular reabsorption. Clearance tests–urea, creatinine, inulin, PAH test, concentration and dilution tests.

UNIT– III: Gastric Function Tests

Collection of gastric contents, Examination of gastric residuum, FTM. Stimulation tests. Tubeless gastric analysis.

UNIT– IV: Clinical Enzymology

Definition of functional and non – functional plasma enzymes. Isozymes and diagnostic tests, enzyme patterns in acute pancreatitis, liver damages, bone disorders, myocardial infarction and muscle wasting.

UNIT– V: Diagnosis of Tumours

Definition of tumor markers, Markers produced by various tissues, classification and clinical applications. Imaging techniques to diagnose cancer – CT, MRI, PET, SPECT.

TEXT BOOKS:

1. M.N. Chatterjee & Ranashinde (2006). *Text Book of Medical Biochemistry*. 6th edition Jaypee Brothers Medical Publisher (P) Ltd.
2. Carl A. Burtis, Edward R. Ashwood and David E. Bruns (eds), (2012). *Tietz Textbook of Clinical Chemistry and Molecular Diagnosis*. 5th edition, Elsevier, St. Louis, USA,

REFERENCE BOOKS:

1. Thomas M. Devlin. (2010) *Biochemistry with Clinical Correlation*. 7th Ed., John Wiley & Sons.
2. Marshall & Lapsle & Day & Ayling, (2014) *Clinical Biochemistry, Metabolic and Clinical Aspects*. 3rd Edition, Elsevier, St. Louis, USA,
3. Prakash, G. (2012) *Lab Manual on Blood Analysis and Medical Diagnostics*, S. Chand and Co. Ltd.

DIGITAL TOOLS:

1. <https://www.ncbi.nlm.nih.gov/books/NBK338593/>
2. <https://www.cancer.org/treatment/understanding-your-diagnosis/tests/imaging-radiology-tests-for-cancer.html>
3. <https://nios.ac.in/media/documents/dmlt/Biochemistry/Lesson-23.pdf>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	3	3	3	1
CO2	3	2	2	1	2	2
CO3	2	2	3	2	3	1
CO4	3	2	3	2	2	3
CO5	3	3	3	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



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SYLLABUS

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15% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCE61	ENDOCRINOLOGY AND HORMONAL REGULATIONS	ELECTIVE – 3	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

The Endocrinology and Hormonal Regulations Course will focus on the anatomy, physiology, biochemistry of the human endocrine system and hormone production, activities, regulatory mechanisms, physiological effects, and disease states.

COURSE OBJECTIVES:

- To explain the role of endocrine system in maintaining homeostasis, integrating growth and development.
- To make the students acquire knowledge related to the major hormones released from the hypothalamus.
- To discuss molecular, biochemical, and physiological effects of hormones on cells.
- To explain the consequences of under and overproduction of hormones
- To make the students identify the physiology, principle of measurement, reference ranges and clinical correlations of chemical constituents of the blood.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	gain knowledge about the classification and mechanism of action of hormones and to demonstrate various types of second messengers and their action.	Upto K3
CO 2	understand hypothalamic and pituitary hormones.	Upto K3
CO 3	learn various functions of thyroid, parathyroid hormones along with their mechanism of action.	Upto K3
CO 4	discuss the link between pancreatic and gastro-intestinal hormones with diseases.	Upto K3
CO 5	demonstrate the biological functions of adrenal gland hormones and reproductive hormones.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

ENDOCRINOLOGY AND HORMONAL REGULATIONS

UNIT– I: Endocrine Systems and Hormones

Hormone – Definition, classification, circulation in blood, modification and degradation; Hormone receptors – structure and regulation, Mechanism of Hormone action. Signal transduction – basic concepts of signals, ligand and receptors, endocrine, paracrine, autocrine functions; Signal transduction cytoplasmic, nuclear receptor and messengers cAMP, cGMP and Calcium ions

UNIT– II: Hypothalamus and Pituitary Hormones

Hypothalamic releasing factors vasopressin, oxytocin. Biosynthesis, secretion, transport, regulation and biological effects of growth hormones, FSH, LH, TSH, ACTH and prolactin

UNIT– III: Thyroid Hormones

Biosynthesis, secretion, transport, regulation and biological actions – Hypo and hyper thyroidism, antithyroid agent's role of parathyroid hormones, calcitriol, calcium and phosphorous homeostasis – Hypo and hyperparathyroidism

UNIT– IV: Pancreatic Hormones

Islets of Langerhans, cell types – Insulin and glucagon: biosynthesis, mechanism of action and biological effects – Hormonal action of somatostatin and pancreatic polypeptide

UNIT– V: Adrenal Hormones

Biosynthesis, secretion, transport, mechanism of action and excretion of glucocorticoids, mineralocorticoids, adrenal medullary hormones – epinephrine and nor epinephrine, steroid hormones – androgens and estrogens – Hormone antagonists

TEXT BOOKS:

1. Harold Varley (1991) *Practical Clinical Biochemistry*, 5th edition. CBS Publications.
2. Sembulingam K and Sembulingam P. (2012) *Essential of Medical Physiology*. 6th Edition, New Jaypee Brothers Medical Publishers, Delhi, India.
3. *Harper's Illustrated Biochemistry*, 26th edition, McGraw–Hill Book Company.

REFERENCE BOOKS:

1. White A, Handler P, Smith E, Stetten D. Jr. (1964). *Principles of Biochemistry*, 3rd edition, McGraw–Hill Book Company.
2. Frisell. W.R (1982). *Human Biochemistry*, 1st edition, Macmillan Publishing Company.
3. Guyton, (2008). *A Text book of Medical Physiology*, 11th edition, Elsevier Publications.

DIGITAL TOOLS:

1. <https://www.studocu.com/en-gb/document/university-college-london/mammalian-physiology/endocrinology-lecture-notes-12131415/972897>
2. <https://teachmephysiology.com/endocrine-system/>
3. https://profketandhatariya.com/wpcontent/uploads/2020/09/introduction_to_endocrinology.pdf
4. [https://www.cell.com/trends/endocrinology-metabolism/fulltext/S1043-2760\(01\)00415-5](https://www.cell.com/trends/endocrinology-metabolism/fulltext/S1043-2760(01)00415-5)

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	1	2	1
CO2	2	2	3	2	3	1
CO3	2	2	3	3	3	2
CO4	2	2	3	3	3	2
CO5	3	2	2	2	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCE62	INDUSTRIAL BIOCHEMISTRY	ELECTIVE – 3	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

The Industrial Biochemistry Course aims to integrate the knowledge of biochemistry and molecular biology with those of microbiology and biochemical engineering, with emphasis on their application to the biotechnological processes.

COURSE OBJECTIVES:

- To make the students discover the wide use of fermentation technology and microbial production techniques.
- To help them achieve essential awareness on principles of fermentation and types of fermenters.
- To update the latest scientific developments on microbes and its industrial application.
- To enable the students gain adequate knowledge on use of microbes in the environment.
- To illustrate on the microbial fabrication of bioactive compounds.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	learn about the culture techniques for isolation of microbes from various sources and preserve the isolates.	Upto K3
CO 2	gain basic knowledge about principles of fermentation and types of fermenters.	Upto K3
CO 3	describe the microbial production of bioactive compounds such as organic acids, bacterial and fungal polysaccharides, antibiotics and vitamins.	Upto K3
CO 4	learn about industrial production of alcohol, alcoholic beverages, production of Single Cell Protein, bioethanol and biogas production.	Upto K3
CO 5	provide fundamental insights to exploit microbes for protecting environment.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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INDUSTRIAL BIOCHEMISTRY

UNIT- I:

Introduction to Fermentation Technology – Isolation and screening of industrially important microbes, Various methods of achieving isolation – Inoculum preparation, strain improvement for better yield; primary and secondary detection of microorganisms. Primary and secondary screening; Biological assay of fermentation products, limitations of Bioassay, Diffusion Assay, Turbidometric assay, metabolic Response Assay, Enzymatic Assay.

UNIT- II:

Fermentation– Principles of fermentation. Surface, Submerged and solid–state fermentation, Design and operation of Fermenter, Agitation and aeration, Downstream processing. Types of Fermenters–Air–Lift fermenter, Fluidized Bed Bioreactor, Packed bed Bioreactor, Continuous culture; fed batch culture, fixed volume bed fed–batch, variable volume fed – batch, advantages and disadvantages of the Fed–batch reactors, continuous – Flow stirred – tank reactor.

UNIT- III:

Microbial Production of Bioactive Compounds – Production of organic acids – Citric acid, lactic acid, acetic acid. Production of bacterial and fungal polysaccharides, Production of Antibiotics – Penicillin and streptomycin. Production of vitamins – B12 and B2.

UNIT- IV:

Industrial Applications of Microbes – Industrial production of alcohol, alcoholic beverages – Wine and Beer by yeast .Production of Single Cell Protein (SCP) – Production of Edible Mushrooms. Bioethanol production, production of biogas from agricultural waste.

UNIT- V:

Microbes and Environment: Microbes in mineral recovery – Bioleaching – mechanism, advantages and disadvantages of bioleaching, Biosorption – Biosorbent material, Biosorption mechanisms. Microbial recovery of petroleum – process and advantages. Microbial degradation of xenobiotics – Biodegradation and Bioremediation.

TEXT BOOKS:

1. Pelczar, M.J., Chan, E.C.S. and Kreig, N.R. (2002) *Microbiology*. 5th Edition, Tata McGraw–Hill, New Delhi.
2. B. Tom Betsy, & Jim Keogh, (2005) *Microbiology Demystified*, Tata McGraw–Hill, New Delhi.

REFERENCE BOOKS:

1. R C Tilton, (2002) *Microbiology*, 10th ed, Tata McGraw Hill, New Delhi.
2. D. Stuart Hoggy (2013) *Essential Microbiology*, John Wiley & Sons, Ltd.



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DIGITAL TOOLS:

1. https://www.academia.edu/13300896/introduction_to_industrial_biochemistry
2. <https://www.americanandimportautorepair.com/wp-content/uploads/formidable/41/industrial-biochemistry-lecture-notes.pdf>
3. https://aiimsrishikesh.edu.in/documents/introduction_to_biochemistry.pptx
4. https://www.researchgate.net/publication/276249481_Lecture_notes_on_Industrial_Biotechnology_1_Fundamentals_of_Microbial_cell_cultivation

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	3	2	2	3
CO2	3	3	3	3	3	2
CO3	3	3	3	2	3	3
CO4	2	3	2	1	2	2
CO5	2	3	2	2	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCE63	THERAPEUTIC NUTRITION	ELECTIVE – 3	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

The Therapeutic nutrition course explores the role played by therapeutic diets in the treatment of chronic disease and other nutritional disorders.

COURSE OBJECTIVES:

To enable the students

- develop intellectual skills in the field of therapeutic nutrition.
- identify patients at risk for major nutrition – related health problems.
- categorize the principles and explain the objectives of diet therapy.
- recognize most common therapeutic diets used in clinical care.
- modify the diet plans to suit the disease condition.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	illustrate the nature of nutritional requirements during fever.	Upto K3
CO 2	relate the nutrition knowledge in weight management.	Upto K3
CO 3	classify hypertension and able to trace the root cause, suggest diet for hypertension.	Upto K3
CO 4	examine about gastrointestinal disorders and summarize the disease management.	Upto K3
CO 5	apply the knowledge of biochemistry in treating metabolic disorders.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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THERAPEUTIC NUTRITION

UNIT- I:

Metabolism, treatment, nutritional requirement and dietary modification during acute, chronic and convalescent stage of fevers. Liquid diets, elemental and synthetic diet.

UNIT- II:

Weight Imbalance – obesity – assessment, risk, etiology and management of dietary, behaviour, pharmaceutical, children, eating disorders. Dietary intake and management – focus on – fat discrimination – SFA, MUFA, PUFA and omega – 3 and 6 – fatty acids.

UNIT- III:

Hypertension – Classification, prevalence, morbidity and mortality. Diet related factors influencing development of hypertension. Management – lifestyle, weight, salt restriction and other dietary modifications.

UNIT- IV:

Gastro intestinal system – Disorders, Classification of disorders – indigestion, acute gastritis and duodenal ulcers. Liver disease – hepatitis and alcoholic liver disease (cirrhosis) – Dietary management and nutritional care. Gall bladder disease – cholelithiasis, cholecystitis, cholestasis – acute & chronic conditions – Dietary management and care. Pancreas – pancreatitis – acute & chronic – Dietary management and nutritional care.

UNIT- V:

Diabetes Mellitus – IDDM and NIDDM. Malnutrition Related Diabetes Mellitus. Diagnosis and Management. Gout – Nutritional care, purines, alcohol pharmacological therapy – Dietary modification. Phenyl Ketonuria – Diagnosis and outcome. Nutritional care and management – Ketogenic diet.

TEXT BOOKS:

1. Sharma, D. S. (2017). *Nutritional Biochemistry*. CBS Publishers and Distributors.
2. Srilakshmi, B. (2019). *Dietetics* – (Multi Colour Edition) ed. New Age International Publishers.
3. B.Srilakshmi, B. (2017). *Food Science* (Multi Colour Edition) ed. New Age International Publishers.
4. Krause's. (2013). *Food, Nutrition, & Diet Therapy* (11th edition) W.B. Saunders Publishers.

REFERENCE BOOKS:

1. Swaminathan. (2005). *Advanced Textbooks of Food and Nutrition*. BAPP CO PRESS.
2. M.N.Chatterjea. (2011). *Textbook of Medical Biochemistry*. Jaypee Brothers. Medical Publishers (P) Ltd, New Delhi.



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SYLLABUS

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DIGITAL TOOLS:

1. <https://unacademy.com/content/kerala-psc/study-material/human-nutrition-and-dietetics/therapeutic-nutrition/>
2. <https://www.teachmint.com/tfile/studymaterial/class-1st/nutrition/therapeuticnutritionpdf/-7bb3-432b-af04-d861054e8887>
3. https://www.cdss.ca.gov/agedblinddisabled/res/VPTC2/9%20Food%20Nutrition%20and%20Preparation/Types_of_Therapeutic_Diets.pdf
4. <http://ecoursesonline.iasri.res.in/course/view.php?id=190>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	1	3	3	2
CO2	1	3	2	3	3	2
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CO4	2	3	2	3	2	2
CO5	2	3	2	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UBCS61	BIO ENTREPRENEURSHIP	SBS – 6	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☐	Entrepreneurship ☒

COURSE DESCRIPTION:

The Bio entrepreneurship Course provides students with the necessary knowledge on how to bridge science and business and translate biotech concepts into commercial terms.

COURSE OBJECTIVES:

- To provide an introduction to the basics of product and service innovation in life science industry.
- To help the students examine the entrepreneurial process in life science industry.
- To provide an overview of the life science market and business development opportunities in the life science industry.
- To describe the processes of product and service development in the life science sector.
- To demonstrate a general understanding of the central role that business development plays for the biomedical industry.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the concept and scope for bioentrepreneurship.	Upto K3
CO 2	identify various operations involved in a venture creation.	Upto K3
CO 3	be aware of gathering funds and launching a winning business.	Upto K3
CO 4	nurture the organization and harvest the rewards.	Upto K3
CO 5	utilize the schemes promoted through knowledge centers and various agencies.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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BIO ENTREPRENEURSHIP

UNIT– I:

Introduction to Bio entrepreneurship; Types of industries – Biopharma, Bioagriculture and CRO.

UNIT– II:

Business plan, budgeting and funding idea or opportunity; Business proposal preparation; funds/support from Government agencies like MSME/banks, DBT, BIRAC, Start – up and make in India initiative.

UNIT– III:

Legal requirements for starting a company; Registration of company in India; Ministry of Corporate Affairs (MCA); difficulties of entrepreneurship in India.

UNIT– IV:

Basics of market forecast for the industry; distribution channels – franchising, policies, promotion, advertising, branding and market.

UNIT– V:

Role of knowledge centres such as universities, innovation centres, research institutions (public & private) and business incubators in Entrepreneurship development. Definition, role and importance of CDSCO, NBA, GLP, GCP, GMP. Introduction to Patents, Trademarks & Copyrights

TEXT BOOKS:

1. Adams, D. J. (2008). *Enterprise for Life Scientists: Developing Innovation and Entrepreneurship in the Biosciences*. Scion Publishing Ltd.
2. Shimasaki, C. (2014). *Biotechnology Entrepreneurship: Starting, Managing, and Leading Biotech Companies*. Academic Press, London.

REFERENCE BOOKS:

1. Jordan, J. F. (2014). *Innovation, Commercialization, and Start – Ups in Life Sciences*. London: CRC Press.
2. Desai, V. (2009). *The Dynamics of Entrepreneurial Development and Management*. New Himalaya. New Himalaya House, Delhi.

DIGITAL TOOLS:

1. <https://www.studocu.com/in/document/jamia-millia-islamia/bioethics-biosafety/bio-entrepreneur-and-its-characteristics/19386932>
2. <https://www.mhaonline.com/faq/what-is-bioenterprise>
3. <https://www.scribd.com/presentation/472476674/Promoting-BioEntrepreneurship>
4. <https://www.science-entrepreneur.com/blog-1/study-bioentrepreneurship>

Mapping of CO with PSO

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CO1	2	3	3	3	2	3
CO2	1	2	2	2	3	2
CO3	2	2	2	3	2	3
CO4	2	1	2	3	1	3
CO5	1	1	1	2	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNERS: Dr. K. RAGHAVAN & Prof. A. R. SARANYADEVI



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SYLLABUS

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B.Sc. MICROBIOLOGY



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

10% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMBC51	CLINICAL MICROBIOLOGY	CORE – 6	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

The Clinical microbiology course provides the conceptual basis for understanding pathogenic microorganisms and the mechanisms by which they cause disease in the human body. It covers mechanisms of infectious disease transmission, principles of aseptic practice, and the role of the human body's normal microflora.

COURSE OBJECTIVES:

To enable the students

- learn basics of infection and the epidemiology of infectious diseases.
- gain an in-depth knowledge on clinical sample processing.
- get diagnostic skills and interpretation of laboratory tests in the diagnosis of infectious diseases.
- acquire basic knowledge about the morphology, pathogenicity and laboratory diagnosis of microbial pathogens.
- attain the knowledge on Anti-microbial chemotherapy and drug resistance.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	gain the basic knowledge about Infectious diseases, Human-microbe interactions, Host defence mechanisms.	Upto K3
CO 2	understand the pathogenicity of bacterial pathogens.	Upto K3
CO 3	comprehend the pathogenicity of viral pathogens.	Upto K3
CO 4	recognize the pathogenicity of fungal pathogens and protozoan parasites.	Upto K3
CO 5	gain the basic knowledge about Anti-microbial chemotherapy and drug resistance mechanisms.	Upto K3

K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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CLINICAL MICROBIOLOGY

UNIT– I: Historical Aspects of Infectious Diseases

Koch's postulates. Human–microbe Interactions, Virulence factors – Adhesins, Aggresins, Invasins and Impedins, Host defence mechanisms.

UNIT– II: Bacteriology

Transmission, Diagnosis, Clinical symptoms, Control, Treatment and Prophylaxes of bacterial member's – Staphylococcus, Streptococcus, E. coli, Salmonella, Bacillus, Vibrio & Mycobacteria.

UNIT– III: Virology

Etiology, Prophylaxis, Clinical symptoms and Treatment for Human Viral Diseases– SARS, **Corona virus disease (COVID-19)**, Rabies, Hepatitis & AIDS, Dengue, Viruses and Cancer.

UNIT– IV: Mycology & Protozoan Diseases

Classification of Mycoses with example– Superficial, Cutaneous, Systemic & Opportunistic types– Life cycle of Candidiasis. Life cycle, Diagnosis and Treatment of Protozoan diseases – Amoebiasis & Malaria.

UNIT– V: Anti–microbial Chemotherapy

Antibacterial – Penicillin, Streptomycin, Antifungal –Nystatin and Antiviral drugs – Azidothymidine, Modes of action with examples – Drug resistance – Multiple drug resistance (MDR), Extensive drug resistance (XDR), Extreme drug resistance (XXDR) and **Pan drug resistance (PDR)**, Mechanisms of Drug Resistance – Enzymatic, **Chemical, Multiple drug resistance Pumps, Metabolic Bypass and R–Plasmids.**

TEXT BOOKS:

1. Murray, Rosenthal and Pfaller, (2021). *Medical Microbiology*, 9thEd., Elsevier Publications, Philadelphia.
2. Kenneth J. Ryan *et al.*, (2022). *Sherris and Ryan's Medical Microbiology*, 8th Ed., McGraw Hill Publications, Australia.
3. David Greenwood, Richard C B Slack, Michael R. Barer, Will L Irving, (2012). *Medical Microbiology*, 18th Ed., Elsevier Publications, New York.
4. Vasanthakumari R. (2016). *Textbook of Microbiology*, 3rd Ed., Wolters Kluwer Pvt. Ltd, Gurgaon.
5. Rajan S. (2017). *Medical Microbiology*, MJP Publishers, Chennai.

REFERENCE BOOKS:

1. Paniker, C. K. J., (2017). *Ananthanarayanan and Paniker's Textbook of Microbiology*, 10th Ed., Orient Longman Publications, India.
2. Mackie and McCartney, (1994). *Medical Microbiology*, 14thEd., Churchill Livingstone publishers, London.
3. Bailey and Scotts, (1994). *Diagnostic Microbiology*, 9thEd, Baron and Fine gold CV Mosby Publications, Missouri.
4. Jawetz E Melnic JL and Adelberg EA, (1998). *Review of Medical Microbiology*, Lange Medical Publications, USA.
5. Joanne Willey, Kathleen Sandman and Dorothy Wood, (2020). *Prescott's*



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SYLLABUS

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Microbiology, 11th Ed, McGraw Hill Publications, Australia.

DIGITAL TOOLS:

1. <https://www.microrao.com/mypgnotes.htm>
2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4922927/>
3. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/env_occupational_health_students/medicalbacteriology.pdf
4. https://www.ipinnovative.com/media/books/Contents_5.pdf
5. https://www.brainkart.com/subject/Medical-Microbiology_252/

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	2	1	2
CO2	3	2	2	2	2	3
CO3	3	2	3	2	3	3
CO4	3	3	2	2	2	3
CO5	3	2	2	3	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. A. R. SARANYADEVI



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

10% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMBC52	AGRICULTURAL AND ENVIRONMENTAL MICROBIOLOGY	CORE – 7	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course exposes the use of microorganisms in Agricultural and environmental applications.

COURSE OBJECTIVES:

To help the students

- understand the role of beneficial microorganisms in environment.
- acquire knowledge related to harmful plant pathogens
- have a basic knowledge of bio fertilizers
- comprehend the role of microbes in biogeochemical cycles.
- get expose the students to the concepts of sewage and waste management process.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	summarise the beneficial role of microbes	Upto K3
CO 2	explain the harmful plant pathogen interactions	Upto K3
CO 3	list the microbes that can be used as biofertilizers	Upto K3
CO 4	outline the biogeochemical cycles.	Upto K3
CO 5	understand the waste management process.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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AGRICULTURAL AND ENVIRONMENTAL MICROBIOLOGY

UNIT– I: Plant, Soil and Microbial Interactions

Bacteria, Fungi and Actinomycetes (Distribution), Microbe–microbe Interaction – Mutualism, Amensalism and Commensalism; **Microbe–plant interactions – Phylloplane – Phyllosphere –Rhizosphere and Mycorrhizae**

UNIT– II: Plant Microbe Interactions (Harmful)

Symptoms, Characters of pathogens and control measures: Bacterial diseases – Citrus canker, Blight of rice. Fungal diseases – Red rot of sugarcane, Tikka leaf spot of ground nut. Viral diseases –TMV, CMV, **Vein clearing disease of Bhendi (*Abelmoschus esculentus*)**.

UNIT– III: Applications of Microorganisms in Crop Production

Plant growth promoting *Rhizobacteria* (PGPR) – ***Pseudomonas fluorescence* and Siderophores. Biofertilizers – Bacterial (*Rhizobium*) & Fungal (Vesicular Arbuscular Mycorrhiza)** – Production and Methods of Application –Biopesticides – Bacterial (*Bacillus thuringiensis*), Fungal (*Beauveria bassiana*) and Viral (Nuclear Polyhedrosis Virus) – Microbial Nematicides and Microbial Herbicides – Biotechnology in Agriculture – Bt Cotton and herbicide tolerant plants. **EM solution. Centres of Agriculture in India.**

UNIT– IV: Microbes and their Role in the Environment

N₂-cycle, P-cycle and C-cycle, Aquatic Microbiology – Microbes in fresh water & Marine water. Air Microbiology.

UNIT– V: Role of Microorganisms in Pollution Management

Biodegradation of Xenobiotics (Chlorinated Pesticides) – Microbial enhanced oil recovery (MEOR) – Bioleaching of Metals (Copper and Gold). Bioremediation–Microbes in Waste treatment – Solid waste (Sanitary land fill and Composting) and liquid waste – Sewage treatment –Biological Oxygen Demand (BOD), Pollution indicating microbes.

TEXT BOOKS:

1. Joanne Willey, Kathleen Sandman and Dorothy Wood, (2020). ***Prescott's Microbiology***, 11th Ed., McGraw Hill Publications, Australia.
2. Subba Rao NS. (2020). ***Soil Microbiology***, 4th Ed., Oxford & IBH Publishing Co., New Delhi.
3. Satyanarayana, U. (2020). ***Biotechnology***, India: Books and Allied (p) Limited., India
4. Charles P. Gerba, Ian L. Pepper, Terry J. Gentry, (2014). ***Environmental Microbiology***, 4th Ed., Elsevier Science, Netherlands.
5. Pandey, B. P. (2018). ***Plant pathology (Pathogen and Plant disease)***, S. Chand & Co Pvt Ltd, New Delhi.



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REFERENCE BOOKS:

1. Bagyaraj, D. J., Rangaswami, G. (2004). *Agricultural Microbiology*, PHI learning Pvt. Ltd., India
2. Atlas, R. M., Bartha, R., Atlas, D. (1998). *Microbial ecology: fundamentals and Applications*, 4th Ed., Benjamin/Cummings, India.
3. Pareek R.P. , Navneet Pareek (2019). *Agricultural Microbiology*, Scientific Publishers, India.
4. Paniker, C. K. J., (2017). *Ananthanarayanan and Paniker's Textbook of Microbiology*, 10th Ed., Orient Longman Publications, India.
5. Vijaya Ramesh K. (2019). *Environmental Microbiology*, MJP publishers, Chennai.

DIGITAL TOOLS:

1. <http://eagri.org/eagri50/AMBE101/lec16.html>
2. <http://eagri.org/eagri50/AMBE101/lec29.html>
3. <https://www.slideshare.net/isurupriyaranga/pgpr-plant-growth-promoting-rhizobacteria>
4. <https://www.biologydiscussion.com/microbiology-2/bioremediation/xenobiotic-compounds-meaning-hazards-and-biodegradation/55625>
5. <https://www.researchgate.net/publication/233795004>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	2	3	2	1
CO2	3	2	2	1	3	3
CO3	3	1	3	2	1	2
CO4	2	3	2	1	2	3
CO5	2	1	3	1	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. K. RAGHAVAN



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

80% Revision

COURSECODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMBC53	IMMUNOLOGY	CORE – 8	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course explores the cells and molecules of the immune system and pathways work together and fight various infections. In addition, basic concepts of transplantation, tumor immunity, immune system deficiencies, autoimmunity and vaccination are examined. The course also emphasizes the antigen–antibody reactions, the mechanism of graft rejection and immune response to tumors, immunotherapy for cancer.

COURSE OBJECTIVES:

To help the students

- develop knowledge and skills related to health and disease and role of immune system.
- develop understanding of the functioning of the immune system,
- develop understanding of the molecular and cellular components and pathways that protect an organism from infectious agents.
- develop the skills and diagnose the presence of antigens and antibodies
- conceptualize the transplantation and tumor.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	become familiar with the historical perspective, cellular and molecular aspects of the immunesystem and the immune response.	Upto K3
CO 2	understand the characteristics of antigen, antibody and its types.	Upto K3
CO3	examine the basic mechanism of hypersensitivity, development of immune cells and their activation and differentiation.	Upto K3
CO 4	understand the principle and application of various immune techniques.	Upto K3
CO 5	comprehend the strategies essential for generating or suppressing immune responses as required in hypersensitivity reactions, transplantation, autoimmune diseases and cancer.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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IMMUNOLOGY

UNIT – I:

Contributions of following scientists to the development of field of immunology – Edward Jenner, Karl Landsteiner, Robert Koch, Paul Ehrlich, Jules Bordet, Elie Metchnikoff, Peter Medawar, MacFarlane Burnet, Neils K Jerne and Rodney Porter. Cells and organs of the system–Stem cells, Lymphocytes, Macrophages, Granulocytes, Mast cells, Dendritic cells. Concept of Innate and Adaptive immunity; Primary and Secondary immune response. Cell mediated and humoral immune response. Immunisation schedule, Mission Indradhanush.

UNIT– II:

Characteristics of an antigen (Foreignness, Molecular size, Chemical complexity and Heterogeneity); Haptens; Epitopes, Paratopes; T-dependent and T-independent antigens; super antigens; Adjuvants. Antibodies– Structure, Types and Functions, Production of Monoclonal Antibodies (a brief account). Complement System – Components; Activation pathways (Classical, Alternative and Lectin pathways).

UNIT– III:

Hypersensitivity– Types, mechanism and examples; Major Histocompatibility Complex – Organization of MHC locus (Human); Structure and Functions of MHC I & II molecules; Antigen processing and presentation (Cytosolic and Endocytic pathways). T and B cell– Development, Activation and Differentiation. Immunotolerance.

UNIT– IV:

Autoimmunity–mechanism; Autoimmune diseases–Hashimoto's Thyroiditis, Myasthenia gravis, Rheumatoid arthritis, SLE; Immunodeficiency diseases – Primary–DiGeorge's syndrome, Selective immunoglobulin deficiencies, X-linked agammaglobulinemia, SCID, Chediak–Higashi syndrome, CGD–Secondary–acquired–HIV–AIDS. Antigen–Antibody reaction– Precipitation– Single and Double Immuno diffusion (Ouchterlony method); Agglutination; Immunoelectrophoresis; Complement fixation test

UNIT– V:

Transplantation and types of graft; Graft Rejection– types and mechanism–GVHD; HLA typing; Clinical transplantation of kidney and Bone marrow, Kidney transplantation approved centres– IKDRC; Tumor Immunity– Tumor antigens–types; Immune response to tumors; Immunotherapy for Cancer (include FDA approved therapies). Vaccines– Types–Killed, Attenuated, Toxoid, Combination, DNA, Edible, Recombinant Vaccines.

TEXT BOOKS:

1. Travers. J., *Immunobiology, The Immune System in Health and Disease*, 3rd Ed., 1997–Garland publishers, NY.
2. Abul. K. Abbas, A. H. Lichtman, Shiv Pillai, *Cellular and Molecular Immunology*, 9th Ed., 2018. Elsevier.
3. C. V. Rao., *Immunology–A Text Book*, 3rd Edition., 2007, Narosa Publishing House, New Delhi



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4. David Male, *Immunology– An Illustrated Outline*. 6th Ed., CRC Press.
5. SK Mohanty, K Sai Leela, *Textbook of Immunology*, 2013. 2nd edition. Jaypee Brothers Publications PVT Ltd.

REFERENCE BOOKS:

1. Roitt, I.M., *Essentials of Immunology*, 1998, Blackwell scientific Publication.
2. William E. Paul, *Fundamentals of Immunology*, 2008. 6TH Ed., Lippincott Williams & Wilkins.
3. Kuby, *Immunology*, 1997, 2nd Ed., W, H. Freeman and company, NY.
4. J. H. L. Playfair, B. M. Chain., *Immunology at a Glance*, 2012, 10th Ed., Wiley Black publishers.
5. Klasus, E. and Elegert, *Immunology Understanding the Immune System*, 1996, Wiley Liss, NY.

DIGITAL TOOLS:

- NPTEL– <https://youtu.be/-bXcy5flhPs>
- <https://www.cdc.gov/vaccines/vac-gen/immunity-types.html>
- <https://www.onlinebiologynotes.com/autoimmune-disease-mechanism-of-autoimmunity-types-and-examples/>
- <https://microbenotes.com/t-cell-t-lymphocyte/>
- <https://www.immunology.org/policy-and-public-affairs/briefings-and-position-statements/transplant-immunology>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	1	2	2	1
CO2	2	2	1	1	1	1
CO3	1	1	3	2	1	3
CO4	1	1	3	2	3	3
CO5	1	1	3	3	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. N. B. SHARMILA



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SYLLABUS

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10% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMBC54	FOOD AND INDUSTRIAL MICROBIOLOGY	CORE – 9	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

Food and Industrial microbiology help to understand the need of microbes in food processing as well as in fermentation foods and large-scale production of essential metabolites, antibiotics, etc.

COURSE OBJECTIVES:

To enable the students

- have basic knowledge on role of microbes in food processing
- acquire knowledge about food preservation techniques
- understand the design and working mechanism of bioreactor
- comprehend some of the production process of commercially important products using large scale fermentation.
- learn the biosafety level and good laboratory practices for quality management

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the role of microbes in food processing	Upto K3
CO 2	summarise various food preservation techniques	Upto K3
CO 3	highlight the design and working mechanism of bioreactor	Upto K3
CO 4	outline the commercially important products production process in large scale	Upto K3
CO 5	define the biosafety level and good laboratory practices for quality management	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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FOOD AND INDUSTRIAL MICROBIOLOGY

UNIT– I: Importance of Food Microbiology

Intrinsic and Extrinsic **Factors affecting microbial growth in food**, Features of Food Spoilage in Vegetables, Cereals and Milk.

UNIT– II: Food Preservation Techniques

Asepsis, Low temperature, High temperature and Irradiation – Radicidation, Radappertization and Radurization, Chemicals, Food Borne Infections –Botulism, Food borne intoxications – Mycotoxicosis, Fermented foods – Sauerkraut – A brief account.

UNIT– III: Fermentor

Basic design and parts –types – Air lift, CSTR, tower and packed bed bioreactors. Upstream process – inoculum preparation – buildup production – Fermentation types – batch, fed batch and continuous, Downstream process.

UNIT– IV: Microbial Synthesis of Industrial products

Antibiotic (Penicillin) Amino acids (Glutamic Acid) Vitamin (Vitamin B12), Solvent (Ethanol) **organic acid (Citric Acid)**. Detection and Assay of Fermentation products (Biological Assay).

UNIT– V: Biosafety and Regulations

BioSafety levels, Guidelines and Regulations and FSSAI. Quality Assurance and Quality Control of Fermented Products–HACCP.

TEXT BOOKS:

1. Frazier, W. C., Westhoff, D. C. (2014). *Food Microbiology*. 5th edition India: Tata McGraw–Hill.
2. James M. Jay. (2012). *Modern Food Microbiology*. Netherlands: Springer Netherlands.
3. K Vijaya Ramesh · (2019). *Food Microbiology*. N.p., MJP Publisher.
4. Adams, M. R., Moss, M. O., & Moss, M. O. (2000). *Food Microbiology*. 2nd Edition Royal society of chemistry.
5. Suresh, K. (2010). 1st Edition. *An Introduction to Industrial Microbiology*. S. Chand Publishing., India.

REFERENCE BOOKS:

1. Waites, M. J., Rockey, J. S., Higton, G., Morgan, N. L. (2013). *Industrial Microbiology: An Introduction*. Germany: Wiley.
2. Crueger, W., Crueger, A. (2017). *Crueger's Biotechnology: A Textbook of Industrial Microbiology*. India: MedTech.
3. Jay, J. M., Loessner, M. J., & Golden, D. A. (2008). 7th edition *Modern Food Microbiology*. Springer Science & Business Media.
4. Lee, S. Y., Nielsen, J., & Stephanopoulos, G. (2016). *Industrial Biotechnology: Products and Processes*. Volume 4. John Wiley & Sons.
5. Rahman, M. S. (Ed.). (2007). *Handbook of Food Preservation*. 2nd Edition CRC press.



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DIGITAL TOOLS:

1. <https://www.slideshare.net/davidmbwiga1990/lecture-3-intrinsic-and-extrinsic-factors>
2. <https://www.onlinebiologynotes.com/food-preservation-from-microbial-spoilage-principle-and-methods/>
3. https://www.brainkart.com/article/Fermentors_41001/
4. <https://www.slideshare.net/AbhijitDebnath143/production-of-penicillin-citric-acid-vit-b12-glutamic-acid-griseofluvin>
5. <https://microbiologynote.com/citric-acid-production/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	3	1	3	2
CO2	3	2	1	3	2	2
CO3	2	3	2	3	1	3
CO4	3	2	3	2	1	2
CO5	2	3	2	1	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. K. RAGHAVAN



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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10% Revision

COURSE CODE	COURSE TITLE	ATEGORY	T	P	REDITS
21UMBCP3	CORE PRACTICAL–III	CORE – 10 PRATICAL	–	5	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

The Core practical–III provides practical training to the students in the fields of Medical Microbiology, Immunology, Soil and Agricultural Microbiology.

COURSE OBJECTIVES:

To enable the students

- learn the practical concept on isolation and identification of organisms.
- portray the process of sterilization and antibiotics sensitivity tests.
- outline the role of bacteria, its quantification and methods in isolation.
- emphasize the importance of Nitrogen fixing bacteria and phosphate solubilising bacteria by its isolation from leguminous plants and soil.
- competently perform serological diagnostic tests and identify blood groups.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	acquire technical skills on identification of pathogenic bacteria and antibiotics sensitivity tests.	Upto K3
CO 2	understand the practical concept on isolation and classification of significant soil microbes.	Upto K3
CO 3	be aware of various immune cells and enumerate them.	Upto K3
CO 4	knowledgeably execute serological diagnostic assays.	Upto K3
CO 5	obtain technical skills on Food and Industrial Microbiology.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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CORE PRACTICAL – III

MEDICAL MICROBIOLOGY

1. Antibiotic susceptibility test: Kirby Bauer Disc Diffusion method
2. Isolation of pathogenic bacteria from clinical specimens: Staphylococcus, Streptococcus, Salmonella, Vibrio

SOIL AND AGRICULTURAL MICROBIOLOGY

1. Isolation and enumeration of soil microbes.
2. Identification of bacterial pathogen in paddy and vegetable crops (field study)
3. Isolation of nitrogen fixing bacteria–Rhizobium, Azotobacter
4. Isolation of phosphate solubilizing bacteria– Pseudomonas
5. Examination of mycorrhizae–VAM
6. Potability testing of water(MPN test)

IMMUNOLOGY

7. Lymphoid organs in experimental animals–mouse/rat/rabbit – Theoretical explanation only.
8. Bleeding techniques – Capillary puncture and Vein puncture.
9. Separation of serum/plasma
10. Erythrocyte Sedimentation Rate (ESR)
11. Blood cell count: RBC count, WBC count–total and differential
12. Blood typing: ABO, Rh

13. Agglutination tests: Widal test

14. Precipitation: Ouchterlony Double Immune Diffusion

FOOD AND INDUSTRIAL MICROBIOLOGY

15. Examination of different food samples.
16. Methylene blue reduction test (MBRT).
17. Alcohol (Ethanol) production using Vitis vinifera.
18. Immobilization of Yeast

TEXT BOOKS:

1. **James G. Cappuccino, Natalie Sherman.** (2013). *Microbiology: A Laboratory Manual*, 10th Ed., Pearson Benjamin Cummings publications, San Francisco.
2. **William Claus. G.W.** (1989). *Understanding Microbes – A Laboratory textbook for Microbiology*, W.H. Freeman and Co., New York.
3. **Dubey, R.C. & D.K. Maheshwari.**(2010). *Practical Microbiology*, S. Chand & Co Pvt Ltd, New Delhi.
4. **Aneja K.R.**(2003). *Experiments in Microbiology, Plant pathology, Tissue culture and Mushroom cultivation*, New Age International Publishers, New Delhi.
5. **Anuradha** (2020). *Practical and Applied Microbiology*, 5th Ed., CBS Publishers & Distributors Pvt. Ltd, India.



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REFERENCE BOOKS:

1. Rangasamy, G and Bagyaraj, D.J. (1993). *Agricultural Microbiology*, 2nd Ed., Prentice–Hall Publications, India.
2. Hleyn Bicknell and Gilstrap.(2001). *Microbiological Experiments: A Health Science perspective*, McGraw–Hill Inc., USA.
3. Kannan. N (2002). *Laboratory Manual in General Microbiology*, Palani Paramount Publications, Palani.
4. Rajan. S and Selvi Christy. (2018). *Experimental Procedures in Life Sciences*, CBS Publishers & Distributors Pvt. Ltd, India.
5. Atlas R.M. (1987). *Microbiology– Fundamentals and Applications*, Macmillan Publishing Company, New York.

DIGITAL TOOLS:

1. <https://in.coursera.org/lecture/antimicrobial-resistance/lecture-7-antimicrobial-susceptibility-testing-SDQ3D>
2. <https://www.youtube.com/watch?v=m9FzmL0Zs3A>
3. <https://www.youtube.com/watch?v=KYSRjtYjiHA>
4. <https://www.youtube.com/watch?v=JzGW9PovzGg>
5. <https://youtu.be/f4MiHUIi2k>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	2	3
CO2	3	3	3	3	3	3
CO3	2	1	3	2	3	3
CO4	2	2	3	3	3	3
CO5	3	3	3	2	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. A. R. SARANYADEVI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

40% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMBE51	COMPUTER APPLICATION IN BIOLOGY	ELECTIVE – 1	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

Computer application in biology involves in the application of computational modeling techniques. It is the fundamental theory and programming in the context of problem solving in biology. This course teaches the basic operating system of a computer which help to understand the key concept of bioinformatics.

COURSE OBJECTIVES:

The goal of this study is to make the students

- learn how to operate a computer with basic knowledge.
- understand the Hardware, Software and languages of computer.
- gain the basic knowledge about internet bioinformatics related tools and gene sequences.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	acquire the knowledge on the basic of computer – History, components and devices of a computer.	Upto K3
CO 2	understand and operate the computer –Word, Excel, Power point and accesses internet.	Upto K3
CO 3	gain the knowledge about the basic and recent languages of computer–BASIC– FORTRAN	Upto K3
CO 4	know about the application of computer in biology using phylogenetic tree construction and its methods	Upto K3
CO 5	understand about the sequence analysis using different software packages– BLAST–FASTA	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COMPUTER APPLICATION IN BIOLOGY

UNIT– I: Introduction to Computer

History and Generation of computer, Components of computer, Block diagram of computer – Binary number system of computer – Input and output devices of computer – storage devices of computer – Types of computer.

UNIT– II: Operating System

Layers of OS – Types and function of OS. Applications of computer – Word, Excel, Power point & Photoshop. **Network Topology – LAN, WAN, MAN. Web browsers – Search Engines, Internet connections, Web pages and E-mail.**

UNIT– III: Computer Languages

BASIC, COBOL, JAVA, **FORTRAN** and **ALGOL** (Definition and applications only), Applications of Software – Algorithms. **Python, Machine learning in Microbiology (A brief account).**

UNIT– IV: Phylogenetic Analysis

Steps in Phylogenetic analysis – Phylogenetic Tree Construction Methodologies – Distance Matrix and Character Based Methods – Types – Definition Only– Structural Prediction – Software for Biomolecular Structure Prediction – MFOLD, Vienna RNA Package – Methods of Structure Prediction – Chou – Fasman Method, GOR Method, Neural Networks and PhD – Brief descriptions only, Digital Biostatistical analysis – Basic, Intermediate and Advance level Biostatistical Packages – examples.

UNIT– V: Similarity Search

Introduction, Sequence Alignment – Pairwise and Multiple Alignments, Global Vs. Local Alignments, Sequence Comparison – Database Search – BLAST, PSI-BLAST, BLAST–N, BLAST–P and WU-BLAST, FASTA and **SPLASH –Brief descriptions only.**

TEXT BOOKS:

1. Peter Norton, *Introduction to Computers*, 6th Ed., Tata McGraw Hill Publications.
2. Robert Ransom, Raymond J. Matela, *Computer Graphics in Biology*, 2012. British library cataloging in publication data
3. P. K. Singh, *Computer Fundamentals*. 2015. V K Global Publications.
4. Ignacimuthu. S, *Basic Bioinformatics*, 2005, Narosa Publishing House Pvt. Ltd.
5. Attwood. T. K and Parry Smith. D.J. 1999. *Introduction to Bioinformatics*, Pearson Education Asia



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SYLLABUS

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REFERENCE BOOKS:

1. Rajadurai M., *Bioinformatics – A Practical Manual*, PSB Book Enterprises.
2. Martin J. Bishop, *Genetics Databases*, II Ed. Academic Press Publications
3. *Mapping And Sequencing*, The Human Genome National Research Council, Division On Earth And Life Studies, Commission On Life Sciences · 1988. National Academic Press.
4. *Computer Programming in Fortran*, V. Rajaraman. 4th Edition. Printice Hall Of India Pvt. Ltd.
5. *Developing Bioinformatics Computer Skills*. Cynthia Gibas, Per Jambeck, Lorrie Lejeune · 2001. O'Reilley & Associates

DIGITAL TOOLS:

1. https://www.tutorialspoint.com/basics_of_computers/basics_of_computers_introduction.html
2. <https://www.genscript.com/tools.html>
3. <https://bip.weizmann.ac.il/education/course/introbioinfo/03/lect12/phylogenetics.pdf>
4. <https://www.encyclopedia.com/science/encyclopedias-almanacs-transcripts-and-maps/development-computer-languages-and-programmers>
5. <https://synbio-tech.com/bioinformatics-tool/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	1	3	2	2
CO2	2	2	1	2	2	3
CO3	1	1	3	2	2	3
CO4	3	1	2	2	3	3
CO5	3	2	2	2	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. V. SELVI



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SYLLABUS

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40% Revision

COURSECODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMBE52	BIOREMEDIATION	ELECTIVE – 1	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course will help the students to gain the knowledge about the environment and the basic microbiological information. It also helps to reduce the pollution and toxic free environment and remove or utilizing the pollutants from the environment. The main *objective* of this course was to gain knowledge about the benefits of bioremediation include lower costs and less disruption of the contaminated environment.

COURSE OBJECTIVES:

To enable the students

- reduce toxicity in the environment.
- receive scientific information about bioremediation and hazardous waste in water and soil environment.
- gain the basic knowledge of different types of pollution occur in the environment and prevent the environment from pollutants.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	receive knowledge of bioremediation and technologies.	Upto K3
CO 2	gain expertise on different types of pollutions.	Upto K3
CO 3	gain knowledge on the accumulation of various gaseous in the environment.	Upto K3
CO 4	explain about the major environmental contaminants– Organic and industrial Waste	Upto K3
CO 5	explain the importance of waste water treatment and impact of using microbes in treatment.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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BIOREMEDIATION

UNIT– I: Bioremediation

Biodegradation – **Biotransformation– Definition. Application and advantages of bioremediation. Bioremediation constraints and priorities. Factors affecting bioremediation.**

UNIT– II: Pollutions

Types of pollutants – **Water (Fresh and marine water), Soil and Air – Sources of pollution and their impact on environment.**

UNIT– III: Environmental Pollution (Air and Water) and Contaminants

Recalcitrant compounds and pollutant – Categorization of contaminants– Carbon, Hydrogen and Sulphur content and density effects on the environment.

UNIT– IV: Bioremediation of Contaminants

- a) Organic waste – Nature and decomposition – Mineralization and Immobilization – Microbes involved – Anaerobic decomposition of organic Matter.
- B) Waste water – Environmental Impact
- C) Industrial waste water – Types and component, Effects, Conventional strategies for waste water management.

UNIT– V: Treatment and Disposal of Waste Waters

Domestic sewage –Primary, Secondary and Tertiary treatment – Microbes in waste water treatment.

TEXT BOOKS:

1. Rajendran. P and Gunasekaran P, 2006. *Microbial Bioremediation*.
2. Amitava Rakshit, Manoj Parihar, Binoy Sarkar, *Bioremediation Science: From Theory to Practice*, 2021. CRC PRESS.
3. Ram Chandra, *Advances in Biodegradation and Bioremediation of Industry*, 2015. CRC PRESS.
4. Ram Naresh Bharagava *Environmental Pollutants and their Bioremediation Approaches*, 2017. CRC PRESS
5. Naofumi Shiomi, *Advances in Bioremediation of Wastewater and Polluted Soil*, 2015. CRC PRESS

REFERENCE BOOKS:

1. Atlas. R and Bartha R 2003, *Microbiology Ecology*, 2nd Ed., Pearson Education Publications.
2. *Microbial Bioremediation & Biodegradation*, Maulin P. Shah, 2020. Springer Nature Singapore PVT Ltd.
3. *Environmental Pollution*, S.M. Shafi · 2005. Atlantic Publishers and Distributors
4. *The Science of Environmental Pollution*, Frank R. Spellman · 2021. Library of Congress Cataloging in Publication Data
5. *Handbook of Water and Wastewater Treatment Technologies*, Nicholas P Cheremisinoff · 2002. Butterworth and Heinemann



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DIGITAL TOOLS:

1. <https://www.renewableresourcescoalition.org/pollution-causes-effects/>
2. <https://microbiologynote.com/bioremediation/>
3. <https://www.intechopen.com/books/wastewater-treatment-engineering/biological-and-chemical-wastewater-treatment-processes>
4. <https://www.epa.gov/sites/default/files/2019-02/documents/emerging-tech-wastewater-treatment-management.pdf>
5. <https://pubs.acs.org/doi/abs/10.1021/acs.est.5b00715>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	3	3	3
CO2	2	3	2	3	3	2
CO3	2	3	1	2	3	3
CO4	2	3	3	2	3	3
CO5	3	2	3	2	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. V. SELVI



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SYLLABUS

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100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMBE53	FERMENTATION AND BIOPROCESS TECHNOLOGY	ELECTIVE – 1	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course emphasizes the fermentation and bioprocess technologies. It's the scientific study of the fundamentals, development, implementation and the operation of bioprocesses in the production process in large scale industries. The Primary and Secondary metabolites of various substance produced during the mass cell production. Control of biomass production using computer enrich the knowledge of computer application in the industries.

COURSE OBJECTIVES:

- To make the students learn the fermentation process and bioreactors
- To make the students understand the basic knowledge of production process techniques
- To make the students gain the basic knowledge to operate a computer in the control of biomass production in large scale industries

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	outline the concept of fermentation methods and its modes.	Upto K3
CO2	understand the knowledge of basic fermenter designs and its types.	Upto K3
CO3	explain the production process using the microorganisms	Upto K3
CO4	know about the application of commercially important Primary and Secondary metabolites process.	Upto K3
CO5	get educated to control the bioprocess using computer application skills.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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FERMENTATION AND BIOPROCESS TECHNOLOGY

UNIT-I: Fermentation Methods

Advantages and modes of fermentation techniques –Batch, Fed batch and continuous fermentation

UNIT- II: Bioreactors

Designs –Types of bioreactors – Airlift, CSTR, and **Bubble column bioreactor.**

UNIT- III: Industrial Fermentation Production Process

Antibiotic (Penicillin), **Vitamins (VitaminB12)**, Solvent (Ethanol).

UNIT- IV: Biomass Production

Steps in bioprocess, Primary and Secondary metabolites, Enzymes and microbial cells production.

UNIT- V: Uses of Computer in Bioprocess

Instrumentation and control of bioprocess, Computer application in the control of bioprocess, Advantage and disadvantage of bioprocess techniques.

TEXT BOOKS:

1. Patel A.H.1985. *Industrial Microbiology*, Macmillan India Pvt. Ltd.Cassida, 1994.
2. Aydin Berenjian, 2019. Springer Nature Switzerland PVT Ltd.
3. *Principles and Applications of Fermentation Technology*, Vinay Sharma, Arindam Kuila · 2018. Scrivener publishing.
4. *Fermentation Technology*, Ray Medina, 2019. ED-TECH Press
5. *Bioreactors: Sustainable Design and Industrial Applications*, Lakhveer Singh, Abu Yousuf, Durga Madhab Mahapatra, 2020. Library of Congress Cataloging in Publication Data

REFERENCE BOOKS:

1. Young M.M.2004. *Comprehensive Biotechnology, Principles and Applications and Regulations of Biotechnology in industry, Agriculture and Medicine*, Vol – 1,2,3 and 4. Reed Elsevier Pvt. Ltd.
2. Stanbury, P.F., Whitaker, A and Hall, S.J. 1995. *Principles of Fermentation Technology*.2nd Ed., Elsevier India Pvt. Ltd.
3. *Principles of Fermentation Technology* Peter F. Stanbury, Allan Whitaker, Stephen J. Hall · 2013. library cataloging in publication data.
4. *Fermentation Microbiology and Biotechnology*, Second Edition, E. M. T. El-Mansi, C. F. A. Bryce, Arnold L. Demain · 2006. Taylor & Francis.
5. *Microbial Technology: Fermentation Technology*, H. J. Peppler, D Perlman· 2014. 2nd vol. Academic Press.

DIGITAL TOOLS:

1. <https://www.sartorius.com/en/products/fermentation-bioreactors>
2. <http://www.biologydiscussion.com/biotechnology/bioprocess-technology/primary-metabolites-secondary-metabolites-and-bioconversions/10126>
3. <https://www.learninsta.com/industrial-production-of-penicillin/>
4. <https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/>
5. <https://www.masterclass.com/articles/what-is-fermentation-learn-about-the-3-different-types-of-fermentation-and-6-tips-for-homemade-fermentation>



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SYLLABUS

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Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	3	3	2	3
CO2	1	2	3	2	3	3
CO3	2	3	1	3	2	3
CO4	1	2	2	2	3	3
CO5	2	2	3	2	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. V. SELVI



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SYLLABUS

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100% Revision

COURSECODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMBS51	BIOCONTROL	SBS – 5	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course highlights the concepts of biological control of insects, mites and weeds in natural and managed ecosystems. Biocontrol reduces the pest population and their impacts on the environment. Bio fertilizers can be expected to reduce the use of synthetic fertilizers and pesticides. Introducing of natural enemies to the environment are capable of sustaining themselves, often by reducing whatever pest population they are supposed to manage.

COURSE OBJECTIVES:

- To explain IPM and biopesticides
- To express the ecological, physiological and biochemical process involved in biological control.
- To outline the bacterial, fungal and viral biopesticides.
- To educate the students about the advantages of biocontrol and its applications.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the basic strategies for biological pest control agents.	Upto K3
CO 2	know about the biological interaction of predation and predators.	Upto K3
CO 3	gain the knowledge of bacteria and fungi used as a biopesticides with examples.	Upto K3
CO 4	explain about the viral biopesticides.	Upto K3
CO 5	outline natural control methods of weeds and plant Extracts.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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BIOCONTROL

UNIT– I: Pest Management

Principles of IPM, Integrated pest management – Rodent pest management – Biocontrol agents with examples, Advantages and application of biocontrol agents– Synthetic and chemical pesticides (comparison), Organic farming.

UNIT– II: Biology and Ecology of Organisms for Biocontrol

Predators, parasites and parasitoids– Nematodes.

UNIT– III: Biopesticides

Bacterial biopesticides – *Bacillus thuringensis*, *B. sphaericus*, and *Pseudomonas chlororaphis*. Fungal biopesticides, *Metarizyum Verticillium*, *Trichoderma* and *Beauveria bassiana* – potentials and limitations.

UNIT– IV: Viral Biopesticides

Nuclear Polyhedro virus, Granulosis virus, CPV and Endomopox virus– potentials and limitations.

UNIT– V: Biological Control of Weeds

Weeds management and methods of weed control– Advantages and disadvantages of biocontrol weeds – *Mycoherbicides* and *Phytophthora palmivora*. Plant extracts – Neem , Onion, Tobacco and Pudina.

TEXT BOOKS:

1. Roy G. Van Driesche and Bellows Jr. TS., *Biological Control – Guide to its applications*, Springer (1996).
2. *Hand Book of Biological Control. Principles and Application of Biological Control*. 1999. Thomas S. Bellows and T.W. Fisher
3. Kumerasan, *Biotechnology*, Saras Publication
4. *Handbook of Biological Control: Principles and Applications*. T. W. Fisher, Thomas S. Bellows, L. E. Caltagirone · 1999. Academic Press
5. *Integrated Pest Management: Current Concepts and Ecological Perspective*. Dharam P Abrol · 2013. Academic Press

REFERENCE BOOKS:

1. Helmut Fritz Van Embden and Service MW, *Pest and Vector Control*, Cambridge University Press (2004).
2. Martin. *Biological Control of Insect Pests Using Egg Parasitoids Hardcover* – 26 Aug 2013 by S. Sithanantham (Editor), Chandish R. Ballal (Editor)
3. Atlas R and Bartha R 1987. *Microbial Ecology*. 2nd Edition, Benjami Cummings Publications.
4. Sudisha Jogaiah, *Biocontrol Agents and Secondary Metabolites: Applications* , 2020. library cataloging in publication data
5. *Biopesticides: Volume 2: Advances in Bio-inoculants* Amitava Rakshit, Vijay Singh Meena, P.C. Abhilash · 2021. Woodhead publishing



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DIGITAL TOOLS:

1. <https://www.farmbiosecurity.com.au/what-is-integrated-pest-management/>
2. <https://www.frontiersin.org/articles/10.3389/fsufs.2021.619058/full>
3. https://agritech.tnau.ac.in/agriculture/agri_weedmgt_biologmethod.html
4. <https://ipm.ucanr.edu/what-is-ipm/>
5. <https://www.intechopen.com/chapters/44118>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	3	3	3	3
CO2	1	2	2	3	2	2
CO3	1	3	3	3	3	2
CO4	1	2	3	2	3	2
CO5	3	3	3	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. V. SELVI



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SYLLABUS

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10% Revision

COURSE CODE	COURSE TITLE	ATEGORY	T	P	REDITS
21UMBC61	VIROLOGY	CORE – 11	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

The Virology course offers an overview of important virus families, their replication strategies and mechanisms for development of viral infectious diseases.

COURSE OBJECTIVES:

- To provide the students an understanding of virus architecture and replication strategies.
- To help them elucidate pathogenesis of diseases caused by viruses.
- To make them gain knowledge on clinical aspects and related implications of viral diseases.
- To describe the general method of viral lifecycle to the students
- To enable them acquire knowledge on viral vaccines and antiviral drugs.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the historical development and basics of virology & assay of viruses.	Upto K3
CO 2	learn the reproductive pathway of phages.	Upto K3
CO 3	receive the knowledge about replication strategy animal viruses.	Upto K3
CO 4	analyse of the replication strategy of plant viruses.	Upto K3
CO 5	acquire knowledge about human viral infections and antiviral therapies.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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VIROLOGY

UNIT– I:

Introduction – History, Structure & Composition of Viruses, Cultivation of Viruses – Methods, Assay and Purification Methods.

UNIT– II:

Bacteriophages – Replication, One Step Growth Curve, Lytic (T4 and Lambda), and Lysogenic (P1 & Lambda) replication of bacteriophages. Filamentous phages – M13 and Q β , Structure, Replication and applications.

UNIT– III:

Animal viruses –Structure and Replication of Simion Virus 40, Herpes Simplex Virus, Adenoviruses, Poxviruses and Retroviruses.

UNIT– IV:

Plant viruses –Structure and Replication of Tobacco Mosaic Virus , Cauliflower Mosaic Virus and Cucumber Mosaic Virus, Prions and Viroids.

UNIT– V:

Human viral infections – Symptoms and Pathogenesis of Common cold, Influenza, Zika fever, Rubella, Mumps, Measles, and Chicken pox. **Antiviral drugs**, Interferons and Phage therapy.

TEXT BOOKS:

1. Dimmock, N. J., Easton, A.J and Leppard, K. N. (2016). *Introduction to Modern Virology*, 7th Ed., Blackwell Scientific Publications. Oxford.
2. Luria, S.E., Darnel, J.E., Jr., Baltimore, D. and Campbell. A, (1978), *General Virology*, 3rd Ed., John Wiley & Sons, New York.
3. Greenwood, D., Slack, R.B., and Peutherer, J.F (2007). *Medical Microbiology*, 17th Ed., Churchill Livingstone publishers, London.
4. Morag C. and Timbury M.C. (1994). *Medical Virology*, 10th Ed., Churchill Livingstone publishers, London.
5. Conrat, HF, Kimball, PC and Levy JA, (1994). *Virology*, 12th Ed., Prentice Hall, Englewood Cliff. New Jersey.

REFERENCE BOOKS:

1. Joanne Willey, Kathleen Sandman and Dorothy Wood, (2020). *Prescott's Microbiology*, 11th Ed, McGraw Hill Publications, Australia.
2. Alan J. Cann, (2015). *Principles of Molecular Virology*, 6th Ed., Academic Press, USA.
3. John Carter, (2007). *Virology: Principles and Applications*, 1st Ed., Wiley Publications, USA.
4. Nicholas H. Acheson, (2011). *Fundamentals of Molecular Virology*, 2nd Ed., John Wiley & Sons Inc., New York.
5. Balasubramanian, A. and Senthil kumar, P.K, (2017). *Medical Microbiology*, Darshan Publication, Rasipuram.



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DIGITAL TOOLS:

1. <https://microbenotes.com/category/virology/>
2. <https://www2.nau.edu/~fpm/bio205/Sp-08/Chapter-06.pdf>
3. <https://paramedicsworld.com/microbiology-notes/virology-notes/medical-paramedical-studynotes>
4. <https://www.ncbi.nlm.nih.gov/books/NBK8098/>
5. <https://microbiologynotes.org/virology-introduction-virus-classification-and-viral-diseases/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	3	3	2
CO2	2	2	2	2	1	1
CO3	2	3	2	2	2	2
CO4	2	2	2	2	2	2
CO5	3	3	3	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. A. R. SARANYADEVI



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

10% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMBC62	BIOCHEMISTRY AND ENZYMOLOGY	CORE – 12	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course gives knowledge about the basic biochemistry concepts and metabolic pathways.

COURSE OBJECTIVES:

To make the students

- study the structure and composition of biomolecules
- acquire knowledge in carbohydrate and fat metabolism
- understand the structure of proteins
- comprehend the nomenclature and function of enzymes
- explore the applications of enzymes in large scale

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand structure and composition of biomolecules	Upto K3
CO 2	outline the carbohydrate and fat metabolism	Upto K3
CO 3	summarise the structure of proteins	Upto K3
CO 4	differentiate enzymes based on their function	Upto K3
CO 5	highlight the use of enzymes in industrial sector	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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BIOCHEMISTRY AND ENZYMOLOGY

UNIT– I: Bioenergetics

Water and Life – pH and Buffers; Laws of Thermodynamics, Oxidation and Reduction reactions – Redox potential, Free energy – Exothermic and Endothermic reactions.

UNIT– II: Carbohydrates and Lipids

Carbohydrates – Classification and Physical and Chemical properties (brief); Carbohydrates pathway – Glycolysis, TCA Cycle, Oxidative Phosphorylation; Lipids and Fatty acids – Classification – Physical and Chemical properties (brief), Fatty acid Biosynthesis and Oxidation (β -Oxidation), **Normal values of Blood glucose level.**

UNIT– III: Amino Acids and Proteins

Amino acids – Classification – Properties – Biosynthesis (Glutamic acid and Lysine); Proteins – Classification and Structure – Primary, Secondary, Tertiary and Quaternary, **Normal values of Urea and Creatinine.**

UNIT– IV: Enzyme Kinetics

Enzymes – Nomenclature, Classification and Properties, Steady State Kinetics and derivation of Michaelis–Menten equation and Lineweaver Burk Equation plot. Mechanism and action of enzymes–Lock and Key model.

UNIT– V: Regulatory Enzymes

Allosteric enzymes –Aspartate transcarbamylase – Multienzyme Complex – Pyruvate Dehydrogenase, Extraction and Purification of Enzymes, Applications of Enzymes (Clinical & Industrial).

TEXT BOOKS:

1. Lehninger, A. L., Nelson, D. L., Cox, M. M. (2013). *Lehninger principles of biochemistry*. 6th Edition, United Kingdom: W. H. Freeman.
2. Berg, J. M., Gatto, G. J., Stryer, L., Tymoczko, J. L. (2015). *Biochemistry*. United States: W. H. Freeman.
3. Satyanarayana, U. (2021). *Biochemistry*, 6e–E–book. Elsevier Health Sciences.
4. Branden, C. I., & Tooze, J. (2012). *Introduction to protein structure*. 2nd Edition Garland Science.
5. Jain, J. L. (2018). *Fundamentals of biochemistry*. 7th Edition, S. Chand Publishing.

REFERENCE BOOKS:

1. Palanivelu, P. (2000). *Analytical Biochemistry and Separation Techniques*, 3rd Ed., 21st Century Publications.
2. Kennelly, P. J., Botham, K. M., McGuinness, O., Rodwell, V. W., & Weil, P. A. (2022). *Harper's illustrated biochemistry*. 31st Edition, McGraw Hill Professional.
3. Okotore, R. O. (2015). *Essentials of Enzymology*. 1st Edition, Xlibris Corporation.
4. Voet, D., & Voet, J. G. (2010). *Biochemistry*. 4th Edition, John Wiley & Sons.



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

5. Lundblad, R. L., & Macdonald, F. (Eds.). (2018). *Handbook of Biochemistry and Molecular Biology*. 5th Edition CRC press.

DIGITAL TOOLS:

1. <https://www.sfu.ca/~mbahrami/ENSC%20388/Notes/Intro%20and%20Basic%20Concepts.pdf>
2. <https://www.osmosis.org/learn/Glycolysis>
3. <https://wou.edu/chemistry/courses/online-chemistry-textbooks/ch450-and-ch451-biochemistry-defining-life-at-the-molecular-level/chapter-2-protein-structure/>
4. <https://microbenotes.com/enzymes-properties-classification-and-significance/>
5. <https://www.docsity.com/en/allosteric-enzymes-biochemistry-lecture-slides/721578/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	2	2	2
CO2	2	3	3	2	3	1
CO3	3	2	3	3	1	2
CO4	2	3	2	1	2	3
CO5	1	1	2	1	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. K. RAGHAVAN



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

55% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMBC63	rDNA TECHNOLOGY	CORE – 13	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course offers tools and techniques employed in rDNA Technology.

COURSE OBJECTIVES:

To enable the students

- understand the use of tools and techniques for manipulation and analysis of genes.
- gain the knowledge of the different types of vectors
- understand the construction of libraries
- comprehend the different techniques for the screening of clones.
- get exposed to the applications of recombinant technology.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the principles, methods and tools associated with recombinant technology.	Upto K3
CO 2	characterize the events in cloning.	Upto K3
CO 3	perceive the methods of the construction of libraries	Upto K3
CO 4	understand the different techniques for the selection of clones	Upto K3
CO 5	learn the various applications of recombinant DNA technology.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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rDNA TECHNOLOGY

UNIT – I: Introduction to Gene Manipulation

Common Steps involved in rDNA technology; Restriction– Modification System– Types of Restriction Endonucleases– Properties and Applications–Nomenclature. Recognition sequences; Cleavage Patterns; DNA manipulative enzymes– Nucleases, Ligases, Polymerases, Manipulative enzymes– Alkaline phosphatase, Polynucleotide kinase, Terminal transferase. Linkers and Adaptors

UNIT – II: Cloning Vectors

Characteristics of an ideal vector–Plasmids – pBR 322 and pUC vectors, Cosmids, Bacteriophages– λ Bacteriophage– Insertion vectors– λ gt10, Replacement vectors– EMBL4, Prokaryotic Expression Vectors, Broad–Host Range and Shuttle vectors, Eukaryotic vectors – YAC vectors.

UNIT – III: Cloning and Strategies

Cloning in *Escherichia coli* and *Bacillus*. **DNA Amplification–PCR and DNA sequencing– Sanger method and Maxam–Gilbert method;** Construction and Screening of Genomic library and cDNA library.

UNIT – IV: Methods for Clone Identification

Recombinant Selection– Blue/White, Blotting – Southern, Colony and Plaque **Hybridization and Immunological detection method.**

UNIT – V: Applications of Recombinant DNA Technology

A) Agricultural – Ti Plasmid and their uses B) Pharmaceutical Industries: Production of Insulin, Interferon, Growth Hormone and **Blood Clotting factors from microorganisms.** C) Protein Engineering D) Drug discovery and Drug development (a brief account) and E) Transgenic Plants (Insect resistant) and animals (Sheep). Biohazards and Biosafety (a brief account).

TEXT BOOKS:

1. Brown, T.A. (2010), *Gene Cloning and DNA Analysis–An Introduction*, 6th edn. Blackwell Science
2. Sandy B. Primrose and Richard Twyman, 2006. *Principles of Gene Manipulation and Genomics*, 7th Ed, 2006, Blackwell Publishing.
3. Sathyanarayana U., 2008, *Biotechnology*, 2nd Ed., Arunabha Sen Books and allied Publications Limited.
4. Desmond S.T. Nicholl, *An Introduction to Genetic Engineering*, 3rd Edition, Cambridge University Press, 2012.
5. K.Rajagopal, *Recombinant DNA Technology and Genetic Engineering*, TATA McGraw Hill, 2012.

REFERENCE BOOKS:

1. Bourgaize jewell. Buiser. *Biotechnology–Demystifying the Concepts*– Pearson Education.
2. Helen kraizer and Adrienne Massey– *Recombinant DNA Technology– A Guide for Teachers*. 2nd Ed.
3. Glick B.R and Pasternak. J.J *Molecular Biotechnology*, 2nd Ed, 2003. ASM press.
4. William J. Thieman Michael A. Palladino, *Introduction to Biotechnology* 3rd Edition, 2014, Pearson Education Ltd.
5. Jermy W. Dale and Malcolm Won Schantz, *From Gene to Genomes, Concepts and Application of DNA Technology*, 2007, John Wiley & Sons Ltd.



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SYLLABUS

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DIGITAL TOOLS:

1. <https://bio.libretexts.org/Bookshelves/Genetics>
2. Blue white screening– <https://youtu.be/VocpyyrmVpA>
3. <https://youtu.be/3oGrVSTJa8I>
4. <https://www.biologydiscussion.com/genetics/construction-of-genomic-library-genetics/71924>
5. cDNA library– <https://youtu.be/FtNreXY7poA>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	1	2	3
CO2	3	2	1	1	2	3
CO3	2	2	2	1	3	3
CO4	1	2	3	2	2	3
CO5	3	3	3	1	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. N. B. SHARMILA



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

60% Revision

COURSECODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMBE61	BIOINFORMATICS	ELECTIVE – 2	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

Bioinformatics is an interdisciplinary field of Science that deals with biological information. It is the computer aided study of biological data. This course helps to develop research and development skill. It also focuses the application of computational methods of biological data analysis and usage of software. Students can obtain the essential qualities necessary for success in a rapidly changing technological environment.

COURSE OBJECTIVES:

- To enhance the students' knowledge of the basic principles and concepts of biology, computer science and mathematics.
- To help them identify and apply logic skills of gene sequence molecular modeling and determine their function.
- To introduce the various scientific journals which help them augment their thirst for research interest.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	know about the basics of Bioinformatics and data information.	Upto K3
CO 2	know about sequence analysis , similarities using different software	Upto K3
CO 3	strongly understand the data storage methods and drug discovery.	Upto K3
CO 4	receive updated information about the recent journals enhance the quality of students	Upto K3
CO 5	enlarge the knowledge on the application of computer.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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BIOINFORMATICS

UNIT-I: Introduction to Bioinformatics

Scope of Bioinformatics – Biological Databases– Types of Databases– Primary (EMBL), Secondary (PDB) and composite databases, Proteinsequence databases (SWISS PROT) – Application of Bioinformatics.

UNIT-II: Sequence Analysis

Basic concepts of sequence similarity, identity and homology (Definition only) – Gene prediction method, RNA fold analysis – GEN BANK, CLUSTALW

UNIT-III: Data Storage

File format, Data Transfer, 3D structure visualize structure – RASMOL – Molecular modeling, Ramachandran Plot.

UNIT-IV: Biological Websites

PubMed, Medline, Science daily, Microbiology online, Science Journals, Google scholar, Reference Manager, Science direct, Springer – ISSN, ISBN and Impact factor.

UNIT-V: Accessing Information Through Internet

Bionet Newsgroups– WWW Software –HTTP and HTML. **Plagiarism and paraphyses Tools.**

TEXT BOOKS:

1. Hooman H. Rashidi and Lukas K. Buehler, *Bioinformatics Basics – Applications in Biological Science and Medicine*, CRC Press, Washington D. C.
2. Ignacimuthu. S 2005, *Basic Bioinformatics*, Narosa Publishing house, Pvt. Ltd.
3. Attwood T. K and Parry Smith. D.J. 1999. *Introduction to Bioinformatics*, Pearson Education Asia.
4. Andreas D. Baxevanis, B. F. Francis Ouellette, *Bioinformatics: A Practical Guide to the Analysis of Genes*. 2004. Vol-3. Second Edition. Wiley Publication.
5. Supratim Choudhuri, *Bioinformatics for Beginners: Genes, Genomes, Molecular*, 2014. Academic Press

REFERENCE BOOKS:

1. Jin Xiong, *Essential Bioinformatics*, Cambridge Publications.
2. Arthur M. Lesk, *Introduction to Bioinformatics*, Oxford University Press.
3. Arthur M. Lesk, *Introduction to Bioinformatics*. Oxford University Press–2003.
4. Prakash S. Lohar. *Bioinformatics*. 2009 MJP Publications.
5. S. Harisha *Fundamentals of Bioinformatics*. 2013. International Publication Data.

DIGITAL TOOLS:

1. <https://www.chtips.com/computer-fundamentals/block-diagram-of-computer-system>
2. <https://www.ncbi.nlm.nih.gov/pubmed/>
3. <https://onlinelibrary.wiley.com/>
4. <https://www.geeksforgeeks.org/types-of-biological-database-in-bioinformatics/>
5. <https://thebiologynotes.com/biological-databases-types-and-importance/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	3	2	3	3
CO2	2	2	3	1	3	2
CO3	2	1	2	3	3	3
CO4	3	3	3	3	3	3
CO5	3	2	3	2	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. V. SELVI



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMBE62	BIOTECHNOLOGY	ELECTIVE – 2	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course will explore the principles and applications of recombinant DNA technology.

COURSE OBJECTIVES:

- To describe the methods and tools in biotechnology
- To elucidate the methods involved in animal and plant biotechnology.
- To make the students acquire the knowledge on various applications of Biotechnology.
- To guide the students learn to define the various forms of intellectual property and the organisations involved.
- To make the students learn the biosafety levels and good laboratory practices for quality management

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the different tools and methods are employed in the laboratory for manipulation of DNA	Upto K3
CO 2	become familiar with various cloning strategies in prokaryotes and eukaryotes	Upto K3
CO 3	become familiar with the methods of Plant and Animal Tissue Culture and their applications and highlight the design and working mechanism of bioreactor	Upto K3
CO 4	become aware of the various biological applications for Human Welfare.	Upto K3
CO 5	understand the importance of IPR, the social and ethical issues concerning biological materials.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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BIOTECHNOLOGY

UNIT-I: Introduction to Genetic Engineering

DNA manipulative and modification enzymes; Cloning and Expression vectors; Gene Cloning strategies.

UNIT-II: Animal Biotechnology

Animal cell culture, culture media – Primary culture and Cell Lines, Tissue Engineering. Transgenic animals and their applications – Knockout mice, Transgenic cattle, Transgenic sheep.

UNIT-III: Plant Biotechnology

Plant tissue culture – media – applications, gene transfer mechanism. Transgenic plants – insect resistance, virus resistance, herbicide resistance.

UNIT-IV: Biotechnology for Human Welfare

Medical Biotechnology – Gene Therapy, Diagnosis and Medical Forensics, Pharmaceutical products, Recombinant vaccines, Monoclonal Antibodies.

UNIT-V: Intellectual Property Rights

GATT and IPR, different forms of IPR, IPR in India, patent co-operation treaty, forms of patents, process of patenting, Indian and international agencies involved in patenting, patenting biological materials. Biosafety – Biosafety cabinets and their types. Bioethics – Bioethical issues and conflicts in developing the GMOs.

TEXT BOOKS:

1. Dubey, R. C. (2007). *A Text book of Biotechnology*, 5th edition. New Delhi: S.Chand & Company Ltd.
2. Satyanarayana, U. (2010). *Biotechnology*, 1st edition. Kolkata: Books and Allied (P)Ltd.
3. Ashish S. Verma, Anchal Singh, *Animal Biotechnology: Models in Discovery and Translation*, 2020. Library of Congress in Publication Data.
4. Birbal Singh, Gorakh Mal, Sanjeev K. Gautam, *Advances in Animal Biotechnology*, 2019. Springer.
5. Mitchell L. Gaynor, MD, *The Gene Therapy Plan*: Penguin Books, 2016.

REFERENCE BOOKS:

1. Brown T.A., *Gene Cloning and DNA Analysis*. 2nd Edition, ASM press. (2004).
2. Sandy Primrose. *Principles of Gene Manipulation and Genomics*. 7th Ed., Blackwell Publishers. (2006).
3. Glick B.R and Pasternak. J.J, *Molecular Biotechnology*, 2nd Ed. ASM press. (2003).
4. C. Neal Stewart, Jr. *Plant Biotechnology and Genetics*, 2016. John Wiley and Sons. 2016.
5. Desmond S. T. Nicholl, *An Introduction to Genetic Engineering*, 2nd Ed., Cambridge University Press, 2002.

DIGITAL TOOLS:

1. Blue white screening– <https://youtu.be/VocpyyrmVpA>
2. <https://youtu.be/3oGrVSTJa8I>
3. <https://www.biologydiscussion.com/genetics/construction-of-genomic-library-genetics/71924>
4. cDNA library– <https://youtu.be/FtNreXY7poA>
5. <https://patienteducation.asgct.org/gene-therapy-101/gene-therapy-basics>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	3	1	3	2
CO2	2	3	2	3	2	2
CO3	2	3	2	3	1	3
CO4	3	2	1	2	2	2
CO5	2	3	2	1	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNER: Prof. N. B. SHARMILA



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SYLLABUS

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100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMBE63	IPR, BIOSAFETY AND BIOETHICS	ELECTIVE – 2	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course exposes the importance of the Intellectual Property Rights, Biosafety and Bioethics of the GMOs.

COURSE OBJECTIVES:

To enable the students

- understand the need for protection of the genetically modified organisms and product development.
- understand the different norms such as patents, trade secrets, copy rights and industrial design rights which are collectively called as intellectual property rights (IPR).
- analyse the importance of the role of biological containment in research, production and release of GMO's.
- understand and implement the containment by Biosafety cabinets of which there are various levels each specific for particular functions.
- acquire the knowledge on bioethical issues in various biological fields.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	acquire knowledge on intellectual property rights and their implications in biological research and product development.	Upto K3
CO 2	understand the role of regulatory agencies for the protection of biological products.	Upto K3
CO 3	acquire knowledge on Patents and filing procedures	Upto K3
CO 4	understand the implementing of Biosafety cabinets and their levels.	Upto K3
CO 5	become aware of the ethical issues involving biological organisms, biological cells, organs and materials.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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IPR, BIOSAFETY AND BIOETHICS

UNIT – I: Introduction to Intellectual Property Rights

Concepts, Patents, Types, Trademarks, Copyright & Related Rights, Industrial Design and Rights, Traditional Knowledge, Geographical Indications– importance of IPR – patentable and non – patentables – patenting life – legal protection of biotechnological inventions.

UNIT – II: Patent System

History, Indian Patent Act 1970, International Conventions and Treaties, World Intellectual Property Rights Organization (WIPO) World Intellectual Property Organization (WIPO), World Trade Organization (WTO), Paris Convention (for the protection of industrial property), Patent Cooperation Treaty (PCT), Budapest Treaty.

UNIT – III: Grant of Patent and Patenting Authorities

Types of patent applications: Ordinary, PCT, Conventional, Divisional and Patent of Addition; An introduction to Patent Filing Procedures; Patent licensing and agreement; Patent infringement – meaning, scope, litigation, case studies, Rights and Duties of patent owner.

UNIT – IV: Biosafety

Introduction; Biosafety Issues in Biotechnology; Biological Safety Cabinets & their types; Biosafety Levels of Specific Microorganisms. Biosafety Guidelines: and regulations (National and International); GMOs – Concerns and Challenges; Role of Institutional Biosafety Committees for GMO applications in food and agriculture; Environmental release of GMOs; Risk Analysis; Risk Assessment.

UNIT – V: Bioethics

Bioethical issues and conflicts in the development of GMOs, Bioethical issues in Agriculture and Health care, stem cell research, Protection of Environment and Biodiversity

TEXT BOOKS:

1. By Deepa Goel, Shomini Parashar (2013), IPR, *Biosafety and Bioethics* 1st Ed., Pearson Education, India.
2. Dubey, R. C. (2007). *A Text book of Biotechnology*, 5th edition. New Delhi: S.Chand & Company Ltd.
3. Satyanarayana, U. (2010). *Biotechnology*, 1st edition. Kolkata: Books and Allied (p)Ltd.
4. *Intellectual Property Rights*, Rajagopalan, Dr. R Radhakrishnan and Dr.S. Balasubramanian, Excel Books , 2008.
5. Karen B. Byers, Dawn P. Wooley, *Biological Safety: Principles and Practices*, 2020 Library of Congress in Publication Data.



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SYLLABUS

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REFERENCE BOOKS:

1. Glick B.R and Pasternak. J.J, *Molecular Biotechnology*, 2nd Ed. ASM press. (2003).
2. Neeraj Pandey, Khushdeep Dharni, *Intellectual Property Rights*, PHI Learning PVT LTD, 2014
3. Laboratory Biosafety Manual: Third Edition, *World health organisation staff, World Health Organization*, 2004, Library Cataloging in Publication Data.
4. M. K. Sateesh, *Bioethics and Biosafety*, Library of Congress in Publication Data, 2013
5. N. S. Sreenivasulu, *Biotechnology and Patent Law: Patenting Living Beings*, 2008 First Edition, Manupatra International Solutions.

DIGITAL TOOLS:

1. https://ris.org.in/sites/default/files/article1_v7n2.pdf
2. <https://ibkp.dbtindia.gov.in/Content/FlashPDF/IBSC%20Handbook.pdf>
3. <https://dbtindia.gov.in/guidelines-biosafety>
4. <https://www.longdom.org/scholarly/bioethics-and-biosafety-journals-articles-ppts-list-1965.html>
5. https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SBB1615.pdf

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	1	2	2	3
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CO5	2	2	3	3	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: N. B. SHARMILA



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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35% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMBE64	ANALYTICAL MICROBIOLOGY	ELECTIVE – 3	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

To study Analytical Microbiology is help to analyse and understand the innovative rapid methods available with the help of various instruments. Perform laboratory experiments using instruments is support to demonstrate and understand the basic separation techniques and its help to learning scientific and writing skills through reporting. Analytical instrumentation in microbiological research and application which includes Chromatography, Centrifuge, HPLC etc., help to analysis chemical markers used in the identification of Amino acids and Proteins etc.,

COURSE OBJECTIVES:

To enable the students

- acquire knowledge the basic separation techniques.
- gain knowledge about the pharmaceutical quality tests.
- analyse the different types of instruments which is help to separate the DNA, RNA and Proteins.
- understand the working principle and application of the instruments.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the basic knowledge of separation techniques of centrifuge.	Upto K3
CO 2	gain the knowledge of separation of Nucleic acids and purification techniques of DNA.	Upto K3
CO 3	acquire the knowledge on various separation techniques –SDS PAGE.	Upto K3
CO 4	understand the different types of chromatography techniques.	Upto K3
CO 5	find out the different types of pharmaceutical quality tests	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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ANALYTICAL MICROBIOLOGY

UNIT– I: Separation Techniques

Centrifuge– Part of Centrifuge –Working Principle, Types of Centrifuge and applications.

UNIT– II: Separation of Nucleic acids

DNA, RNA – Agarose Gel Electrophoresis, Principles, Methods and Application. **DNA purification techniques.**

UNIT– III: Protein Separation Techniques

SDS PAGE, NATIVE PAGE – Principles, Methodology and applications.

UNIT– IV: Chromatography Techniques

Thin Layer Chromatography, Paper Chromatography, High Liquid Performance Chromatography (HPLC), **GCMS, FTIR**

UNIT– V: Pharmaceutical Quality Tests

Pyrogen test, sterility test, Microbial Limit Test (MLT), Minimum Inhibitory Concentration (MIC), **Automated Biochemical Test.**

TEXT BOOKS:

1. Dube R.C.1999. *Text book of Biotechnology*, S. Chand and company.
2. Palanivelu P. 2004. *Analytical Biochemistry and Separation Technology*.
3. Elsa Lundanes, Léon Reubsæet, Tyge Greibrokk, *Chromatography*, 2013.Wiley Publications.
4. Concepts and Contrasts James M. Miller, *Chromatography*, 2005. Wiley Publications.
5. Michal Holcapek, Wm. Craig Byrdwell, *Handbook of Advanced Chromatograph/Mass Spectrometry*, 2017. Academic Press.

REFERENCE BOOKS:

1. Keith Wilson and John Walker, 1994. *Practical Biochemistry – Principles and Techniques*, 4th Ed., Cambridge University Press.
2. Hans Peter Schmauder, *Methods in Biotechnology*, 2003, Taylor and Francis.
3. Reiner Westermeier, *Electrophoresis in Practice: A Guide to Methods*, 2016. Fifth Edition. Wiley.
4. Dr Robin Martin, *Gel Electrophoresis: Nucleic Acids*, 2020. Taylor & Francis
5. Wallace Woon-Fong Leung, *Centrifugal Separations in Biotechnology*, 2020. Second Edition. Library of Congress Cataloging in Publication Data

DIGITAL TOOLS:

1. <https://druckerdiagnostics.com/knowledge/how-a-centrifuge-works/>
2. <https://www.thermofisher.com/blog/ask-a-scientist/what-is-chromatography/>
3. <https://www.khanacademy.org/science/ap-biology/gene-expression-and-regulation/biotechnology/a/gel-electrophoresis>
4. <https://apps.who.int/iris/handle/10665/39594>
5. <https://www.britannica.com/science/chromatography>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	2	3	3
CO2	3	2	3	3	3	2
CO3	2	1	2	3	2	2
CO4	3	2	2	3	3	2
CO5	2	2	3	3	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. V. SELVI



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMBE65	MYCOLOGY	ELECTIVE – 3	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course provides an understanding of general concepts of Mycology, major groups of fungi and their associations, Life cycle, Clinical manifestations, Laboratory Diagnosis and Treatment and Economic Importance of Fungi.

COURSE OBJECTIVES:

- To provide a background on the characteristics of fungi, Heterothallism and Para – sexuality.
- To make the students understand the various classes of fungi and the morphology, life cycle and the mode of transmission of various plant pathogenic fungi.
- To make the students recognize the basics of infections and epidemiology of various mycoses.
- To make the students acquire the diagnostic skills and the interpretation of tests and the treatment for different mycoses.
- To make the students gain an in – depth knowledge on the importance of fungi in Agriculture and Biotechnology.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	gain the basic knowledge on the classification of fungi, characteristics of important group of fungi, and their associations with algae.	Upto K3
CO 2	understand the life cycle of various plant pathogenic fungi, their mode of transmission and disease life cycle.	Upto K3
CO 3	correlate a particular fungal infection with their clinical manifestations.	Upto K3
CO 4	identify mycoses with the help of laboratory diagnosis and able to give appropriate treatment.	Upto K3
CO 5	understand the importance of various fungi in the field of agriculture and biotechnology.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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MYCOLOGY

UNIT – I: Mycology

Characteristics, classification (Alexopoulos and Mim's) of fungi. General features of different fungi group – Phycomycetes, Ascomycetes, Basidiomycetes and Deuteromycetes. General account and importance of lichens. Heterothallism and Para – sexuality. Sex hormones in fungi.

UNIT – II: General Features of Important Plant Pathogenic Fungi and their Disease Life Cycle

Mucor, Saccharomyces, Neurospora, Agaricus, Fusarium, Alternaria and Cladosporium. Important plant diseases caused by fungi – symptoms, disease cycles and control Late blight of potato – Phytophthora infestans; Ergot of rye – Claviceps purpurea; Black stem rust of wheat – Puccinia graminis, Wilt of tomato – Fusarium oxysporum Red rot of sugarcane – Colletotrichum falcatum.

UNIT – III: Classification of Mycoses

Epidemiology, Clinical manifestations, Laboratory diagnosis and Treatment of Important diseases caused by fungi in various systems – Respiratory system – Blastomycosis, Histoplasmosis, Nervous system – Cryptococcosis, Digestive system – Claviceps purpurea, Reproductive system – Candidiasis, Skin and Nails – Cutaneous mycoses, Subcutaneous mycoses.

UNIT – IV: Role of Fungi in Biotechnology

Application of fungi in food industry (Fermentation, Baking, Organic acids, Enzymes); Secondary metabolites (Pharmaceutical preparations – Antibiotics)

UNIT – V: Role of Fungi in Agriculture

Biofertilization, Biostimulation, Bioinsecticides: Biofertilizers–symbiotic (Bradyrhizobium, Rhizobium, Frankia), Non – Symbiotic (Azospirillum, Azotobacter, Mycorrhizae, Phosphate solubilizers), PGPRs; Biological control (Mycofungicides) and Mushroom.

TEXT BOOKS:

1. Constantine J.Alexopoulos (1993), *An Introduction to Mycology*, 3rd Ed., H.S.Poplai for Wiley Eastern LTD.
2. Mehrotra, R.S. and K.R.Aneja *An Introduction to Mycology*. New Age International
3. Webster, J. *Introduction to Fungi*. Cambridge University Press. Cambridge, U.K. 1985.
4. Mahendra Rai I.K , *Advances in Fungal Biotechnology, 2009*, International Publishing House Pvt. Ltd.
5. R. S. Mehrotra, K. R. Aneja, *An Introduction to Mycology*, 1990, New Age International Publishers,1990



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REFERENCE BOOKS:

1. Casida LE, *Industrial Microbiology*, 1968, J. Wiley.
2. Pelczar, MJ Chan ECS and Krieg NR, *Microbiology*, 7th Ed., 2008, McGraw – Hill.
3. Willey, Sherwood, Woolverton. Prescott, Harley, and Klein's *Microbiology*, McGraw – Hill publication
4. Tortora, Funke, Case. *Microbiology*, Pearson Benjamin Cummings.
5. Jacquelyn G. Black. *Microbiology Principles and Explorations*. John Wiley & Sons, Inc.

DIGITAL TOOLS:

1. <https://www.earth.com/earthpedia-articles/a-beginners-guide-to-mycology/>
2. <https://www.frontiersin.org/articles/560315>
3. <https://pubmed.ncbi.nlm.nih.gov/12898399/>
4. <https://www.frontiersin.org/articles/10.3389/fpls.2019.01068/full>
5. <https://bsppjournals.onlinelibrary.wiley.com/doi/10.1111/j.1364-3703.2011.00783.x>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	2	1	2
CO2	3	2	2	2	2	3
CO3	3	2	3	2	3	3
CO4	3	3	2	2	2	3
CO5	3	2	2	3	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. N. B. SHARMILA



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMBE66	PARASITOLOGY	ELECTIVE – 3	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course provides an understanding of general concepts of parasitology, major groups of parasites, life cycle, Clinical manifestations, Laboratory diagnosis and Treatment.

COURSE OBJECTIVES:

- To provide a background on the concepts, terminologies, types of parasites and their life cycle.
- To make the students understand the various classes of parasites, their morphology, life cycle and the mode of transmission.
- To make the students recognize the basics of infections of various parasites.
- To make the students understand the different methods of collection of samples and their processing.
- To make the students acquire the diagnostic skills and the interpretation of tests

COURSE OUTCOMES (Cos):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the concept of parasitism, their associations, life cycle and transmission	Upto K3
CO 2	categorize various parasites	Upto K3
CO 3	understand the life cycle of various parasites and their mode of transmission.	Upto K3
CO 4	correlate a particular parasitic infection with their clinical manifestations	Upto K3
CO 5	identify parasites with the help of laboratory diagnosis and able to give appropriate treatment.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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PARASITOLOGY

UNIT – I: Introduction

Parasitism, Parasite – Types, Host – Types, Host – Parasite Relationship, Life – cycle of Parasites, Sources of Infection, Pathogenesis

UNIT – II: Protozoan infections

Amoeba – Intestinal Amoeba – *Entamoeba histolytica* – Morphological form – Life cycle – Clinical manifestations – Laboratory diagnosis and Treatment, *Leishmania donovani* – Clinical manifestations – Laboratory diagnosis and Treatment, Malarial parasite – Life cycle – Clinical manifestations – Laboratory diagnosis and Treatment.

UNIT – III: Helminthic infections

Cestodes – Cysticercosis – Life cycle – Laboratory diagnosis and Treatment, Trematodes – *Schistosoma*, *Fasciola* – Life cycle – Laboratory diagnosis and Treatment.

UNIT – IV: Intestinal Nematodes

Ascaris lumbricoides, *Ancylostoma duodenale*, *Necator americanus*, *Wuchereria bancrofti* – Clinical Manifestations – Laboratory diagnosis and Treatment.

UNIT – V: Laboratory diagnosis of parasitic diseases

Examination of Stool – Collection, Microscopic and Macroscopic Examination, Egg counting method, Examination of blood, Immunodiagnostic methods and Antibody Detection tests. Treatment of parasitic diseases.

TEXT BOOKS:

1. Paul G. Engelkirk, Janet Duben – Engelkirk ***Burton's Microbiology for the Health Sciences***, 2015, 10th Ed., Wolters Kluwer Health, USA
2. Apurba S Sastry, Sandhya Bhat (2021), ***Essentials of Medical Microbiology***, 2021, 1st Ed., Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.
3. Jayaram Paniker, ***Textbook of Medical Parasitology*** 2013, 7th Ed., Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.
4. Conor R. Caffrey, ***Parasitic Helminths: Targets, Screens, Drugs and Vaccines***, 2012, Vol –3, Wiley Blackwell Publications.
5. Donald L Lee, ***The Biology of Nematode***, 2002, CRC Press, 2002

REFERENCE BOOKS:

1. Larry s. Roberts John Janovy (2009), ***Foundations of Parasitology***, 8th Ed. Mac Graw Hill Higher Education.
2. Lynne Shore Garcia , ***Diagnostic Medical Parasitology***, 6th Edition, 2020, Wiley Publication .
3. Alan Gunn, Sarah J. Pitt, ***Parasitology: An Integrated Approach***, 2012, Wiley Publication.
4. Elizabeth Zeibig , ***Clinical Parasitology: A Practical Approach***, 2012, 2nd Ed., Elsevier.
5. Mark F Wiser, ***Protozoa and Human Disease***, 2010, Garland Science and Publications.



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DIGITAL TOOLS:

1. <https://www.cambridge.org/core/journals/parasitology>
2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2276811/>
3. <https://www.britannica.com/animal/nematode>
4. <https://www.hindawi.com/journals/ipid/2009/278246/>
5. [https://www.mayoclinicproceedings.org/article/S0025-6196\(12\)61099-4/fulltext](https://www.mayoclinicproceedings.org/article/S0025-6196(12)61099-4/fulltext)

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	2	1	2
CO2	3	2	2	2	2	3
CO3	3	2	3	2	3	3
CO4	3	3	2	2	2	3
CO5	3	2	2	3	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. N. B. SHARMILA



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UMBS61	PHARMACUETICAL MICROBIOLOGY	SBS – 6	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

The course describes the importance of pharmaceutical microbiology, products of microbial origin, therapeutic uses of various drugs, their mode of action and toxicity.

COURSE OBJECTIVES:

To enable the students

1. understand the drug actions on microorganisms.
2. understand the antibiotics and their mode of action.
3. gain the knowledge in the aspect of mechanism of pharmacological agents on various infectious microorganisms.
4. understand good practices and regulations involved in the pharmaceutical industries.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	gain the basic knowledge of pharmaceutical microbiology	Upto K3
CO 2	explore the different microbial products used in pharmaceutical applications	Upto K3
CO 3	understand the therapeutic uses, mode of action and toxicity of various drugs	Upto K3
CO 4	develop the skills of the evaluation of pharmaceutical products	Upto K3
CO 5	gain information about the good laboratory practices and regulations for utilizing microbial product in pharmaceutical applications	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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PHARMACUETICALMICROBIOLOGY

UNIT – I: Drug

definition and properties of ideal drug – Drug Absorption, Bioavailability and Routes of Administration–distribution– oral, topical, sublingual, inhalation and injection (definitions only). Action and Elimination (a brief account), Route of drug administration: Phase I and Phase II – Role of cytochrome P450 in drug metabolism.

UNIT–II: Antibiotics

definition and classification of antibiotics. Structure of antibiotics (Penicillin, Streptomycin, Chloramphenicol and Tetracycline) and polypeptide antibiotics (Bacitracin and Actinomycin D). Mode of action of penicillin G.

UNIT – III: Chemotherapy

therapeutic uses, mode of action and toxicity – antiprotozoal infections– Amphotericin, Metronidazole– anti–helminthic agents–Mebendazole, Diethylcarbamazine.

UNIT – IV: Antimicrobial Agents

Mechanism– Sulfonamides, Penicillin, Cephalosporins–antifungal agents– Imidazole, Ketoconazole, Fluconazole– Antiviral agents– Acyclovir, Amantidine, Osteltamivir.

UNIT – V: Quality Assurance

Good manufacturing practice (GMP) – Good Laboratory Practice (GLP)

Quality Evaluation: sterility test, antibiotic assay, microbial limit tests and preservative efficacy test.

TEXT BOOKS:

1. Hugo, W B., & Russell, A D. (2016). *Pharmaceutical Microbiology*, 8th edition. Oxford: Blackwell Science.
2. *Pharmaceutical Biotechnology: Concepts and Applications*, Gary Walsh, First Edition, Wiley Publications, 2007
3. *Pharmaceutical Biotechnology*, Chandrakant Kokare, First Edition, Nirali Prakashan – Advancement of Knowledge, 2019.
4. *Pharmaceutical Quality Assurance*, Anusuya R. Kashi, Bindu Sukumaran and Veena P, Nirali Prakashan – Advancement of Knowledge, 2020.
5. *Handbook of Cancer Chemotherapy*, Roland T. Skeel, Samir N. Khleif, Eighth Edition, Lippincott Williams & Wilkins, 2011

REFERENCE BOOKS:

1. Prescott, Harley & Klein, (2008). *Microbiology*, 7th edition. New York: The McGraw–Hill companies.
2. Patrick, & Murray, R. (2007). *Medical Microbiology*, 4th edition. Missouri: The C.V. Mosby Company.
3. Fifth Edition, Dann J.A.Crommelin, Robert D.S.Sindelar and Bernd Meibohm, *Pharmaceutical Biotechnology: Fundamentals & Applications*, 2002, Springer.
4. David Roesti, Marcel Goverde, *Pharmaceutical Microbiological Quality Assurance and Control*, 2020, Wiley Publication.
5. Geoff Hanlon, Norman A. Hodges, *Essential Microbiology for Pharmacy and Pharmaceutical Science*, 2012, Wiley BlackWell.



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SYLLABUS

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DIGITAL TOOLS:

1. <https://www.knowledgedose.com/routes-of-drug-administration/>
2. <https://www.britannica.com/science/antibiotic>
3. <https://emedicine.medscape.com/article/999282-medication>
4. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6604941/>
5. <https://www.who.int/teams/health-product-policy-and-standards/standards-and-specifications/gmp>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	1	2
CO2	3	3	2	1	2	2
CO3	3	2	3	2	3	3
CO4	2	3	2	2	2	2
CO5	3	2	2	3	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. N. B. SHARMILA



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SYLLABUS

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B.Com. COMPUTER APPLICATIONS



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

PERCENTAGE OF REVISION 10%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCCC51	INCOME TAX LAW & PRACTICES – I	CORE – 11	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The course is designed to explain the various concepts of Income Tax.

COURSE OBJECTIVES:

- Introduce the Income Tax Act and the exempted incomes U/S 10
- Explain the concepts of Allowances , perquisites, Provident Fund under the head Income from Salary
- Define income from House Property
- Illustrate the Business and Professional Income
- Describe the essentials of Capital gain and Other Sources.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the various concepts of Income Tax and the sections of various exempted incomes	Upto K3
CO 2	identify the exempted and taxable allowances, perquisites and to solve the problems based on Income from Salary	Upto K3
CO 3	calculate the Net Annual Value under the head House property	Upto K3
CO 4	compute the Income from Business and Profession	Upto K3
CO 5	identify the capital assets and solve the problems of Capital gain and also the other sources incomes.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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INCOME TAX LAW & PRACTICES – I

UNIT – I: Income Tax Act, 1961

Definition – Income – Assessment–Assessment Year–Previous Year Person–Assesse – Resident – Resident but not ordinarily resident–Nonresident – Deemed Income Capital receipts and Revenue Receipts – Capital expenditure and Revenue expenditure. Exempted Incomes u/s 10, Exempted income on free trade zones u/s 10A, Special economic zones u/s 10AA, Export oriented zones u/s 10B, 10BA, charitable trust u/s 11, 12, and 13, political parties u/s 13A.

UNIT – II: Computation of taxable income– Income from Salary

Definition, Meaning, Provident fund–Allowances, Perquisites, Gratuity, Pension, Encashment of Leave salary – Deduction u/s 16/–.

UNIT – III: Income from House Property

Meaning, Incomes from House property wholly exempt from tax, different categories of House properties: – Let out and self-occupied house, Gross Annual Value, Net Annual Value, computation of Income from House Property.

UNIT – IV: Profits and gains from Business or Profession

Definition of Business and Profession, meaning of admissible and inadmissible expenses, Depreciation and other deductions.

UNIT – V: Capital Gains and Income from Other Sources

Meaning, Short Term Capital, Long Term Capital Gain, deduction u/s 54 and Income from Other Sources: **Meaning, Casual Incomes, Interest incomes, interest on debenture, income from securities (dividend).**

Note: Question Paper Pattern: 70% Problems, 30% Theory.

TEXT BOOK:

Reddy T. S and Hari Prasad Reddy Y., *Income Tax Theory, Law and Practice* –Margham Publications, Chennai–17, Nineteenth edition 2021.

REFERENCE BOOKS:

1. Dr. Vinod K. Singhania. *Student Guide to Income Tax*, Taxmann Publications (P.) Ltd., New Delhi, 46th Edition
2. Bagawathi Prasad, *Income Tax Law and Practice*, New Age International Publishers (p.) Ltd., Edition 32.

DIGITAL TOOLS:

1. <https://www.collinsdictionary.com/dictionary/english/resident>
2. <https://www.merriam-webster.com/dictionary/allowance>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	3	3	3	2
CO2	3	3	2	3	3	3
CO3	3	3	3	2	2	3
CO4	2	3	3	3	3	2
CO5	2	3	3	3	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. N. M. MEKALA



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SYLLABUS

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PERCENTAGE OF REVISION 20%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCCC53	CORPORATE ACCOUNTING – I	CORE – 13	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

The course is designed to make the students gain basic accounting knowledge & skills applicable to Corporate Accounting.

COURSE OBJECTIVES:

To make the students

- develop a conceptual understanding of the fundamentals of Corporate Accounting.
- ensure the knowledge of distinction between 'Debenture' and 'Share', Accounting for issue of Debentures
- understand the procedure of final accounts of joint stock company as per new provisions.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	analyse about the procedure for issue , forfeiture and reissue of shares	Upto K3
CO 2	gain knowledge about the redemption of debentures	Upto K3
CO 3	acquaint knowledge with the calculation of profit – prior incorporation.	Upto K3
CO 4	compute the problems related to accounting treatment in the books of purchasing company and the vendor company	Upto K3
CO 5	prepare the valuation of goodwill and shares	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

CORPORATE ACCOUNTING – I

UNIT – I: Issue, forfeiture and Reissue of Shares

Shares – Definition – Classes of shares – Issue of shares – Over Subscription and Under subscription – Pro-rata allotment – Issue of shares at par – Issue of shares at premium – Issue of shares at discount – Forfeiture of shares – Re-issue of forfeited – Redemption of Preparations.

UNIT – II: Issue of Debentures and Redemption of Debentures

Debentures – Definition – Classification of Debentures – Distinction between 'Debenture' and 'Share' – Issue of Debentures – Accounting for issue of Debentures

Redemption of Debentures – Redemption without provision – Redemption out of Provision – Cum-Interest and Ex-Interest

UNIT – III: Final Accounts of Joint Stock Companies

Final Accounts of Joint Stock Companies (as per Revised Schedule VI presented in Vertical Format): Calculation of managerial remuneration – Contents of final statement – Profit and Loss account and Balance sheet.

Profit Prior to Incorporation: Meaning – Treatment of profit or loss prior to incorporation – Methods of ascertaining profits or loss prior to incorporation – Basis of Apportionment of Expenses – Steps involved in ascertaining pre and post incorporation profits

UNIT – IV: Amalgamation, Absorption and Reconstruction

Meaning – Purchase consideration as per AS 14 – Methods of Accounting for Amalgamation – Accounting treatment in the books of purchasing company and the vendor company (Excluding external reconstruction)

Alteration of share capital – Internal reconstruction – Scheme of capital reduction – Construction of Balance Sheet after reconstruction.

UNIT V: Valuation of Goodwill and Shares

Goodwill – Definition – Factors affecting value of goodwill – Need for valuation – Methods of Valuation – Valuation of shares – Yield method – Earning capacity method – Fair value of a share.

Note: Question Paper Pattern: 70% Problems, 30% Theory.

TEXT BOOK:

Reddy T.S & Dr. Murthy A, *Corporate Accounting*, Margam publications

REFERENCE BOOKS:

1. Gupta R L Radhaswamy M, *Corporate Accounting Volume II*, Sultan Chand & Sons.
2. Dr.Arulanandam M A, Dr. Raman K.S, *Advanced Accountancy*, Vol.II (Corporate Accounting), Himalaya Publishing House.
3. Dr. Sukla S M, Dr.Gupta K L, *Corporate Accounting*, Sahityabhawan Publications

DIGITAL TOOLS:

1. https://www.jandkicai.org/pdf/16776Issue_Etc.pdf
2. https://www.bdu.ac.in/cde/SLM/SLM_FULL/B.Com%20B.M%20Books%20Soft%20Copy/Corporate%20Accounting/Unit%202.pdf
3. <https://learn.financestrategists.com/explanation/shares-and-debentures/profit-or-loss-prior-to-incorporation/>
4. <http://web.gjuonline.ac.in/distance/book/bcom/BCOM%20204%20Advance%20Accounting.pdf>
5. https://siesce.edu.in/docs/resources/Amalgamation%20of%20Companies_31457.pdf

Mapping of CO with PSO

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CO4	3	3	3	2	2	2
CO5	3	3	2	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. R. R. VISHNUPRIYA



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCCP54	LAB: VISUAL PROGRAMMING USING VB	CORE – 14 LAB	–	5	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course is an event driven programming language that provides a graphical user interface (GUI)

COURSE OBJECTIVES:

To make the students

- understand the benefits of using VB 6.0 for windows as an application tool
- understand the VB event driven programming concepts.
- learn to use the VB toolbox, object properties and object methods.
- use the menu design window.
- gain a basic understanding of data base access and management using data bound control.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	define Visual Basic concepts and properties	Upto K3
CO 2	create Visual Basic forms with using properties	Upto K3
CO 3	draft Visual Basic forms with using functions	Upto K3
CO 4	prepare Visual Basic forms with using control array and tools	Upto K3
CO 5	design Visual Basic forms with using graphics and control system	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

LAB: VISUAL PROGRAMMING USING VB

1. To Display Welcome Message using Command button & Text Box.
2. Simple Arithmetic operations and check odd or even no.
3. Checking Armstrong number or not.
4. To generate Fibonacci Series
5. To display DATE and TIME using Timer Control.
6. To change form Background color using H Scroll/V Scroll
7. To change form Background color using Menu Editor.
8. Menu Editor using MDI Form
9. To Add item and Delete item using List Box
10. To prepare Electricity Bill (EB) calculation.
11. String Manipulations.
12. To calculating Students Mark List
13. To Create User Login and Password
14. Employee Details using DAO control

Note: Internal – 40 marks and External – 60 marks.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	3	3
CO2	3	3	3	2	3	3
CO3	2	3	2	3	2	3
CO4	3	3	3	3	2	3
CO5	3	2	2	3	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. S. MAHENDRAN



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCCE51	VISUAL PROGRAMMING	ELECTIVE – 1	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

To enable the students to acquire the basic knowledge about the visual basic properties and command.

COURSE OBJECTIVES:

To make the students

- develop a front – end application using Visual Basic.
- develop a front – end tool for Customer Interaction in Business
- apply the concepts of VB in business applications
- understand the intrinsic controls.
- gain knowledge on data controls

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	define Visual Basic concepts and properties	Upto K3
CO 2	create Visual Basic forms with using properties	Upto K3
CO 3	draft Visual Basic forms with using functions	Upto K3
CO 4	design Visual Basic forms with using graphics and control system	Upto K3
CO 5	prepare Visual Basic forms with using control array and tools	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

VISUAL PROGRAMMING

UNIT – I:

Introduction Starting & Exiting Visual Basic – Using Project Explorer – Working with Forms – Using Toolbox – Working with projects.

UNIT – II:

Using Intrinsic Visual Basic Controls Labels and Textbox controls – Using Command Button control – Using Frame, Checkbox, option Button controls – List Box and Combo Box Controls – Using Formatting Controls.

UNIT – III:

Using Control Statements if – Select Case – Do – For – Exit Statements.

UNIT – IV:

Using Dialogue Boxes Mgs Box – Input Box – Common Dialogue controls – Open & Save as Dialog Boxes.

UNIT – V:

Using Menus Creating Menus – Adding code to Menu – Creating Shortcut Menu. – using Pitcher Box – Rich text box.

TEXT BOOK:

Teach Yourself VB 6 – Scott Warner –Tata Mc Graw Hill, New Delhi, 1999.

REFERENCE BOOKS:

1. *Mastering Visual Basic 6* – Evangel Pertoutsos – BPB Publishers
2. *Visual Basic 6 from the Ground up* – Gray Cornell – TMH, New Delhi, 1999

DIGITAL TOOLS:

1. <https://youtu.be/hfqqRUAXCC0> – Starting a new project
2. <https://youtu.be/zvCyberczars> – Visual Basic forms with using properties
3. https://youtu.be/_j-S_AU3pQY – Function procedures in VB
4. <https://youtu.be/M68iTntVw9w> – The With Statement in VB

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	3	2	3	3
CO2	3	3	2	3	2	2
CO3	3	3	3	3	2	3
CO4	3	2	3	3	3	2
CO5	2	3	3	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. S.MAHENDRAN



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCCE53	MULTIMEDIA	ELECTIVE – 1	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

Multimedia is the use of a computer to present and combine text, graphics, audio, and video with links and tools that let the user navigate, interact, create, and communicate.

COURSE OBJECTIVES:

To make the students

- identify a range of concepts, techniques and tools for creating and editing the interactive multimedia applications.
- identify the current and future issues related to multimedia technology.
- explore a brief history of multimedia in education;
- learn the phases involved in multimedia planning, design and production
- demonstrate the ability to create original multimedia work for public presentation

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	recall the tools and animation options	Upto K3
CO 2	implement the animation techniques	Upto K3
CO 3	compare the animation techniques in flash	Upto K3
CO 4	select the appropriate software/tools for animation	Upto K3
CO 5	describe flash and 3ds max interface	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

MULTIMEDIA

UNIT – I: Flash's Basic Elements

Flash Stage – Flash toolbox – Using the tools – Flash Panels – Timeline – Layers – Drawing Objects – Drawing Lines and Fills – Using Colors – Rotating, Skewing & Scaling – Grouping Objects.

UNIT – II: Animations, Graphics and Sounds

Creating Animations – Tween Types – Motion Tween – Shape Tween – Creating Guides – Creating a Mask – Working with Symbols – Working with library – Working with Imported Graphics – Working with Sounds – Adding Sounds – Editing Sounds – Setting Sound Output Options.

UNIT – III: Action Scripts Action

Script Basics – Data Types Basics – Using Action Scripts to Control Actions – Using Action Scripts to Control Properties – Actions and Event Handlers

UNIT – IV: 3ds Max Interface Elements, View Ports and Objects

3ds Max interface Elements – Working with View Ports – Working with Objects – Primitive Objects – Modifying the Primitive – Saving Objects – Transforming Objects – Freezing the Objects – Cloning the Objects – Mirroring Objects – Grouping the Objects

UNIT – V: Modifiers and Animations

Modifier types – Using modifiers – Understanding objects and sub objects – Applying different modifiers – Animation in 3ds max – Understanding frames, key frames and keys – Animation tools – Changing the number of frames – Animating objects in auto key and set key mode – Motion panel – Animating different Objects (15 hours)

TEXT BOOKS:

1. Brain Underdahl, *Macromedia Flash MX – A Beginner's Guide*, Dreamtech Press, 2002
2. Brain Underdahl, *3ds Max is Simple Steps*, Dreamtech Press, 2007 Edition

REFERENCE BOOKS:

1. *Teach yourself Macromedia Flash MX in 24 Hrs.*
2. *Macromedia Flash 8 Bible* – Robert Reinhardt Snow Dowd.
3. *3ds Max7 Fundamentals*, Beyond Courseware Manual – Focal Press
4. Brain Underdahl, *Macromedia Flash MX – The Complete Reference*, McGrawHill, 2002.

DIGITAL TOOLS:

1. [https://www.amazon.in/Macromedia – Flash – MX – Beginners – Guide/dp/0072222662](https://www.amazon.in/Macromedia-Flash-MX-Beginners-Guide/dp/0072222662)
2. <https://www.geeksforgeeks.org/introduction-to-macromedia-flash-8>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	3
CO2	3	3	2	3	2
CO3	3	2	2	2	3
CO4	2	2	3	2	3
CO5	3	3	2	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. J. R. NATHAN



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCCSP4	LAB: COMPUTERIZED ACCOUNTING USING TALLY	SBS – 5 LAB	–	2	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

A computerized accounting system is an accounting information system that processes the financial transactions and events as per generally accounting principles (GAAP) to produce reports as per user requirements.

COURSE OBJECTIVES:

To make the students

- work with well-known accounting software i.e. Tally
- create groups.
- understand to enter accounting voucher entries including advance voucher entries, do Inventory master.
- do stock creation, stock group creation, stock categories and calculate unit of measures.
- learn the preparation of stock statements and financial reports also print financial statements, etc.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the basic knowledge on creation of company in Tally software	Upto K3
CO 2	develop a strong knowledge on ledger creation and group creation	Upto K3
CO 3	utilise and understand how to create the vouchers with documents	Upto K3
CO 4	create stock categories and unit measurement	Upto K3
CO 5	understand the preparation of Financial statement and stock report and GST calculation	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COMPUTERIZED ACCOUNTING USING TALLY

1. Creation of Company
2. Creation of Account Group
3. Creation of Ledger Accounts
4. Creation of Cost categories
5. Creation of Cost centers
6. Creation of Voucher
7. Voucher Transaction
8. Voucher Transaction displaying Book
9. Creation of Stock group and categories
10. Creation of stock items
11. Creation of Godowns
12. Creation of units of measures
13. Maintaining accounts with inventory
14. Pure inventory vouchers
15. Reports

Note: Internal – 40 marks and External – 60 marks.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	2	3	2
CO2	3	3	3	3	3	3
CO3	3	3	3	2	3	3
CO4	3	2	3	3	2	3
CO5	2	3	2	3	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. P. DHIVYA



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

PERCENTAGE OF REVISION 10%

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCCC61	INCOME TAX LAW & PRACTICES – II	CORE – 15	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The course is designed to explain the various concepts of Income Tax.

COURSE OBJECTIVES:

- To introduce the term clubbing of income and set-off and carry forward of losses.
- To explain the concepts of gross qualifying income
- To define the term assessment of individual and HUF
- To illustrate the Partners, partnership and Association of Persons
- To describe the essentials of return of income and Assessment Producers.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the term clubbing of income and set-off and carry forward of losses	Upto K3
CO 2	identify the deduction of incomes under sections 80	Upto K3
CO 3	calculate the total taxable income of an individual and HUF	Upto K3
CO 4	compute the total taxable income of Partners and Association of Persons.	Upto K3
CO 5	gain knowledge of various assessment procedures and Permanent Account Number.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

INCOME TAX LAW & PRACTICES – II

UNIT – I:

Clubbing of Income: **Meaning, Income of minor child, Deemed incomes. Set-off and Carry Forward of Losses:** Introduction, meaning, schemes of Set-off and carry-forward of Losses, Inter head adjustments and Intra head adjustments.

UNIT – II:

Deductions from Gross Total Income u/s 80: Meaning, Nature of deductions, Gross qualifying amount – meaning, deductions U/S 80C, 80D; 80DD, 80E, 80G, 80GGB, 80QQB, 80U.

UNIT – III:

Assessment of Individual: meaning, total income of an individual, computation of tax liability. Assessment of Hindu Undivided Family: Meaning, Composition of Hindu Undivided Family, Schools of Hindu Law, Hindu Coparcenary, Computation of HUF total income.

UNIT – IV:

Assessment of Partnership firm: Meaning of Partnership, Kinds of Partnership firms for taxable purpose, meaning of Limited liability Partnership. Assessment of Association of persons: Meaning, Computation of AOP's Business Income and AOP's total income.

UNIT – V:

Return of Income: Meaning, Submission of return of Income–Return of Loss–Belated Return Revised Return–Procedure for assessment: Meaning, Self-assessment- Re-assessment – Best judgment assessment – Ex-party assessment – Rectification of mistakes, Permanent Account Number–Meaning.

Deduction and Collection of Tax at Source–Advance Payment–Tax Refunds–Income under“Net of Tax” – Tax credit certificate–Tax clearance Certificate, Goods and Services Tax : Meaning , percentage available to various products (latest amendments).

Note: Question Paper Pattern: 70% Problems, 30% Theory.

TEXT BOOK:

Reddy T. S and Hari Prasad Reddy Y., *Income Tax Theory Law and Practice*, Margham Publications, Chennai–17, Nineteenth edition 2021.

REFERENCE BOOKS:

1. Dr. Vinod K.Singhania ,*Student Guide to Income Tax*, Taxmann Publications (P.) Ltd., New Delhi, 46th Edition.
2. Bagawathi Prasad,*Income Tax Law and Practice*, New Age International Publishers (P.) Ltd., Edition 32.

DIGITAL TOOLS:

1. <https://tax2win.in/guide/section-64-clubbing-income>
2. https://www.taxmanagementindia.com/visitor/acts_rules_chapter_provisions.asp?Ch_ID=24

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	3	3	3	3
CO2	3	3	2	3	3	2
CO3	3	3	3	2	2	3
CO4	2	3	3	3	3	3
CO5	2	3	3	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. N. M. MEKALA



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCCC62	WEB TECHNOLOGY	CORE – 16	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

Students will gain the skills and project-based experience needed for entry into web application and development careers. On completion of this course, a student will be familiar with client server architecture and able to develop a web application using java technologies.

COURSE OBJECTIVES:

- Impart knowledge to students regarding publishing the content on the World Wide Web
- Introduce the basics of graphic production with a specific stress on creating graphics for the web
- Make the students develop a dynamic webpage by the use of java script
- Make them learn the basic tools and applications used in Web publishing
- Make the students gain the skills and project-based experience needed for entry into web application and development careers

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	understand the basic concepts of web programming using HTML.	Upto K3
CO2	understand the basic concepts using Java script	Upto K3
CO3	point out the importance of CSS to design the web pages	Upto K3
CO4	create and test dynamic web pages by the use of JavaScript	Upto K3
CO5	design a HTML file Using JSP	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

WEB TECHNOLOGY

UNIT – I: Introduction

History of Internet – Internet Services and Accessibility – Uses of Internet – Protocols – Web Concepts – The Client/Server Model of the Web – Retrieving Data from the Web – How the Web Works – Web Browser – Searching Information on the Web – Internet Standards – Protocols – Internet Protocol – Transmission Control Protocol – User Datagram Protocol.

UNIT – II: HTML

Introduction – SGML – DTD – DTD Elements – Attributes – Outline of an HTML Document – Head Section – Prologue – Link – Base – Meta – Script – Style – Body Section – Headers – Paragraphs – Text Formatting – Linking – Marquee Tags – Embedding Images – Tables – Lists – Frames – Other Special Tags and Characters – HTML Forms.

UNIT – III: VB Script

Introduction – Embedding VB Script Code in an HTML Document – Comments – Variables – Operators – Assignment Operator – Numerical Operator – String Concatenation – Procedures – Conditional Statement – Looping Constructs – Objects and VB Scripts – Cookies.

UNIT – IV: Javascript

Introduction – Need of a Scripting Language – Language Elements – Identifiers – Expressions – Keywords – Operators – Functions – Statements – Objects of Java script – Window Object – Document Object – Form Object – Select Object – Date Object – Math Object.

UNIT – V: DHTML Introduction

Cascading Style Sheet – Dynamic Coding CSS – External Style Sheets – DHTML Document Object Model and Collections – Event Handling – Assigning Event Handlers – Event Bubbling – Filters & Transitions – Data Binding.

TEXTBOOK:

Gopalan N.P. and Akilandeswari J. *Web Technology A Developer's Perspective*. Delhi: PHI Learning Private Limited, 2nd Edition, 2018.

REFERENCE BOOKS:

1. DanialMinoli, Emma Minoli. *Web Commerce Technology Handbook*. New Delhi: Tata McGraw hill Publishing Company Pvt. Ltd., 2010
2. MuthuKrithigaVenkatesh L. *Web Technology*. Chennai: Margam Publications, 2010.
3. RajKamal. *Internet & Web Technologies*. New Delhi: Tata McGraw Hill Publisher, 2013.

DIGITAL TOOLS:

1. https://www.tutorialspoint.com/data_communication_computer_network/client_server_model.htm
2. <https://www.slideshare.net/RichaSingh59/html-basic-tags>
3. <https://www.youtube.com/watch?v=eA9mnY1Z2so>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	2	3	2	2
CO2	3	3	3	3	2	3
CO3	3	3	3	3	2	2
CO4	3	3	3	2	3	3
CO5	3	3	3	2	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. S. MAHENDRAN



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCCC63	CORPORATE ACCOUNTING – II	CORE – 17	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

The course will enable the students to gain expert Accounting knowledge & Skills applicable to Corporate Accounting, in Conformity with Indian Companies Act 1956.

COURSE OBJECTIVES:

The students will be able to

- acquire the conceptual Knowledge of the accounting standards.
- receive basic knowledge of accounting procedures of Banking Companies.
- get basic knowledge of accounting procedures of Insurance Companies.
- gain Theoretical idea and accounting treatment of Holding Companies.
- study the concepts and preparation of liquidators' final statements

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the conceptual Knowledge of the accounting standards.	Upto K3
CO 2	get basic knowledge of accounting procedures of Banking Companies.	Upto K3
CO 3	gain basic knowledge of accounting procedures of Insurance Companies.	Upto K3
CO 4	compute the accounting treatment of Holding Companies.	Upto K3
CO 5	analyze the concepts and preparation of liquidators' final statements	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

CORPORATE ACCOUNTING – II

UNIT – I: Accounting Standards

Introduction – Meaning – Objectives – Need for accounting Standards – Significance – International Accounting Standards – Accounting Standards in India – Indian Accounting Standards – AS-1 – Disclosure of Accounting Policies – AS-2 – Valuation of Inventories – AS-3 – Cash flow Statements – AS-6 – Depreciation Accounting – AS-10 – Accounting for Fixed Assets – AS-14 – Accounting for Amalgamation – AS-21 – Consolidated Financial Statements (Simple problems only)

UNIT – II: Accounts of Banking Companies

Accounts of Banking Companies (New Format): Preparation of profit and loss account and balance sheet – Legal forms – Bills for collection – Acceptances and Endorsements – Branch adjustments, Adjustments of bad and doubtful debts, Rebate on bills discounted, Provision for Taxation and Depreciation.

UNIT – III: Accounts of Insurance Companies:

Accounts of Life Insurance Business (New Format) – Types of policies – Annuity business – Surrender value – Life Assurance Fund – Preparation of final accounts–Revenue account–Valuation balance sheet– Balance Sheet

Accounts of General Insurance Business (New Format) – Fire and Marine Insurance – Revenue a/c – Profit and Loss account –Balance sheet

UNIT – IV: Accounts of Holding Companies

Meaning of Holding Company and Subsidiary company – Minority interest – Cost of control or capital reserve – Treatment of Unrealised profit– Mutual Owings– Preparation of consolidated balance sheet

UNIT – V: Liquidation

Meaning – Legal provisions – Order of Payment – Preparation of Statement of affairs & Deficiency/surplus a/c (Simple problems only) – Preparation of liquidator's final statement of account.

Note: Question Paper Pattern: 70% Problems, 30% Theory.

TEXT BOOK:

Reddy T.S & Dr. Murthy A, *Corporate Accounting*, Margam publications

REFERENCE BOOKS:

1. Gupta R L Radhaswamy M, *Corporate Accounting Volume II*, Sultan chand& sons
2. Dr.Arulanandam M A, Dr.Raman K.S, *Advanced Accountancy*, Vol.II (Corporate Accounting), Himalaya publishing house
3. Dr. Sukla S M, Dr.Gupta K L, *Corporate Accounting*, Sahityabhawan Publications

DIGITAL TOOLS:

1. https://static.careers360.mobi/media/uploads/froala_editor/files/Introduction%20to%20Accounting%20Standards_7iWCuHN.pdf
2. <https://www.dynamictutorialsandservices.org/2015/04/accounts-for-holding-companies.html>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	3	3	3
CO2	3	2	3	3	3	2
CO3	3	3	3	2	3	3
CO4	3	3	2	3	3	2
CO5	3	3	2	3	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNER: Dr. R. R.VISHNUPRIYA



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCCE62	COMPANY LAW	ELECTIVE – 2	5	-	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The course covers the entire lifecycle of a company, from incorporation to dissolution. All the new aspects of Companies Act, 2013 are dealt with in detail. Recent amendments and case laws are also discussed in the modules.

COURSE OBJECTIVES:

- To inform the students about the elementary ideas and the logic of the corporate law.
- To acquaint the students with the legal norms regulating the subjects of the corporate law, their legal structure and the position (status) of the trading subjects.
- To help the students understand the concept of Consent, Free Consent, Classification of contracts.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the basic tenets of Company Law regime.	Upto K3
CO 2	explain about the various flaws in existing Company Law and how the judiciary has responded to them.	Upto K3
CO 3	develop clear understanding about the practical situations faced by the various stakeholders of Indian Company Law regime in their professional life.	Upto K3
CO 4	have an awareness about the rights of affected parties (against irregular company operations) in India.	Upto K3
CO 5	develop analytical perspective about the existing Company Law framework so as to enable them to suggest necessary changes.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

COMPANY LAW

UNIT– I: Company Law – An Overview

Company – Definition–Characteristics– Lifting the corporate veil – Advantages of Incorporation –Company Law Administration – National Company Law Tribunal & Appellate tribunal.

UNIT– II: Kinds of Companies

Classification on the basis of incorporation – On the basis of members – Private and Public – Privileges of private company – private and public company distinguished – On the basis of liability – On the basis of ownership – Government company –Foreign company – On the basis of control – Holding and Subsidiary company – One Person Company (OPC).

UNIT– III: Formation of Company

Formation of company –Preliminary contracts – Certification of Incorporation –Promotion – Certificate of commencement of Business– Promoters– Functions & Legal Status – MCA 21 – Scheme for filing statutory documents& other transactions by companies through electronic mode – Features of MCA 21.

UNIT– IV: Memorandum and Articles of Association

Memorandum of Association – Nature and Contents – Alteration of memorandum – Doctrine of ultravires– Articles of Association – Purpose and Content –Alteration of articles – Doctrine of constructive notice and indoor management.

UNIT– V: Declaration of Dividend and Winding Up

Share Capital – Meaning –Kinds – Alteration of share capital– Dividend – Provisions for declaration of dividend – Winding up of companies – meaning – modes – circumstances in which company may be wound up by Tribunal – Voluntary winding up circumstances.

TEXT BOOKS:

1. Kapoor N,D, *Company Law and Secretarial Practice* , 13th Ed., Sultan Chand & Sons, New Delhi, 2020.
2. Srinivasan, *Company Law and Secretarial Practice*, Margam Publications, Chennai, 2020.

REFERENCE BOOKS:

1. Pillai R.S.N. & Bhagwathi, *Business Law*, S. Chand & Co., New Delhi, 2018.
2. Majumdar A.K and Kapoor G.K, *Company Law and Practice*, Nabhi publications, New Delhi, 2019.

DIGITAL TOOLS:

1. <https://www.indiafilings.com/learn/classification-of-companies/>
2. <https://vakilsearch.com/blog/explain-procedure-formation-company/>
3. https://en.wikipedia.org/wiki/Memorandum_of_association
4. <https://www.legalraasta.com/blog/dividend-declaration-as-per-companies-act-2013/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	3	3	3	3
CO2	3	3	2	3	1	3
CO3	1	3	3	2	3	3
CO4	3	2	3	2	3	2
CO5	3	3	1	3	3	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNER: Dr. SITHU MURALIDHARAN DEVI



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCCE63	PRINCIPLES OF INSURANCE	ELECTIVE – 2	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course imparts knowledge on the principles and practices of Insurance in India.

COURSE OBJECTIVES:

To make the students

- understand the nature of insurance and principles that govern insurance
- gain an insight on the fundamental principles of life insurance
- acquire knowledge about life insurance policy condition and procedure for making claims against insurance policies.
- become familiar with the necessity of marine insurance
- receive knowledge of various aspects of fire insurance principles, managing it and risk involved.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	gain an insight into essential elements of insurance contract	Upto K3
CO 2	acquire knowledge about the principles and procedure for taking a life policy	Upto K3
CO 3	gain broader understanding of life insurance policy conditions and their claims	Upto K3
CO 4	familiarized with the legal and financial aspects of marine insurance	Upto K3
CO 5	able to identify the importance of fire insurance need	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

PRINCIPLES OF INSURANCE

UNIT– I:

Insurance – Origin – Meaning – Types of Insurance – Fundamental Principles of Insurance – Functions and importance of Insurance – IRDA.

UNIT– II:

Life Insurance – Fundamental Principles of Life Insurance – Types of Life Insurance policies – Procedure for taking a Life policy – Modes of Premium Single, annual, half – yearly, quarterly and monthly.

UNIT– III:

Life Insurance policy conditions – Lost policies – Assignment – Nomination – Settlement of claim – Lapse of Life Insurance policy – Revival of policy – Rebating – Surrender value – Loan on Life Insurance policies.

UNIT– IV:

Marine Insurance – Meaning – Types of Marine policies – Conditions of Marine policy – Marine losses – settlement of claims.

UNIT– V:

Fire Insurance – Meaning – Types of Fire Insurance policies – Conditions of Fire Insurance policy – Procedure for settlement of claim – Reinsurance– meaning of motor insurance, burglary insurance, personal accident insurance and sports insurance

TEXT BOOK:

M.N. Mishra, S.Chand and company, *Insurance – Principles and Practices*

REFERENCE BOOK:

Ghosh & Agarwal, *Principles Practice & Law of Insurance*, Life insurance in India – Dr. R.M. Ray

DIGITAL TOOLS:

1. <https://www.godigit.com/guides/types-of-insurance>
2. <https://cleartax.in/s/insurance>
3. <https://www.insuranceinstituteofindia.com/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	1	2	2	1	2
CO2	1	2	2	2	2	2
CO3	2	2	3	2	2	3
CO4	2	2	2	3	2	3
CO5	2	3	3	2	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. K. R. KAVITHA



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCCEV1	PROJECT & VIVA – VOCE	ELECTIVE –3	–	5	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

Students work in teams to define, analyze implement and evaluate a real-world software system. Most of the work in this course is team-based project work, although there are some introductory lectures on software project management and teamwork strategies.

COURSE OBJECTIVES:

To make the students

- design with various design representation including architectural design, database design and GUI design
- apply the coding skills and develop the system
- prepare test cases and test the system through various testing according to the project work
- understand feasibilities and analysis of project work
- learn documentation and presentation skills

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	receive detail knowledge about the basics of project application software	Upto K3
CO 2	outline the various modules and its tables to get the result of the project designing	Upto K3
CO 3	apply appropriate techniques to assess ongoing project performance.	Upto K3
CO 4	differentiate the data base control model to meet organizational needs	Upto K3
CO 5	evaluate the academic performance with the practical knowledge in report writing	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

PROJECT & VIVA – VOCE

1. A maximum of two students can join to do the project work
2. Students must undertake the project work under the guidance of a faculty member
3. Progressive reports have to be submitted to the guide periodically
4. The internal test marks is 40 and is divided into the following components.
 - (i) **Two Presentations - 2 X 10 = 20 marks**
 - (ii) **Progressive Reports - 10 marks**
 - (iii) **Internal Viva-voce - 10 marks**
5. The external examination will be jointly conducted by both the Internal and external examiners
6. The students must submit 3 copies (2 copies for 2 students + 1 copy for the Dept.) of their Project Report two weeks before the external examination.
7. The maximum marks for the external examination is 60 and it may be divided into the following components.
 - (i) **Project Report - 20 marks**
 - (ii) **Project Presentation - 20 marks**
 - (iii) **Project viva-voce - 20 marks**

Note: Internal – 40 marks and External – 60 marks.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	3	3
CO2	2	2	3	2	3	2
CO3	3	3	3	2	3	3
CO4	3	3	3	3	2	3
CO5	3	2	2	3	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. J.R. NATHAN



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100 % MODIFIED – NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCCSP5	LAB: WEB TECHNOLOGY	SBS-6 LAB	–	2	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course is intended to teach the basics involved in publishing content on the World Wide Web.

COURSE OBJECTIVES:

To make the students

- understand the syntax and semantics of HTML
- develop the ability to logically plan and develop web pages.
- learn to separate style from content and a well-defined set of published Standards.
- create forms and check for data accuracy
- develop skills in analyzing the usability of a website.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand and apply the various tags in HTML programs	Upto K3
CO 2	apply knowledge in developing web applications.	Upto K3
CO 3	analyze a web page and identify its elements and attributes.	Upto K3
CO 4	assess a web page using HTML and Cascading Style sheets.	Upto K3
CO 5	analyze and apply the role of languages like HTML, CSS, and JAVA Script protocols in the workings of web and web applications.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

LAB: WEB TECHNOLOGY

1. Write a HTML program for formatting text.
2. LAB – PRACTICAL Write a HTML program for creating ordered, unordered and definition list.
3. Write a HTML Program to use Image as a Link.
4. Create Your Class Time Table Using HTML.
5. Write a program to design Login form in HTML.
6. Create a web page that has blinking text.
7. Write a program in JAVA script to add two integers.
8. Write a JAVA script program to print the content of the current window.
9. Write a JAVA script program to compute the values.
10. Write an internal CSS program.
11. Write an external CSS program.
12. Create a simple CSS style sheet to display your XML data.
13. Write a simple JSP program to print the current date and time.
14. Write a program in JSP to auto refresh a page.

Note: Internal – 40 marks and External – 60 marks.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	3	2	2	2
CO2	3	3	3	3	3	3
CO3	3	3	2	2	3	3
CO4	3	3	3	3	2	3
CO5	2	3	3	2	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. S. MAHENDRAN



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SYLLABUS

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B.C.A.



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCAC52	RELATIONAL DATABASE MANAGEMENT SYSTEM	CORE-10	6	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course provides fundamental concepts of Database Management System for the database architecture which enhances the user to analyze data normalization, Integrity Constraints and PL/SQL.

COURSE OBJECTIVE:

To learn various concepts of Database Architecture, Data Modeling, Analysis of Data Normalization, Integrity constraints, Queries and its Aggregate Functions and PL/SQL.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	remember the Quality of Information, Introduction of DBMS, RDBMS Characteristics, Types of DBMS	Upto K3
CO2	know about Integrity Constraints and apply the basic concepts of Database Architecture	Upto K3
CO3	know about Data Modeling and analyze the Data Normalization	Upto K3
CO4	apply the Basic concept of SQL– Tables, Views and Indexes and discuss Queries , Sub Queries	Upto K3
CO5	explain the application of Aggregate functions and discuss Integrity Constraints and PL/SQL	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

RELATIONAL DATABASE MANAGEMENT SYSTEM

UNIT-I:

Data, Information and Information processing: Introduction – Definition of Information – Quality of Information – Information Processing. Introduction to DBMS: Introduction – why a Database ? – characteristic of data in database – DBMS – why DBMS – Types of DBMS – DDL.

UNIT – II:

Introduction – RDBMS Technology – The relational data structure – Relational Data Integrity – Relational data manipulation – Codd's rules – Database Architecture and Data Modeling: Introduction, Conceptual. Physical and Logical Database Model – Database design – Design Constraints.

UNIT – III:

E-R Modeling: Introduction – ER- Model – Components of an ER Model – ER Modeling Symbol – Data Normalization : Introduction – Keys – Relationship – 1NF – 2NF–3NF – 4NF – 5NF – DKNF – Denormalization .

UNIT – IV:

SQL Data types and Literals – Types of SQL Commands – SQL Operators – Arithmetic – Comparison operators – Logical operators – Set operators – operator precedence. Tables: Create a Table – Modify a Table – Deleting a Table. Queries and sub queries

UNIT – V:

Aggregate function – insert,update and delete operation – data integrity – PL/SQL Blocks – Control Structure – Iterative Control statement – Cursors – Triggers

TEXT BOOK:

Alexis Leon and Mathews Leon, *Data base Management System* ,LeonVikas Publishing Chennai,2002

CHAPTERS and SECTIONS (For UNIT-I, II, III,IV and V)

Unit – I:	Chapter 1: Pg.No: 1– 6,Chapter 5: Pg.No:99–117, Chapter 6: Pg.No. 138 to 143
Unit – II:	Chapter 7: Pg.No:159–168, Chapter 8: Pg.No: 177–186
Unit – III:	Chapter 9: Pg.No:195–211,Chapter 11:Pg.No:241–254
Unit – IV:	Chapter 14: Pg.No:296–310,Chapter 15: Pg.No:319–322, Chapter 17: Pg.No: 355–376
Unit – V:	Chapter 18: Pg.No:385–390,Chapter 19:Pg.No:395–398,Chapter 28:Pg.No:567–575Chapter 46:D:Pg.No:933–949,952–953.Chapter 20: Pg.No: 401–407,Chapter 25: Pg.No. 485 to 491



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SYLLABUS

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REFERENCE BOOKS:

1. Raghu Ramakrishnan & Johannes Gehrke, *Database Management Systems*, 2nd edition, McGraw Hill international Edition, 2003
2. C.J.Date, *An Introduction to Database Systems*, Pearson education 8th edition

DIGITAL TOOLS:

1. <http://www.studytonight.com/dbms/rdbms-concept.php>
2. <https://www.tutorialspoint.com/sql>
3. <https://beginnersbook.com/2015/04/rdbms-concepts/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1					
CO2		2	1			
CO3	1	2	2			3
CO4	1	2	2		1	3
CO5	1	2	2		1	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. S.E.HEMAPRIYA



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCACP5	WEB TECHNOLOGY LAB	CORE – 11 LAB – V	–	5	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course provides fundamental concepts of Web Technology using HTML, JAVA Script and VB Script.

COURSE OBJECTIVE:

To learn various concepts of designing a web page using different tags using HTML, JAVA Script and VB Script.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	design a web page using different tags using HTML	Upto K3
CO2	design for a web page using tables, links, frames etc.	Upto K3
CO3	analyze the web page using different validation techniques using JAVA Scripts	Upto K3
CO4	apply the web page validation techniques using JAVA Script Event Handling	Upto K3
CO5	apply the web page validation techniques using VB Script Event Handling using simple form entry and ticket booking	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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WEB TECHNOLOGY LAB

HTML:

1. Design student ID card using image tag.
2. Display various Subjects using Lists.
3. Design class Timetable using Tables.
4. Display various Text styles and Colors using Frames.
5. Design Student Admission Form.

JAVASCRIPT:

6. Login ID Validation
7. Handling Mouse Events
8. Creating Cookies
9. Background Color Changing
10. Evaluate an Expression.
11. Performing Arithmetic Operation.
12. Performing String Operation.
13. EB Bill Calculation.
14. Cinema Ticket Booking
15. Create a sample Bank Entry form.

COURSE DESIGNER: Prof. S.E.HEMAPRIYA



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCAE51	WEB TECHNOLOGY	ELECTIVE-1	4	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The Course helps to learn about basic web page creation using HTML along with different tags and their attributes and create a web page of their own

COURSE OBJECTIVE:

To learn about the structure of HTML with different types of tags and to learn web page creation

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	remember the Overview of HTML with its structure and basic formatting tags.	Upto K3
CO2	apply different types of List and Marquee tag with attributes.	Upto K3
CO3	apply different table building tags with attributes	Upto K3
CO4	discuss Linking Pages, Image tag and Frame tag attributes	Upto K3
CO5	discuss Form tag, input tag and webpage creation	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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WEB TECHNOLOGY

UNIT-I:

Overview of HTML–structure of a html program–HEAD tag–BODY tag–paragraph tag–formatting tag– (Bold–underline–italic–strike thru–superscript–subscript)

UNIT-II:

LISTS–Ordered list and unordered list–marquee tag–break tag–ruler tag–foot tag–data definition tag.TABLES–TABLE building tags and attributes of table–table tag–table header tag–table row tag–table data tag–row span–column span.

UNIT-III:

LINKS–linking pages using anchor tag–attributes of anchor tag–image tag and its attributes–frame tag.

UNIT-IV:

FORMS–Form tag–input tag–types–text,radio,button,check,password–sample webpage creation.

UNIT-V:

Java Script : Introduction – Language elements– Objects of Javascript– other objects

TEXT BOOK:

1. *HTML COMPLETE*–BPB publications–2nd edition (Unit – I to IV)
2. *Web Technology* by N.P.GopalanAkilandeshwari (Unit – V)

CHAPTERS and SECTIONS:

Unit – I:	Chapter – 3
Unit – II:	Page No. 817 to 821,718,719,735,736, 746 to 748, 757,837 to 839 and 915 to 917,Chapter 7.
Unit – III:	Chapter – 5, Chapter– 8 (Page No. 266 to 277) Chapter – 4 (P. No. 129 to 140)
Unit – IV:	Chapter – 11
Unit – V:	Chapter 5.1 to 5.4 Page.No. 95– 114

REFERENCE BOOKS:

1. *HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP andjQuery*, 2 nd Paperback – 1 January 2016
2. *Mastering Html, Css&Javascript Web Publishing Paperback* – 15 July 2016
by Laura Lemay (Author), Rafe Colburn (Author), Jennifer Kyrnin (Author)
3. *Web Technology: Theory and Practice* by M. SrinivasanReleased June 2012Publisher(s): Pearson India, ISBN: 9788131774199

DIGITAL TOOLS:

1. <https://www.geeksforgeeks.org/web-technology/>2.<https://builtwith.com/>
3. <https://www.intechinc.com/blog/which-technology-is-right-for-my-website/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1					
CO2	1	2	2			
CO3	1		2			3
CO4	1		1			3
CO5	1	2	3	1	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. S.E.HEMAPRIYA



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCAS51	QUANTITATIVE APTITUDE	SBS-5	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course provides basic mathematical concepts helpful in various competitive exams.

COURSE OBJECTIVES:

- To enrich the students' knowledge in basic mathematical concepts.
- To make the students acquire higher success ratio in various aptitude tests using simple and easy time management techniques.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	remember Numbers and to calculate HCF and LCM	Upto K3
CO2	refresh Problem on Numbers and Ages	Upto K3
CO3	calculate problems on Percentages and Profit and Loss	Upto K3
CO4	find the Simple Interest and Compound Interest and discuss the Odd Man Out reasonability	Upto K3
CO5	discuss Areas, Surface areas and Volumes of different shapes.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

QUANTITATIVE APTITUDE

UNIT – I:

Numbers – HCF & LCM of numbers

UNIT-II:

Problems on Numbers – Problems on Ages.

UNIT-III:

Percentage – Profit & Loss

UNIT-IV:

Simple Interest – Compound Interest – ODDMan out

UNIT –V:

Area – Volume & Surface areas, time & distance (Solved examples only)

TEXT BOOK:

Quantitative Aptitude – R.S. Aggarwal – S.Chand Publishers, 2007

REFERENCE BOOKS:

1. SURA'S *Quantitative Aptitude and Arithmetic Competitive Exam Book*– Latest Edition 2022eller: SuraBooks.Publisher: Sura College of Competition,2021
2. *Quantitative Aptitude for Competitive Examinations Paperback* – 21 February 2017 by R S Aggarwal (Author)

DIGITAL TOOLS:

1. <https://www.indiabix.com/>
2. <https://www.tutorialspoint.com/quantitative Aptitude/index.htm>
3. <https://www.javatpoint.com/apptitude/quantitative>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	1		2
CO2	1	2	2	1	1	3
CO3	1	2	2	1	2	3
CO4	1	2	2	2	1	3
CO5	1	2	2	2	1	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. V.B.SHAKILA



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCASP3	LAB: PL/SQL	SBS-6 LAB	–	2	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

The Course talks about creation of Tables and usage the DDL queries, DML queries, Mathematical calculation, Process Queries and Sub-queries, and apply in PL/SQL programs.

COURSE OBJECTIVE:

To make the students create tables, apply, DDL, DML queries in them and also to analyze them using Queries and Sub queries and practise them using PL/SQL programs in any back end environment

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	understand creation of Tables and usage of the Data Definition Language queries, Data Manipulation Language queries	Upto K3
CO2	know the Data Manipulation Language queries with Set operation , Mathematical calculation	Upto K3
CO3	respond to queries using various Aggregate functions, sub- queries	Upto K3
CO4	write basic PL/SQL programs	Upto K3
CO5	understand simple PL/SQL Programs using Tables	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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PL/SQL LAB CYCLE

1. Data definition language programs.
2. Data manipulation language programs.
3. Data manipulation with arithmetic operations.
4. Data manipulation with logical operation.
5. Data manipulation with conditional or comparison operations
6. Data manipulation with Aggregate functions of number functions.
7. Data manipulation with group by operations.
8. Data manipulation with set operations.
9. Data manipulation with sub-queries operations.
10. Data manipulation with join query for two or more table.
11. Data manipulation with mathematical functions.
12. Data manipulation with character functions.
13. Data manipulation with date functions.
14. Data manipulation with special operations.
15. Data manipulation with STRING OPERATORS
16. PL/SQL program for calculating Area of circle.
17. PL/SQL program for generate Even Number.
18. PL/SQL program for generate Prime Number.
19. PL/SQL program for checking an Adam Number.
20. PL/SQL program for checking a Number palindrome or Not.

COURSE DESIGNER: Prof. S.E.HEMAPRIYA



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCAC61	PROGRAMMING IN PYTHON	CORE-13	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course describes how to develop the Website and Application in AI.

COURSE OBJECTIVE:

To make the students

- understand the basic of Python.
- understand the List, tuples and Slicing.
- understand Function, string, and File, Exception Handling

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	know about the basic of PYTHON and its operators	Upto K3
CO 2	understand the PYTHON Operators, List and Tuples.	Upto K3
CO 3	learn about the Decision making and Loop control statements and apply them in PYTHON	Upto K3
CO 4	acquire knowledge on various Functions and Strings in PYTHON	Upto K3
CO 5	apply the Concept File Handling and Exception Handling in PYTHON	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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PROGRAMMING IN PYTHON

UNIT – I: Basics and Operators

Introduction to Python – Values and Types –Python Keywords–Identifier/Variable – I/O statements – (The printf () Function – The input () Function –The eval () Function) – Commenting in Python. Operators and Expressions – Arithmetic Operators – Operator Precedence and Associativity – Changing Precedence and Associativity of Arithmetic Operators – Translating Mathematical Formulae into Equivalent Python Expressions – Bitwise Operator –The Compound Assignment Operator

UNIT –II: Operators, Lists and Tuples

Boolean Type – Boolean Operators – Using Numbers with Boolean Operators – Using String with Boolean Operators – Boolean Expressions and Relational Operators. Lists – Creating Lists –Accessing Elements of a List –Negative List Indices –List Slicing [Start : End] –List Slicing with Step Size –Python Built–In Functions for Lists –The List Operator – Tuple – Introduction to Tuples – Creating Tuples – Inbuilt functions for Tuples –Indexing and Slicing – Operations on Tuples – Lists and Tuples – Sort the tuples.

UNIT –III: Decision Making Statements& Loop Control Statements

Decision Making Statements – Conditional Expressions – Loop Control Statements – The while Loop – The range () Function – The for Loop – Nested Loops – The break Statement – The continue Statement.

UNIT –IV: Functions and Strings

Functions – Syntax and Basics of a Function –Use of a Function – Parameters and Arguments in a Function – The Local and Global Scope of a Variable – The return Statement –Recursive Functions –The Lambda Function –The String Operators –String Operations.

UNIT –V: File Handling and Exception Handling

File Handling – Need of file Handling –Text Input and Output – Exception Handling – Errors and Exception –Python Exception and its Hierarchy –Handling Exception –Raising Exception –Modules –Packages on Python.



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TEXT BOOK:

Problem Solving and Python Programming – Ashok NamdevKamthane and Amit Ashok Kamthane–McGrawHall Education 2018

REFERENCE BOOKS:

1. *Problem Solving and Python Programming* – P.RadhaGanesan– Chess EducationalPublishers
2. *Python Programming: A Modular Approach* – SheetalTaneja and Naveen Kumar Pearson Publication
3. Tony Gaddis, *Starting out with Python (3C)*, Pearson, 2015.
4. Kenneth A.Lambert, *Fundamentals of Python*.
5. James Payne, *Beginning Python using Python 2.6 and Python 3*.
6. Charles Dierach, *Introduction to Computer Science using Python*.
7. Paul Gries, *Practical Programming: An Introduction to Computer Science using Python 3*.
8. Balagurusamy, *Introduction to Computer & Problem Solving using Python*, McGraw Hill Education, 2016.

DIGITAL TOOLS:

1. <https://www.guru99.com/python-tutorials.html>
2. <https://www.javatpoint.com/python-tutorial>
3. <https://www.studytonight.com/python/>
4. <https://www.programiz.com/python-programming>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2				
CO2		2	1			2
CO3	2			2	1	
CO4	2		2	1		2
CO5	2	2	2	1	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. R.P.UMADEVI



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCACP6	LAB – VI: PYTHON PROGRAMMING	CORE –14 LAB – VI	—	5	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course describes how to develop Website and Artificial Intelligence applications using Python programs

COURSE OBJECTIVES:

- To improve the creativity of the students during website creation.
- To make the students understand the concepts of python.
- To develop students' programming skills in python.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	know the basic concepts of python program and their execution.	Upto K3
CO 2	understand python structure and execute its application	Upto K3
CO 3	understand about Operators and slicing technique	Upto K3
CO 4	execute the programs using Decision making and looping statements.	Upto K3
CO 5	develop application using File Handling and Exception Handling	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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PYTHON PROGRAMMING – LAB

<u>Ex. No.</u>	<u>Name of the Programs</u>

1.	Write a Python program to compute addition of two numbers.
2.	Write a Python program to finding Total, Average and grade system of Student Marks.
3.	Write a Python program to calculate Area and Circumference of a Circle.
4.	Write a Python program to compute Temperature Conversion.
5.	Write a Python program to calculate of Simple Interest (SI).
6.	Write a Python program to check whether the number is Positive Number or Negative Nos.
7.	Write a Python program to check whether the year is Leap Year or Not.
8.	Write a Python program to calculate greatest of three numbers.
9.	Write a Python program to check whether the number is Prime Number or Not.
10.	Write a Python program to check whether the number is ODD or EVEN Number.
11.	Write a Python program to Swapping of two numbers without using temporary variable.
12.	Write a Python program to print the Fibonacci series using recursion.
13.	Write a Python program to calculate Factorial of a given number using recursion function.
14.	Write a Python program to calculate sum of digits of a given number using function.
15.	Write a Python program to reverse the given input number using function.
16.	Write a Python program to check whether the number is Palindrome Number or Not.
17.	Write a Python program to check whether the number is Armstrong Number or Not.
18.	Write a Python program to find the minimum and maximum of a list of numbers.
19.	Write a Python program: "tuple1 = (10,50,20,40,30)" i. To display the elements 10 and 50 from tuple1 ii. To display length of a tuple1. iii. To find the minimum element from tuple1. iv. To add all elements in the tuple1. v. To display same tuple1 multiple times.
20.	Write a Python program. i. To calculate the length of a string. ii. To reverse words in a string. iii. To display same string multiple times. iv. To concatenate two strings. v. Str1="South India" , using string slicing to display "India"

COURSE DESIGNER: Prof. R.P.UMADEVI



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SYLLABUS

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCACP7	LAB – VII: OPEN SOURCE TECHNOLOGY (PHP)	CORE-16 LAB – VII	–	5	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course helps the students to acquire the basic knowledge in designing a Web Page and also acquire the knowledge to learn programming in PHP to develop online applications.

COURSE OBJECTIVES:

To enable the students

- get the knowledge in various tags in HTML
- know the basics of PHP
- learn about the scripting in PHP for the development of applications.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the basic concepts of HTML	Upto K3
CO 2	learn about the basic concepts of PHP	Upto K3
CO 3	understand about the Looping statements and User Defined functions	Upto K3
CO 4	know about the PHP server side scripting	Upto K3
CO 5	acquire the knowledge in developing webpage	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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OPEN SOURCE TECHNOLOGY (PHP)

PHP:

1. Arithmetic operations.
2. If, Else, Else–If statements.
3. For each statement and is function statements.
4. Continue Break statements.
5. Arrays.
6. String functions.
7. Personal information using Post method.
8. Bus Ticket Reservation using Post method.
9. Employee Details using Get method.
10. Student Details using Get method.
11. Calendar function.
12. Multiplication Table.
13. Inheritance.
14. Validation.
15. Session.

COURSE DESIGNER: Prof. S.E.HEMAPRIYA



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**B.Sc.INFORMATION
TECHNOLOGY**



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40% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UITC52	TCP/IP	CORE-10	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

To understand the basic concept of networking and analyze various switching techniques. To get the knowledge of Transport Layer Services, TCP Services, Client Server Paradigm and Discuss FTP and web Documents.

COURSE OBJECTIVES:

To make the students

- understand about Basic of Networks
- understand about the Classes of IP Address
- understand about DNS and DHCP

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand about the basics concepts of Networking like devices, topology and networking	Upto K3
CO 2	analyze various switching techniques, Networking Sources, and Apply in IPV4 Addressing	Upto K3
CO 3	know Transport Layer Services, TCP Services, Client Server Paradigm	Upto K3
CO 4	analyse DHCP operation and DNS	Upto K3
CO 5	discuss FTP and Web Documents	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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TCP/IP

UNIT– I: Basics of Networks

Definition – Need for Network – Types of Network : LAN,WAN,MAN – Types of Topology: Bus, Star, Ring – Transmission Media : Coaxial Cables , Twisted Pair Wire , Optic Fibre – **Transmission Mode : Duplex , Full Duplex , Half Duplex, Modern-Connecting Devices** : Hub , Switches , NIC, Repeater, Bridges , Gateway.

UNIT– II: Network Layer

OSI Model: Layered Architecture – OSI Model – Layers in TCP/IP Protocol Suite. Switching: Circuit and Packet Switching – Connection Less and Connection Oriented Services –Ipv4 Address: Introduction – Classful and Classless addressing.

UNIT– III: TCP

Transport Layer Services: Process to Process, Addressing, Encapsulation and Decapsulation, Multiplexing and Demultiplexing, Flowcontrol, Connection and Connection less Protocols –Simple, Stop & Wait ,Go-Back N – TCP Services – TCP Connection : Error Control, Checksum, Acknowledgement, Retransmission. Client Server Paradigm: Client, Server , Concurrency, Socket Interface.

UNIT– IV: DHCP and DNS

Introduction – DHCP Operation – Configuration– DNS: Need for DNS – Namespace – DNS in the Internet– DNS Msg – Types of Record.

UNIT– V: FTP and WWW

FTP: Connections, Communication, Command processing, File Transfer – WWW Architecture : Hypertext and Hypermedia, Web client, Web server, Uniform Resources Locator (URL) – Web Documents: Static Documents, Dynamic Documents, Active Documents– Electronic mail : Architecture , User Agent , SMTP Commands & Responses, Mail Transfer Phases.

TEXT BOOK:

TCP/IP Protocol Suite 4th Edition – Behrouz A.Forouzan TATA McGrawHill Edition
CHAPTERS and CHAPTERS and SECTIONS (For UNIT–I, II, III,IV and V)

Unit – I: Page 20 – 30,

Unit – II: Page 95 – 107, 115 – 142

Unit – III: Page 375–379,386,390,391,395,465,466,543–546

Unit – IV: Page 569 – 579, 582–592, 598,599,

Unit – V: Page 630 –639, 657–659,660–663,681–686,687–691



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REFERENCE BOOKS:

1. Andrew S. Tanenbaum, *Computer Networks*, 4th Edition, Pearson Education,
2. E.Douglas Comer, David L. Stevens, *Internetworking with TCP/IP* – Volume - I, II and III

DIGITAL TOOLS:

1. <http://www.studytonight.com/computer-networks>
2. <http://www.techiwarehouse.com/engine/d9e99072/Basic-Networking-Tutorial>
3. <https://www.guru99.com/tcp-ip-model.html>
4. <https://www.simplilearn.com/tutorials/cyber-security-tutorial/what-is-tcp-ip-model>
5. http://xahlee.info/linux/tcp_ip_tutorial.html
6. https://www.tutorialspoint.com/ipv4/ipv4_tcpip_model.htm

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	1		1	
CO2		2	1			2
CO3	1	2	2	2	1	3
CO4	1	2	1	1	1	2
CO5	1	2	2	2	1	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. T. S. B. ARUN PRASANTH



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UITE52	BIG DATA FUNDAMENTALS	ELECTIVE – 1	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

Big Data Fundamentals consists of Big Data Concepts and Terminology, Big data Adoption and Planning, Enterprise Technologies and Big Data Business Intelligence and its Storage Technology.

COURSE OBJECTIVES:

1. To enable the students understand the fundamental concepts of Big data
2. To help them interpret Big data Adoption and Planning and Big data Storage Concept
3. To make them understand Big data and Processing Concepts and Big Data Analysis Techniques

COURSE OUTCOMES (CO)

After the completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand about fundamental concepts of Big data	Upto K2
CO 2	describe Big data Adoption and Planning	Upto K2
CO 3	understand about Big data Storage Concepts	Upto K3
CO 4	utilize Big data and Processing Concepts	Upto K3
CO 5	understand about Big Data Analysis Techniques	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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BIG DATA FUNDAMENTALS

UNIT– I: Introduction

Understanding Big Data: Concepts and Terminology : Dataset , Data Analysis , Data Analytics – Big Data Characteristics– Different types of data. **Business Motivations and Drivers for Big data Adoption:** Business Process Management – Information and Communications Technology – Internet of Everything.

UNIT– II: Adoption and Planning

Big data Adoption and Planning Considerations: Organization Prerequisites – Data Procurement – Privacy – Security – Provenance – Limited Real time Support – Distinct Performance Challenges – Distinct Governance Requirements – Distinct Methodology – Clouds– Big Data Analytics Lifecycle.

UNIT– III: Big Data Business Intelligence

Enterprise Technologies and Big Data Business Intelligence: Online Transaction Processing(OLTP) – Online Analytical Processing(OLAP) – Extract Transform Load(ETL)–Data Warehouses – Data Marts. **Big Data Storage Concepts:** Clusters – File Systems and Distributed File Systems –NoSQL – Sharding– Replication –ACID – BASE.

UNIT– IV: Big Data Processing Concepts

Big Data Processing Concepts: Parallel Data Processing – Distributed Data Processing – Hadoop– Processing Workloads – Cluster – Processing in Batch Mode –processing with map reduce –Processing in Real time Mode – Speed Consistency Volume (SCV).

UNIT– V: Storage Technology

Big Data Storage Technology: On–Disk Storage Devices – RDBMS Database –NoSQL Databases – Types Key value, document, column family, graph – In–Memory Storage Devices . Big Data Analysis Techniques: Quantitative Analysis– Qualitative Analysis – Data Mining – Machine Learning – Semantic Analysis

TEXT BOOK:

Big Data Fundamentals Concepts, Driver & Techniques, Thomas Erl, WajidKhattak and Paul Buhler, 3rdEdition, Pearson publication, 2018. Chapters: 1–8

REFERENCE BOOKS:

1. **Big Data Strategies**, Pam Baker ,1st edition , Cengage Learning India Private Limited, 2016.
2. **Big Data**, Dr. Anil Maheshwari, 1st edition , Published by McGraw Hill Education (India) Private Limited, 2017.
3. **Big Data and Analytics**, SeemaAcharya and Subhashini Chellappan, 2ndedition,Wiley India Private Limited, 2017.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2				
CO2		2	1			3
CO3	3	2	1	2	1	3
CO4		2	2	1	2	3
CO5	1	2	2	1	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNER: Prof. T. S. B. ARUN PRASANTH



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SYLLABUS

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UITE53	BIOMETRICS	ELECTIVE – 1	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

To Learn about the Biometrics authentication and analyze the Fingerprint and Hand Geometry with various recognition techniques and their future.

COURSE OBJECTIVES:

1. To give knowledge about Biometrics
2. To impart knowledge about Scanning and Fingerprints
3. To make the students understand about Biometric scanning and Evaluation

COURSE OUTCOMES (CO)

After the completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the Authentication Techniques and Key Elements of Biometrics	Upto K2
CO 2	analyze the Fingerprint and Hand Geometry theoretically	Upto K2
CO 3	get the knowledge of Iris and Retina Scanning and Signature Recognition and Key stroke Dynamics	Upto K2
CO 4	analyze about Hand Grip, Brain Wave pattern and their future	Upto K3
CO 5	discuss the future of Biometrics and its Testing and Evaluation	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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BIOMETRICS

UNIT- I:

How Authentication technologies work : What you Know–Passwords and PINs– Cards and Tokens – What you are: Biometrics – Multi–Factor authentication – Subverting the system – Deploying Authentication systems – Economics of Authentication –How **Biometrics work :** Brief History of Biometrics – Why Use Biometrics – Key Elements of Biometric System.

UNIT- II:

Fingerprint and Hand Geometry: – History of Fingerprints – Hand Geometry –**Facial and Voice recognition:** Facial recognition application – Facial recognition Technology – Voice Verification

UNIT- III:

Eye Biometrics: Iris and retina Scanning: – Iris recognition technology – Applications – Retina Scanning – Accuracy.

Signature Recognition and Keystroke Dynamics: Signature Recognition – Keystroke Dynamics

UNIT- IV:

Esoteric Biometrics – Vein pattern – Facial Thermography – DNA– Sweat pores – Hand Grip – Fingernail Bed – Body Odor – Ear – Gait– Skin Luminescence – Brain Wave Pattern – Footprint and Foot Dynamics – The Future.

UNIT- V:

Biometrics in large Scale Systems – Getting Started– Documenting the procurement process – specifying the systems – Same AFIS RFP Overview.

Biometric Testing and Evaluation: –Who tests and Who Benefits– The three bears principle– Best practices for Biometrics testing – Types of Testing – Certification.

TEXT BOOK:

Biometrics – The Ultimate References, John D. Woodward, Jr. Nicholas M. Orlans , Peter T. Higgins – Dreamteach Publishers 2003

REFERENCE BOOK:

Guide to Biometric Reference Systems and Performance Evaluation Petrovska – Delacretaz ,Dijana, chollet, Gerard, Dorizzi, Bernadette

DIGITAL TOOLS:

1. <http://www.biometric-solutions.com/fingerprint-recognition.html>
2. <https://www.rfwireless-world.com/Tutorials/Biometric-technology-tutorial.html>
3. <https://www.javatpoint.com/biometrics-tutorial>
4. <https://www.tutorialspoint.com/biometrics>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2			2	
CO2	1	2	1			3
CO3	2	1	1	2	1	3
CO4	1	2	2	1	2	3
CO5	1	2	3	1	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. S.E. HEMAPRIYA



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

20% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UITC61	SOFTWARE ENGINEERING	CORE – 13	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

This course helps to learn the basic concepts of Software Engineering such as planning, design, coding, cost estimation, verification and validation.

COURSE OBJECTIVES:

To enable the students

- understand the concepts of Software Engineering.
- understand the concepts of Cost estimation.
- understand the concepts of Verification and Validation Techniques.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the Planning and development process	Upto K3
CO 2	learn about the Software cost Estimation techniques	Upto K3
CO 3	understand how to prepare SRS and requirement specifications	Upto K3
CO 4	acquire the concepts of software designing and notations and	Upto K3
CO 5	apply the verification and validation techniques in software testing	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SOFTWARE ENGINEERING

UNIT– I:

Introduction to Software Engineering Some definitions – Quality and productivity factors – Managerial issue. Planning a software project: Definition the problem – Developing a solution strategy– planning the development process – planning an organization structure – other planning activities.

UNIT– II: Software Cost Estimation

Software – Cost factors – software cost estimation techniques – Specification techniques – staffing – level estimation – estimating software maintenance costs.

UNIT– III: Software requirements definition

The software requirements specification – format languages and processors for requirements specification.

UNIT– IV: Software Design

Fundamentals Design concepts – Modules and modularizing Criteria Design Notations – Design Techniques – Detailed Design Consideration – Test plan – Mile stones walk through and inspection – Design guide lines.

UNIT – V : SPM

Introduction to Project – Software Project Management – Need of Software Project Management – Software Management Activities – Types of software project management : Conflict , Risk, Requirement , Change , Software Configuration , Release – Aspects of Management : Planning, Leading, Execution, Time Management , Budget , Maintenance – Disadvantage – Project Management Process : Feasibility Study, Project Planning, Execution, Termination – Software Development Paradigm : Waterfall Model, Spiral Model , Iterative Model , V Model.

TEXT BOOK:

Richard E.Fairly, *Software Engineering Concepts*, McGraw Hill Book Company.

E-Content : Unit - V

CHAPTERS and SECTIONS (For UNIT–I, II, III,IV)

Unit – I:	Chapter 1 (1.1, 1.3, 1.4) , Chapter 2(2.1 to 2.5)
Unit – II:	Chapter 3(3.1 to 3.4)
Unit – III:	Chapter 4(4.1 to 4.3)
Unit – IV:	Chapter 5(5.1 to 5.5, 5.7 to 5.9)

REFERENCE BOOK:

Roger S. Pressman, *Software Engineering: A Practitioner's Approach*, McGraw Hill International Book Company.

DIGITAL TOOLS:

1. www.tutorialspoint.com/software_engineering/
2. www.computernotes.com/software-engineering
3. <https://www.geeksforgeeks.org/software-engineering-project-management-process/Unit V>
4. https://www.tutorialspoint.com/software_engineering/software_development_life_cycle.htm Unit - V

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2		1		
CO2		2	3			2
CO3	2			2	3	2
CO4	2		2	1		2
CO5	2	2	2	1	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNER: Prof. T.S.B. ARUN PRASANTH



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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40% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UITC62	RELATIONAL DATABASE MANAGEMENT SYSTEM	CORE-14	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course helps to provide fundamental concepts of Database Management System for the database architecture which enhances the user to analyze data normalization, Integrity Constraints and PL/SQL.

COURSE OBJECTIVES:

To learn various concepts of Database Architecture, Data Modeling, Analysis of Data Normalization, Integrity constraints, Queries and its Aggregate Functions and PL/SQL.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	remember the Quality of Information, Introduction of DBMS, RDBMS Characteristics, Types of DBMS	Upto K3
CO 2	know about Integrity Constraints .Apply the basic concepts of Database Architecture	Upto K3
CO 3	know about Data Modeling. Analyze the Data Normalization	Upto K3
CO 4	apply the Basic concept of SQL– Tables, Views and Indexes. Discuss about Queries, Sub Queries	Upto K3
CO 5	explain the application of Aggregate functions Discuss about Integrity Constraints and PL/SQL	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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SYLLABUS

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RELATIONAL DATABASE MANAGEMENT SYSTEM

UNIT – I: Introduction

Data, Information and Information processing : Introduction – Definition of Information – Quality of Information – Information Processing. Introduction to DBMS : Introduction – why a Database ? – characteristic of data in database – DBMS – why DBMS – Types of DBMS – DDLC.

UNIT – II: Introduction to RDBMS

Introduction – RDBMS Technology – The relation al data structure – Relational Data Integrity – Codd's rules – Database Architecture and Data Modeling : Introduction, Conceptual. Physical and Logical Database Model – Database design – Design Constraints.

UNIT – III: E–R Model

E–R Modeling : Introduction – ER– Model – Components of an ER Model – ER Modeling Symbol – Data Normalization : Introduction – Keys – Relationship – 1NF – 2NF–3NF –4NF – 5NF – DKNF – Denormalization .

UNIT – IV: Introduction to SQL and Tables

SQL Data types and Literals – Types of SQL Commands – SQL Operators – Arithmetic – Compare operators – Logical operators – Set operators – operation procedure.

Tables: Create a Table – Modify a Table – Deleting a Table : Aggregate function . Queries and sub queries

UNIT – V:Aggregate Function and PL/SQL

Aggregate function – insert, update and delete operation – data integrity – PL/SQL Blocks – Control Structure – Iterative Control statement.

TEXT BOOK:

Database Management System – Mathews Leon and Alex Leon – Tata McGraw Hill Education.

Unit – I:	Chapter 1 : Pg.No. 1,3–5 Chapter 5 : 99–116, Chapter 6 : 138–143
Unit – II:	Chapter 7 : Pg.No. 159–168, Chapter 8 : Pg.No 177–186
Unit – III:	Chapter 9 : Pg.No.159–211
Unit – IV:	Chapter 14 : Pg.No. 296 – 310, Chapter 15 : Pg.No. 319–320, Chapter 17 : Pg.No. 355 – 376
Unit – V	Chapter 18 : Pg.No. 386 – 390, Chapter 19 : Pg.No. 395 – 398, Chapter 28 : Pg.No. 567 – 577, Chapter 29 : 605 – 606, Chapter 46.D – 934, 945–948, 952 – 958

REFERENCE BOOKS:

1. Raghu Ramakrishnan & Johannes Gehrke *Database Management Systems*, 2nd edition, McGraw Hill international Edition,2003
2. C.J.Date, *An Introduction to Database Systems*, Pearson education 8th edition

DIGITAL TOOLS:

1. <http://www.studytonight.com/dbms/rdbms-concept.php>
2. <https://www.tutorialspoint.com/sql>
3. <https://beginnersbook.com/2015/04/rdbms-concepts/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1			1		
CO2		2	1	2		
CO3	1	2	2	2		3
CO4	1	2	2	2	1	3
CO5	1	2	2	3	1	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. S. E. HEMAPRIYA



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UITE63	ETHICAL HACKING	ELECTIVE-3	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course helps us to learn about need for Security, types of attacks, threats and also to know the knowledge about security planning and implementation of firewall and access tools.

COURSE OBJECTIVES:

To make the students

- understand about the basic of security.
- understand about various Threats.
- understand about Security Technologies.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the Basic knowledge of Hacking and types of attacks	Upto K3
CO 2	explain about the Foot printing methods ,tool and ensure to protect environment.	Upto K3
CO 3	apply to safe ethical techniques in the world wide web to be beneficial to the society.	Upto K3
CO 4	examine and understand the knowledge about various techniques cracking tools , Keyloggers and spyware	Upto K3
CO 5	understand about penetration testing and evaluate, improve the testing.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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ETHICAL HACKING

UNIT-I: Introduction to Hacking

Importance of Security – Elements of Security – Phases of an Attack – Types of Hacker Attacks – Hacktivism – Vulnerability Research.

UNIT-II: Foot Printing

Introduction to Foot printing – Information Gathering Methodology – Foot printing Tools – WHOIS Tools – DNS Information Tools – Locating the Network Range.

UNIT-III: Scanning

Objectives – Scanning Methodology – Tools – Introduction to Enumeration – Enumeration Techniques – Enumeration Procedure – Tools.

UNIT-IV: Cracking Passwords

Password Cracking Websites – Password Guessing – Password – Cracking Tools – Password Cracking – Counter measures – Escalating Privileges – Executing Applications – Keyloggers and Spyware

UNIT-V: Penetration Testing

Introduction to Penetration Testing, Phases of penetration testing, tools.

TEXT BOOK:

Ec-Council, *Ethical Hacking and Countermeasures: Attack Phases*, Delmar Cengage Learning, USA, 2009.

Unit – I:	Chapter 1 (Sec: 1.1 to 1.10)
Unit – II:	Chapter 2(Sec: 2.1 to 2.29)
Unit – III:	Chapter 3(Sec: 3.1 to 3.46), Chapter 4 (Sec: 4.1 to 4.35)
Unit – IV:	Chapter 5(Sec: 5.1 to 5.37)
Unit – V:	Chapter 6(Sec: 6.1 to 6.27)

REFERENCE BOOKS:

1. Gary Hall, *Hacking, Computer Hacking, Security Testing, Penetration Testing, and Basic Security*, Kindle Edition, Kindle Direct Publishing, USA, 2016.
2. Alan T. Norman, *Computer Hacking Beginners Guide*, Kindle Edition, Kindle Direct Publishing, USA, 2016.
3. Andrew Huang, *The Hardware Hacker*, 1st Edition No Starch Press, USA, 2017.

DIGITAL TOOLS:

<https://www.synopsys.com>
<https://www.simplilearn.com/cyber-security-tutorial>
<https://www.javatpoint.com/ethical-hacking-tutorial>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	3	3	2	2
CO2	2	1	3	2	3	3
CO3	1	3	2	3	2	2
CO4	3	2	3	3	3	2
CO5	3	3	2	2	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNER: Prof. T. S. BARUN PRASANTH



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B.A. TAMIL



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

100% Revision New Course

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UTLC52	யாப்பருங்கலக்காரிகை – யாப்பிலக்கணம்	CORE – 10	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	V	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

யாப்பிலக்கண வகைகளை அறிந்து பிழையின்றி எழுதவும், படிக்கவும் படைப்புகளை உருவாக்கும் முயற்சியில் மாணவர்களை ஈடுபடுத்தும் முறையில் இத்தாள் அமைக்கப்பட்டுள்ளது.

COURSE OBJECTIVE:

மாணவர்கள், வெண்பா, ஆசிரியப்பா, கலிப்பா, வஞ்சிப்பாக்களின் வகை மற்றும் இனங்களைப்பற்றி அறிந்து படைப்புகளை உருவாக்கும் முயற்சியில் இத்தாள் வடிவமைக்கப்பட்டுள்ளது.

COURSE OUTCOMES (COs):

No.	கற்றல் அடைவுகள்	Knowledge Level (According to Bloom's Taxonomy)
CO 1	யாப்பருங்கலக்காரிகை வழி தமிழ்ப்பாக்கள் பாவகைகள் மற்றும் பாவினங்களை அறிதல்	Upto K3
CO 2	ஆசிரியப்பா, கலிப்பா, வஞ்சிப்பாக்களின் வகை மற்றும் இனங்களின் வரையறைகளைக் கற்றுணர்தல்	Upto K3
CO 3	இலக்கியத்தின் பாடுபொருளுக்கும் அதன் வடிவத்திற்குமான தொடர்பினை புரிந்து கொள்ளல்.	Upto K3
CO 4	காலந்தோறும் மாற்றம் பெற்று வந்துள்ள யாப்பு வடிவங்களைப் புரிந்து கொள்ளல்	Upto K3
CO 5	பா, பாவகை, பாவினங்களைப் படைக்கவும், பயின்று நயம் உணரவும், உணர்த்துவும் பயிற்சி பெறுதல்.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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யாப்பருங்கலக்காரிகை – யாப்பிலக்கணம்

கூறு: 1

உறுப்பியல்

எழுத்து அசை சீர்

கூறு: 2

தளை அடி தொடை

கூறு: 3

செய்யளியல்

வெண்பா, ஆசிரியப்பா

கூறு: 4

வஞ்சிப்பா, கலிப்பா, மருட்பா

கூறு: 5

பா அலகிடும் பயிற்சி

ஆசிரியப்பா வெண்பா எழுதும் பயிற்சி

பாடநூல்:

யாப்பருங்கலக்காரிகை – அமிதசாகரர்

பார்வை நூல்கள்:

1. அ. கி. பரந்தாமனார் – கவிஞராக
2. அரங்கராசன் – யாப்பறிந்து யாப்புனைய

DIGITAL TOOLS:

1. www.store.tamilexicon.com,
2. www.kala.tamilforum.blogspot.com
3. www.noolaham.in,
4. www.tamipeper.com,
5. www.sangatham.com

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3		1		
CO2	2	3	1		
CO3		3	1		
CO4	3			2	
CO5					3

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNER: Dr. K. R. KRISHNARAM



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

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20% Revision

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UTLC61	சங்க இலக்கியம்	CORE – 13	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

பாட்டும் தொகையும் என அமைந்த அடையாளமான சங்க மரபினை வெளிப்படுத்தும் முறையில் இத்தாள் அமைந்துள்ளது.

COURSE OBJECTIVE:

பாட்டும் தொகையும் என அமைந்த தமிழின் தனித்த அடையாளமான சங்க மரபினை விளக்கும் முறையில் இத்தாள் வடிவமைக்கப்பட்டுள்ளது.

COURSE OUTCOMES (COs):

No.	கற்றல் அடைவுகள்	Knowledge Level (According to Bloom's Taxonomy)
CO 1	சங்க இலக்கிய வகைமையும், வடிவத்தையும் தெரிந்து கொள்ளுதல்.	Upto K3
CO 2	சங்க இலக்கியத்தின் செவ்வியல் தன்மையை அறிந்து கொள்ளுதல்	Upto K3
CO 3	சங்க கால தமிழ் சமூகத்தின் பண்பாட்டை புரிந்துகொள்ளல்.	Upto K3
CO 4	சங்க இலக்கியங்களில் எடுத்துரைப்பு முறைகள், இலக்கிய உத்திகள் முதலியவற்றை புரிந்து கொள்ளல்	Upto K3
CO 5	பிற்கால இலக்கியங்களின் மீதான சங்க பனுவல்களின் தாக்கத்தினை இனங்காணும் திறனைப் பெறுதல்	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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சங்க இலக்கியம்

கூறு: 1

நெடுநல் வாடை

கூறு: 2

பத்துப்பாட்டு – சிறுபாணாற்றுப்படை

கூறு: 3

1. நற்றிணை – 5 பாடல்கள் (42, 80, 149, 151, 153)
2. குறுந்தொகை – குறிஞ்சி (1, 11, 33, 47, 111, 134)
முல்லை (259, 267, 271, 275, 281)
மருதம் (285, 288, 290, 305, 314)
நெய்தல் (334, 347, 353, 367, 400)
பாலை (151, 168, 186, 207, 226)
3. ஐங்குறுநூறு – நெய்தல், திணை – 10 பாடல்கள்
வெள்ளாங்குருது – 10

கூறு: 4

1. பதிற்றுப்பத்து – பரணர் – ஐந்தாம்பத்து
2. பரிபாடல் – 3 பாடல்கள் – வகைக்கு ஒன்று
திருமால் பாடியது 3ஆம் பாடல்
செவ்வேல் பாடியது 9ஆம் பாடல்
வையை பாடியது 11ஆம் பாடல்

கூறு: 5

1. கலித்தொகை – 3 பாடல்கள் (25, 43, 99)
2. அகநானூறு – 3 பாடல்கள்
முல்லை (134), நெய்தல் (200), குறிஞ்சி (222)
3. புறநானூறு – 8 பாடல்கள்
(20, 36, 182, 183, 188, 189, 192, 312)

பாடநூல்:

சங்க இலக்கியம்

பார்வை நூல்கள்:

1. கு.வெ. பாலசுப்பிரமணியன் NCBH Book House, சென்னை.
2. ந. சுப்புரெட்டியார் **அகத்திணை இலக்கிய கொள்கைகள்**
3. வ.சுப. மாணிக்கம் – **தமிழக்காதல்** மணிவாசகர் பதிப்பகம், சென்னை
4. தமிழண்ணல் – **பரிசில் வாழ்க்கை** பாரிநிலையம், சென்னை
5. இரா. குமரன் – **செவ்வியல் நூல்கள் 41**, கவின் பதிப்பகம், தஞ்சாவூர்



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

DIGITAL TOOLS:

- www.puram400.org,
- www.chennailibrary.com
- www.sangatamil.com,
- www.noolaham.in,
- www.semmozhitamil.com
- www.tamilvu.org,
- www.projectmadurai.org,
- www.learnsangatamil.com
- www.sangampoemsinenglish.wordpress.com

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	2	3		
CO2	1	2	3		
CO3	1	1		2	
CO4	1			2	3
CO5	2			3	

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNER: Dr. K. R.KRISHNARAM



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100% Revision New Course

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UTLC64	தண்டியலங்காரம் – அணி இலக்கணம்	CORE – 16	5	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

தமிழ் இலக்கண மரபை புரிந்து கொள்ளும் வகையிலும் இலக்கியங்களில் பயன்படுத்த பெற்றுள்ள அணிகளின் சிறப்பை உணர்ந்து கொள்ளும் வகையிலும் இத்தாள் அமைந்துள்ளது.

COURSE OBJECTIVE:

செய்யுளில் பயன்படுத்த பயன்படும் பல்வகை அணிகளின் பயன்பாட்டினை அறியவைத்து உணர்ச்செய்வதே நோக்கமாகக் கொண்டு இத்தாள் வடிவமைக்கப்பட்டுள்ளது.

COURSE OUTCOMES (COs):

No.	கற்றல் அடைவுகள்	Knowledge Level (According to Bloom's Taxonomy)
CO 1	தமிழ் அணி இலக்கண மரபு குறித்து அறிந்து கொள்ளல்	Upto K3
CO 2	தண்டியலங்காரம் கட்டமைக்கும் அணி வகைகளை அறிந்து கொள்ளல்	Upto K3
CO 3	மடக்கு சித்தரக்கவி வழுக்களின் வகைகளைத் தெரிந்து கொள்ளல்	Upto K3
CO 4	இலக்கிய எடுத்துரைப்புக்கும் அணிகளுக்குமான தொடர்பினை புரிந்து கொள்ளல்	Upto K3
CO 5	சமூக கால பணுவல்களில் பயின்று வரும் அணி வகைகளை இனம் காணும் திறனைப் பெறுதல்.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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தண்டியலங்காரம் – அணி இலக்கணம்

கூறு: 1

பொதுவணியியல்

பொருளணியியல்

(தன்மையணி முதல் பின்வருநிலையணி வரை)

கூறு: 2

பொருளணியியல்

(முன்னவிலக்கணி முதல் இலேசவணி வரை)

கூறு: 3

பொருளணியியல்

(நிரல் நிறையணி முதல் விசேட அணி வரை)

கூறு: 4

பொருளணியியல்

(ஒப்புமைக் கூட்டணி முதல் பாவிக அணி வரை)

கூறு: 5

சொல்லணியியல்

சித்திரக்கவி – 20

வழுக்களின் வகைகள் – 9

மலைவு – 6

பாடநூல்:

தண்டியலங்காரம் – தண்டியடிகள்

அணி இலக்கணம்

பார்வை நூல்கள்:

1. கண்ணன். இரா. 2003, அணி இலக்கண வரலாறு, கூட்டல் பதிப்பகம், சென்னை.
2. அறவேந்தன். இரா. 2004, தமிழ் இலக்கண மரபும், இலக்கண மறுவாசிப்பும், சபாநாயகம் பப்ளிக்கேசன் சிதம்பரம்.

DIGITAL TOOLS:

1. www.suntan.com
2. www.ilakkanam.org
3. <http://www.tamilvu.org/library/10800/html/10800ind.htm>
4. <http://store.tamillexicon.com/jz;bayq;fhuk/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1		3		
CO2	1		3		
CO3		3			
CO4	2		3	3	3
CO5	1		2		3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. K. R.KRISHNARAM



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SYLLABUS

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100% Revision New Course

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UTLEV1	செய்தித்தாள் தயாரித்தல்	PROJECT ELECTIVE – 3	5	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

செய்தி நிறுவனத்தில் இதழியல் தொழில்நுட்பங்களைக் கொண்டு செய்தித்தாள் தயாரிக்கும் முறைகளை கற்பதன் மூலம் தனிமனித வளர்ச்சி காண வைப்பதே இத்தாளின் நோக்கமாகக் கொண்டு அமைக்கப்பட்டுள்ளது.

COURSE OBJECTIVE:

இன்றைய உலகில் தகவல் தொடர்பு முக்கிய இடம் வைக்கிறது. இவ்வகையில் செய்தித்தாள் தயாரிக்கும் பயிற்சிகளின் மூலம் பணிவாய்ப்பினை பெறுவதற்கான அடிப்படைத் திறன் வளர்க்கும் நோக்கில் இத்தாள் வடிவமைக்கப்பட்டுள்ளது.

COURSE OUTCOMES (COs):

No.	கற்றல் அடைவுகள்	Knowledge Level (According to Bloom's Taxonomy)
CO 1	தகவல் பரிமாற்றத்தின் வளர்ச்சி வரலாறு அறிய வைத்தல்	Upto K3
CO 2	இதழியல் பணி மற்றும் கடமை குறித்த புரிதலை பெறுதல்	Upto K3
CO 3	தற்கால இதழியில் சமூகம், செய்தியாளரின் கடமை சிந்தனைகளை உணர்த்துதல்.	Upto K3
CO 4	ஊடகத்துறையில் பணி வாய்ப்பினை பெறும் தகுதியினை அடையச் செய்தல்	Upto K3
CO 5	தனிமனித வளர்ச்சியை அடைய செய்தி தயாரிக்கும் திறன் வளர்ச்சி அறியச் செய்து முன்னேற்றம் காண வைத்தல்.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY



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செய்தித்தாள் தயாரித்தல்

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1		2		
CO2		2			
CO3	3	2			3
CO4	1	3		2	
CO5	1		2		3

3. Advanced Application 2. Intermediate Development 1. Introductory Level
COURSE DESIGNER: Dr. K. R.KRISHNARAM



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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UTLEV2	குறும்படம் தயாரித்தல்	PROJECT ELECTIVE –3	5	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

குறும்படம் தயாரித்தலின் மூலமாக காட்சி ஊடகத்தில் காணப்படும் வளர்ச்சியை அறிவதன் முறையில் சமூகத்தில் விழிப்புணர்வு நன்மை, தீமை முக்கிய பங்கினை உணர்த்தலும், பணி வாய்ப்பின் அவசியத்தை எடுத்துரைத்தலும் நோக்கமாகக் கொண்டு இத்தாள் அமைந்துள்ளது.

COURSE OBJECTIVE:

காட்சி ஊடகங்களை அறிந்து கொள்ளல் – நல்ல பயனுள்ள ஆக்கங்களை வளர்த்தல் – சமூக சிந்தனைகளை வளர்த்தல் – திரைக்கலைஞர் ஆகுதல் – சிறந்த குறும்படங்களை உருவாக்குதல் ஆகியவை நோக்கமாகக் கொண்டு இத்தாள் வடிவமைக்கப்பட்டுள்ளது.



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குறும்படம் தயாரித்தல்

பார்வை நூல்கள் : குறும்படம்

1. மருதக்குடியும், மகாலட்சுமி என்கிற எருமையும், இயக்குநர் போ. மணிவண்ணன்
2. ஆயிசா – இயக்குநர், நடராசன்
3. ஈஇ – இயக்குநர் மார்ட்டின்
4. நாக் அவுட் – இயக்குநர் லெனின்

RELATED ONLINE CONTENTS:

1. Filmstrips India (Youtube)
2. Sramakrishnan.com (Website)
3. Wikipedia

DIGITAL TOOLS:

1. ஒரு கண் ஒரு பார்வை :
http://thamizhstudio.com/shortfilms_okop.php
2. ராஜாங்கத்தின் முடிவு:
http://thamizhstudio.com/shortfilms_rajangathin_mudivu.php
3. நடந்த கதை:
<http://www.youtube.com/watch?v=H7Pja1 ulHOY>
4. பெல்அடிச்சாச்சு:
<http://www.youtube.com/watch?v=2kHiFdO jUE>
5. தமிழ்:
<http://www.youtube.com/watch?v=ZiMw4pWPAjs>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1		2		
CO2		2			
CO3	3	2			3
CO4	1	3		2	
CO5	1		2		3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. K. R.KRISHNARAM



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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UTLEV3	ஆவணப்படம் தயாரித்தல்	PROJECT ELECTIVE – 3	5	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
III	VI	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

ஆவணப்படம் தயாரிப்பதன் மூலம் காட்சி ஊடகத்தை அறிந்து படைப்பாக்கத்திற்கு மூலம் சமூகத்தில் விழிப்புணர்வு ஏற்படுத்தல் மற்றும் தேசப்பற்று சிந்தனை ஏற்படுத்தல் முதலியவை நோக்கமாகக் கொண்டு இத்தாள் அமைந்துள்ளது.

COURSE OBJECTIVE:

காட்சி ஊடகங்களை அறிந்து கொள்ளல் – படைப்பாற்றல் திறனை வளர்த்தல் – சமூகத்திற்கு விழிப்புணர்வு உண்டாக்குதல் – தேசிய உணர்வு சிந்தனை தூண்டுதல் – சிறந்த ஆவணப்படங்களை உருவாக்குதல் முதலியவை நோக்கமாகக் கொண்டு இத்தாள் வடிவமைக்கப்பட்டுள்ளது.

ஆவணப் படம் தயாரித்தல்

1. ஆவணப்படம் – சிறகுகளின் சொர்க்கம் (Wings of Paradise)

இயக்குநர் போ. மணிவண்ணன்

2. ஆவணப்படம் – இராமையாவின் குடிசை

இயக்குநர் – பாரதி கிருட்டினகுமார்

3. ஆவணப்படம் – சயாம் மரண ரயில்

இயக்குநர் குறிஞ்சி வேந்தன்

RELATED ONLINE CONTENTS:

1. Filmstrips India (Youtube)

2. Wikipedia



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NEW COURSES



SOURASHTRA COLLEGE, MADURAI – 625004

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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

**B.Sc. COMPUTER SCIENCE
(CLOUD COMPUTING AND
CYBER SECURITY)**



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS

(Under CBCS based on OBE) (with effect from 2023 – 2024)

New Course

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23UCDC11	PROGRAMMING IN C	CORE – 1	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course provides the fundamental knowledge of a programming language and its features which enhances the user to write general purpose application programs.

COURSE OBJECTIVES:

- To introduce and form a firm foundation in programming
- To stress the importance of clarity, simplicity and the efficiency in writing programs

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	identify the basic concepts needed for program development	Upto K3
CO2	apply the basic concepts and develop program to find solutions for simple problems	Upto K3
CO3	design programs to solve complex problems by using suitable control statements	Upto K3
CO4	analyze the problem and design efficient program using functions	Upto K3
CO5	use array and structure to handle volume of data	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2– UNDERSTANDING, K3– APPLICATION



SOURASHTRA COLLEGE, MADURAI – 625004

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B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS

(Under CBCS based on OBE) (with effect from 2023 – 2024)

PROGRAMMING IN C

UNIT – I:

Overview of C: History of C – Importance of C – Basic Structure of C Programs – Programming Style – Character Set – C Tokens – Keywords and Identifiers – Constants, Variables and Data Types – Declaration of Variables – Defining Symbolic Constants – Declaring a variable as a constant – overflow and underflow of data. **Operators and Expressions:** Arithmetic, relational, logical, assignment operators – increment and decrement operators, conditional operators, bitwise operators, special operators – **Arithmetic Expressions** – Evaluation of Expressions – Precedence of Arithmetic Operators – Type Conversions in Expressions – Operator Precedence and Associativity – Mathematical functions.

UNIT – II:

Managing I/O Operations: Reading and Writing a Character – Formatted Input, Output – Decision Making & Branching: if statement – if else statement – nesting of if else statements – else if ladder – switch statement – the ?: operator – goto statement – the while statement – do statement – the for statement – jumps in loops.

UNIT – III:

Arrays: One– Dimensional Arrays – Declaration, Initialization – Two– Dimensional Arrays – Multi– dimensional Arrays – Dynamic Arrays Initialization. **Strings:** Declaration, Initialization of string variables – reading and writing strings – string handling functions.

UNIT – IV:

User– defined functions: Need – multi– function programs – elements of user defined functions – definition – return values and their types – function calls, declaration, category – all types of arguments and return values – nesting of functions – recursion – passing arrays, strings to functions – scope visibility and life time of variables. **Structures and Unions:** Defining a structure – declaring a structure variable – accessing structure members – initialization – copying and comparing – operation on individual members – array of structures – arrays within structures – structures within structures – structures and functions –unions– size of structures – bit fields.

UNIT – V:

Pointers : Understanding Pointers, Accessing the address of a variable – declaring, initialization of pointer variables – accessing a variable through its pointer – chain of pointers– pointer increments and scale factors – pointers and character strings – pointers as function arguments – pointers and structures. **Files:** Defining, opening, closing a file – IO Operations on files – Error handling during IO operations – command line arguments.



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B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS

(Under CBCS based on OBE) (with effect from 2023 – 2024)

TEXT BOOKS:

1. *Programming in ANSI C*, E. Balagurusamy, 7th Edition, Tata Mc Graw Hill Publishing Company, 2017.

REFERENCE BOOKS:

1. *Programming with C*, Schaum's Outline Series, Gottfried, Tata McGraw Hill, 2006.
2. *Programming with ANSI and Turbo C*, Ashok N. Kamthane, Pearson Education, 2006.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	–	–	–	–	–
CO2	–	2	1	–	–	2
CO3	2	–	–	–	–	–
CO4	2	–	2	3	–	1
CO5	2	2	2	3	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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(Under CBCS based on OBE) (with effect from 2023 – 2024)

New Course.

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23UCDCP1	LAB: PROGRAMMING IN C	CORE – 2 LAB – I	–	6	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course is designed to develop logic and programming skills through immersion in the fundamentals of C which enhances the user to write general purpose application programs in C.

COURSE OBJECTIVES:

- To develop logics which will help them to create programs, applications in C.
- To enhance the analyzing and problem solving skills and use the same for writing programs in C.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	Understand basic Structure of the C-PROGRAMMING, declaration and usage of variables	Upto K3
CO2	Manage I/O operations in your C program	Upto K3
CO3	Control the sequence of the program and give logical outputs	Upto K3
CO4	Apply code reusability with functions and pointers	Upto K3
CO5	Understand the basics of file handling mechanisms	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2– UNDERSTANDING, K3– APPLICATION



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(Under CBCS based on OBE) (with effect from 2023 – 2024)

LAB: PROGRAMMING IN C

Section A:

1. Write a C Program to find the sum of digit
2. Write a C Program to check whether a given number is Armstrong or not
3. Write a C Program to check whether a given number is Prime or not
4. Write a C Program to generate the Fibonacci series
5. Write a C Program to display the given number is Adam number or not
6. Write a C Program to print reverse of the given number and string
7. Write a C Program to find minimum and maximum of '_n' numbers using array
8. Write a C Program to arrange the given number in ascending order
9. Write a C Program to add, subtract and multiply two matrices
10. Write a C Program to calculate NCR and NPR

Section B:

11. Write a C Program to find the grade of a student using else if ladder
12. Write a C Program to implement the various string handling functions
13. Write a C Program to create an integer file and display the even numbers only
14. Write a C Program to calculate quadratic equation using switch– case
15. Write a C Program to implement the various string handling function
16. Write a C Program to generate student mark list using array of structures
17. Write a C Program to create and process the student mark list using file
18. Write a C Program to create and process pay bill using file
19. Write a C Program to create and process inventory control using file
20. Write a C Program to create and process electricity bill using file



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(Under CBCS based on OBE) (with effect from 2023 – 2024)

New Course .

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23UCDA11	MATHEMATICAL FOUNDATIONS - I	ALLIED – 1	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course provides the fundamental knowledge of Mathematical foundations like Logic, Relations, Counting, Graph Theory and Matrices.

COURSE OBJECTIVES:

- To impart knowledge on solving problems using Logic
- To give the basic ideas about Relation
- To teach the basic concepts of Counting
- To give the basic concepts of Graph Theory and its applications
- To solve various problems using Matrices

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	discuss the idea of Proposition, Predicates and Quantifiers	Upto K3
CO2	identify the basic concepts of Relations	Upto K3
CO3	explain the basic concepts of Pigeonhole principle, Permutation, Combination and applications of Recurrence relations.	Upto K3
CO4	acquire knowledge about the basic concepts of Graph Theory and its applications	Upto K3
CO5	find Eigen values and Eigen vectors using matrix concept	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2– UNDERSTANDING, K3– APPLICATION



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(Under CBCS based on OBE) (with effect from 2023 – 2024)

MATHEMATICAL FOUNDATIONS – I

UNIT – I: The Foundations: Logic and Proofs

Propositional logic – Applications of Propositional logic – Propositional equivalences – (Exclude Propositional satisfiability, Applications of satisfiability, Solving satisfiability problems, and its related problems) – Predicates and Quantifiers – Rules of inference.

UNIT – II: Relations

Relations and their properties – Representing relations – Closures of relations – Partial orderings (Theorems statement only; Exclude lexicographic ordering – Exclude Lattices)

UNIT – III: Counting

The basic of counting – The pigeonhole principle – Permutation and Combinations – Applications of recurrence relations – Solving recurrence relations – Divide and Conquer algorithms and recurrence relations. (All theorems and Results statement only)

UNIT – IV: Graphs

Graphs and Graphs models, (Excluding Biological networks; Tournaments; all its related examples and problems) – Graph terminology and special types of graphs – Representing graphs and Graph isomorphism – Connectivity (paths – connectedness in undirected graphs – paths and isomorphism – counting paths between vertices) – shortest path problems.

UNIT – V: Matrices

Introduction – operations – inverse – Rank of a matrix, solution of simultaneous linear equations – Eigen values and Eigen Vectors.

TEXT BOOKS:

1. *Discrete Mathematics and its Applications*, Seventh Edition, Kenneth. H. Rosen, Mc Graw Hill Publishing Company, 2012.
2. *Discrete Mathematics*, M. Venkataraman, N. Sridharan and N. Chandrasekaran, The National Publishing Company, 2009.

REFERENCE BOOKS:

1. *Modern Algebra* – S.Arumugam and A. Thangapandi Isaac, SciTech publications, 2005.
2. *Invitation to Graph Theory* – S.Arumugam and S.Ramachandran, Scitech Publications, 2005, Chennai.
3. *Discrete Mathematical Structures with applications to Computer Science* – Tremblay and Manohar, McGrawHill, 1997.
4. *Mathematical Structure for Compute Science, Discrete Mathematics and its Applications*, Judith L.Gersting, W.H.Freeman and Company, Seventh Edition, 2014.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	–	–	3	2	–	3
CO2	–	–	3	2	–	3
CO3	–	–	3	2	–	3
CO4	–	–	3	2	–	3
CO5	–	–	3	2	–	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS

(Under CBCS based on OBE) (with effect from 2023 – 2024)

New Course .

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23UCDS11	LAB: PC ASSEMBLING, TROUBLE SHOOTING AND SYSTEM MANAGEMENT	SBS – 1 LAB – II	–	2	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

This course provides the fundamental knowledge of component identification, memory-system, peripheral installation and configuration, preventive maintenance, hardware repair/Troubleshooting, installation/format Operating system and system configuration, and device-drivers.

COURSE OBJECTIVES:

- It aims to Understand basic concept & structure of Computer Hardware & Networking Components.
- To Apply their knowledge about computer peripherals to identify/rectify problems on board.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	A hands-on approach will be used to provide the student with a basic skill level to work on a computer with the lid off	Upto K3
CO2	Student will be able to understand the hardware specifications that are required to run operating system and various shipboard application programs.	Upto K3
CO3	Perform routine maintenance, upgrades	Upto K3
CO4	Manage data backup & restore operations on server and update anti-virus software and set schedules	Upto K3
CO5	Learn basic networking hardware and tools	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2– UNDERSTANDING, K3– APPLICATION



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B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS

(Under CBCS based on OBE) (with effect from 2023 – 2024)

LAB: PC ASSEMBLING, TROUBLESHOOTING AND SYSTEM MANAGEMENT

PC Assembling

Installing the motherboard.
Installing the CPU and heat sink.
Installing the RAM.
Installing the power supply.
Installing the hard disk and optical drive.
Connecting various cables (ATX power connector, cabinet cables for power, reset button, front USB/audio panel cable).
BIOS settings – setting time, changing boot sequence, system password setting
Changing CMOS battery
Connecting extra cabinet fan

PC Troubleshooting

Booting with CD/DVD, pen drive, LAN & hard disk with different OS
Formatting hard drive.
Installing the OS and drivers.
Troubleshooting BSOD (blue screen of death)
Installation of service packs, applications such as MS Office, Anti-virus software.
Creating restore point and backup a drive.
Using hard disk tools (sfc, disk checker, defragmenter, data recovery).
Windows update, registry fix, msconfig, gpedit.
Using repair tools like ccleaner, system mechanic, malware bytes.

System Management

Familiarization with configuring and installing a LAN (Assign IP addresses)
Internet connection sharing over LAN
File transfer over LAN
Installing and using web browser and firewall
Using search engines like Google
CD/DVD burning – image burning – data/audio/video CD/DVD making with Nero
Playing audio and video with VLC media player – creating play list.

REFERENCE BOOKS:

1. Mueller, Scott, *Upgrading & Repairing PCs*, 14th Edition, Que Publishing, 2003.
Moulton, Pete, "A+ Certification and PC repair Guide", 2nd Edition, Prentice Hall PTR, 2002.
2. Loukides, Mike, Musumeci, G., *System Performance Tuning*, 2nd Edition, O'Reilly, 2002.
3. Bigelow, Stephen, *Troubleshooting, Maintaining & Repairing PCs*, 5th Edition, Osborne, 2002.



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(Under CBCS based on OBE) (with effect from 2023 – 2024)

New Course .

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23UCDC21	JAVA PROGRAMMING	CORE – 3	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course teaches students the syntax of the Java programming language; object-oriented programming with the Java programming language; creating graphical user interfaces (GUI), exceptions, and file input/output (I/O).

COURSE OBJECTIVES:

- To understand the basic concepts and fundamentals of platform independent object oriented language.
- To demonstrate skills in writing programs using exception handling techniques and multithreading.
- To understand streams and efficient user interface design techniques.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the basic concepts of Object oriented programming and java evolution and features	Upto K3
CO 2	apply the basic concepts of OOP, java features and its applications.	Upto K3
CO 3	write object oriented programs using Inheritance, Strings and Vectors, Interfaces.	Upto K3
CO 4	design object oriented programs, multithreading, exception handling,	Upto K3
CO 5	understand Packages and Data files in JAVA.	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY



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B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS

(Under CBCS based on OBE) (with effect from 2023 – 2024)

JAVA PROGRAMMING

UNIT – I: Fundamentals of Object – Oriented Programming

Introduction, Object Oriented paradigm, Basic Concepts of OOP, Benefits of OOP, Applications of OOP, Java features.

Overview of Java Language: Introduction, Simple Java program structure, Java tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Command line arguments.

Constants, Variables & Data Types: Introduction, Constants, Variables, Data Types, Declaration of Variables, Giving Value to Variables, Scope of variables, Symbolic Constants, Type casting, Getting Value of Variables, Standard Default values; Operators & Expressions.

UNIT – II: Decision Making & Branching:

Introduction, Decision making with if statement, Simple if statement, if. Else statement, Nesting of if. else statements, the else if ladder, the switch statement, the conditional operator.

Decision Making & Looping: Introduction, The While statement, the do– while statement, the for statement, Jumps in loops.

Classes, Objects & Methods: Introduction, Defining a class, Adding variables, Adding methods, Creating objects, Accessing class members, Constructors, Method overloading, Static members, Nesting of methods;

UNIT – III: Inheritance:

Extending a class, Overloading methods, Final variables and methods, Final classes, Finalizer methods, Abstract methods and classes;

Arrays, Strings and Vectors: Arrays, One– dimensional arrays, Creating an array, Two–dimensional arrays, Strings, Vectors, Wrapper classes

Interfaces: Multiple Inheritance: Introduction, Defining interfaces, Extending interfaces, Implementing interfaces, Assessing interface variables;

UNIT – IV: Multithreaded Programming:

Introduction, Creating Threads, Extending the Threads, Stopping and Blocking a Thread, Lifecycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the „Runnable“ Interface.

Managing Errors and Exceptions: Types of errors: Compile– time errors, Runtime errors, Exceptions, Exception handling, Multiple Catch Statements, Using finally statement.

UNIT – V: Packages:

Introduction, Java API Packages, Using System Packages, Naming conventions, Creating Packages, Accessing a Package, using a Package.

Managing Input/ Output Files in Java: Introduction, Concept of Streams, Stream classes, Byte Stream Classes, Input Stream Classes, Output Stream Classes, Character Stream classes: Reader stream classes, Writer Stream classes, Using Streams, Reading and writing files.



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(Under CBCS based on OBE) (with effect from 2023 – 2024)

TEXT BOOKS:

Programming with JAVA, A Primer, E. Balagurusamy, 5th Edition, McGraw– Hill Company, 2015.

- Unit I** : Chapters 1 – 5
Unit II : Chapters 6,7 and 8.1– 8.10
Unit III : Chapter 8.11– 8.18, Chapters 9 and 10
Unit IV : Chapter 12 and 13
Unit V : Chapter 14, 11.1– 11.7 and 16

REFERENCE BOOKS:

1. *Introduction to JAVA Programming*, K. Somasundaram, Jaico Publishing House, New Delhi, 2013.
2. K. Somasundaram, *Don Learn JAVA – A Practical Approach*, Anuradha Publications, Chennai, 2013.
3. *Programming in Java*, Sachin Malhotra, Oxford University Press
4. *Programming with Java: Based on Schaums's Outline of Programming with Java*, Tata John R. Hubbard, Second Edition, McGraw – Hill Company, 2001.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3					
CO2		2	1			2
CO3	2					
CO4	2		2	3		1
CO5	2	2	2	3	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS

(Under CBCS based on OBE) (with effect from 2023 – 2024)

New Course .

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23UCDCP2	LAB: JAVA PROGRAMMING	CORE – 4 LAB – III	–	6	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course provides the object oriented programming features which supports modular programming and Applet programming features which support web based programming.

COURSE OBJECTIVES:

- To introduce Object oriented programming and Applet programming concepts using JAVA and improve their OOP and Applet programming Skills.
- To introduce Object oriented programming and java programming features– Encapsulation, Polymorphism, Inheritance, Multithreading, Exception handling, Interface, Package and Applets and Graphics.
- To develop programs for data file access using JAVA streams classes.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	write programs using Object oriented programming paradigm – Encapsulation (Classes and objects), Polymorphism and Inheritance.	Upto K3
CO 2	apply various java features like multithreading, exceptional handling, interface, package, overloading, overriding	Upto K3
CO 3	utilize different types of inheritance to suit different applications	Upto K3
CO 4	design to write programs using Object oriented programming paradigm that enables runtime polymorphism using interface and applet programming	Upto K3
CO 5	apply Object oriented programming paradigm for flat file organization. – Sequential and Random access	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY



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B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS

(Under CBCS based on OBE) (with effect from 2023 – 2024)

LAB: JAVA PROGRAMMING

Write Programs in Java for the following:

1. To implement a simple temperature conversion program.
2. To perform addition and subtraction of complex numbers using class and objects.
3. To perform volume calculation using method overloading.
4. Using command line arguments, test if the given string is palindrome or not.
5. String manipulation using String Methods (Use of any five String methods are preferred).
6. Write a program to fill names into a list. Also, copy them in reverse order into another list. If the name contains any numeric value throw an exception Invalid Name
7. Program to demonstrate the use of any two built-in exceptions in Java.
8. To perform multiplication of matrices using class and objects.
9. Using multilevel inheritance process student marks.
10. Implement multiple inheritance for payroll processing.
11. Implement interface for area calculation for different shapes.
12. Create a package called Arithmetic that contains methods to deal with all arithmetic operators. Also write a program to use the package
13. Create two threads such that one of the threads generate Fibonacci series and another generate perfect numbers between two given limits.
14. Define an exception called: Marks Out of bound: Exception, that is thrown if the entered marks are greater than 100.
15. Program to demonstrate the use of Wrapper class methods.
16. File Processing using Byte stream.
17. File Processing using Character Stream.
18. Write applets to draw the following Shapes:
(a). Cone (b). Cylinder (c). Square inside a Circle (d). Circle inside a Square
19. Write an applet Program to design a simple calculator.
20. Write an Applet Program to animate a ball across the Screen.



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(Under CBCS based on OBE) (with effect from 2023 – 2024)

New Course .

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23UCDA21	MATHEMATICAL FOUNDATIONS – II	ALLIED – 2	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☐

COURSE DESCRIPTION:

This course helps to provide the fundamental knowledge of Mathematical foundations based on Statistics and Probability.

COURSE OBJECTIVES:

- To impart knowledge on data collection and diagrammatic representation in Statistics
- To give the basic ideas about Moments and Skewness
- To teach the basic concepts of Correlation and Regression
- To give the basic concepts of Probability
- To solve various problems using t– test, F– test and Chi– square test.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	define collection of data and state the representation of data in Bar – charts, Pie – diagrams, Histograms, Frequency polygon and Ogives.	Upto K3
CO2	explain the concept of moments, skewness and kurtosis solve problems	Upto K3
CO3	define correlation, regression and solve problems in correlation, rank correlation. Also find the regression equations.	Upto K3
CO4	explain addition, multiplication theorem, conditional probability, independent events, expectation and solve problems	Upto K3
CO5	solve problems in t– test, F– test and chi– square test	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY



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(Under CBCS based on OBE) (with effect from 2023 – 2024)

MATHEMATICAL FOUNDATIONS – II

UNIT – I: Introduction to Statistics:

Primary and secondary data–classification, tabulation and Diagrammatic Representation of statistical data – Bar– charts, Pie– diagrams – Graphical Representation of data – Histograms, Frequency polygon, Ogives.

UNIT – II: Measures of Dispersion:

Characteristics–coefficient of dispersion – Coefficient of variation–Moments – skewness and kurtosis – Pearson's coefficient of skewness – Bowley's coefficient of Skewness – Coefficient of skewness based upon moments.

UNIT – III: Simple Correlation:

Karl Pearson's coefficient of correlation –correlation coefficient for A bivariate frequency distribution – Rank correlation – Regression – lines of regression – Properties of regression coefficient.

UNIT – IV: Events and Sets:

Sample space – concept of probability–addition and multiplications Theorem on probability – conditional probability and independence of events – Baye's Theorem – concept of random variable – Mathematical Expectation.

UNIT – V: Concept of Sampling Distributions:

standard error–Tests of significance based on t, Chi – square and F distributions with respect to mean, variance.

TEXT BOOKS:

Statistical Methods, S.P. Gupta, Sultan Chand and sons, 2004.

Unit I : Chapters 1, 2.2, 2.2.1, 2.2.2, 2.2.3 – 2.2.5

Unit II : Chapters 7 and 8

Unit III: Chapters 9, 9.1, 9.2, 9.3, 10, 10.1, 10.2, 10.2.1, 10.2.2, 10.2.3, 10.3

Unit IV: Chapter 16

Unit V : Chapters 18.3, 18.4, 18.7.1, 18.7.2, 19

REFERENCE BOOKS:

1. Statistics, Dr. S. Arumugam and A. Thangapandi Issac, New Gamma Publication house, 2002.
2. Kishor S. Trivedi – Probability and statistics with reliability queuing and Computer Science
3. Applications – Prentice Hall of India (P) Ltd., New Delhi – 1997. Discrete Mathematics – Seymour Lipschutz, Marc Lars Lipson Schaum's Outlines– by, 3rd Edition., Tata McGraw Hill, Education Pvt. Ltd., New Delhi. 5th Reprint 2012.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	–	3
CO2	–	1	3	2	–	3
CO3	–	1	3	2	–	3
CO4	1	2	3	2	–	3
CO5	2	3	3	2	–	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS

(Under CBCS based on OBE) (with effect from 2023 – 2024)

New Course .

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23UCDS21	LAB: LINUX AND SHELL PROGRAMMING	SBS – 2 LAB – IV	–	2	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

To understand the basic principles of Linux OS and also help them understand its utilities.

COURSE OBJECTIVES:

To understand and make effective use of **Linux** utilities and shell scripting language to solve problems.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	write simple programs using basic commands	Upto K3
CO2	write simple programs using mathematical logic	Upto K3
CO3	write a simple programs using strings	Upto K3
CO4	write a simple programs using while loop	Upto K3
CO5	write a simple programs using files	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY



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B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS

(Under CBCS based on OBE) (with effect from 2023 – 2024)

LAB: LINUX AND SHELL PROGRAMMING

SECTION – A

1. Write a Linux script to find the number of users who have logged in.
2. Write a Linux script to see the current date, user name and current directory.
3. Write a Linux script to print the numbers 5,4,3,2,1 using While loop.
4. Write a Linux script to set the attributes of a file.
5. Write a Linux script to convert lowercase to uppercase using trutility.
6. Write a Linux script to copy and rename a file.
7. Write a Linux script to add 5 numbers and find the average.
8. Write a Linux script to convert a decimal number to hexadecimal conversion.
9. Write a Linux script to find the factorial of a number.
10. Write a Linux script to check for palindrome.

SECTION – B

11. Write a Linux script to display Hello World in Bold, Blink effect and in different colors like red, green etc.
12. Write a Linux script to display a multiplication table.
13. Write a Linux script to perform arithmetic operations using case.
14. Write a Linux script to add two real numbers.
15. Write a Linux script to display the following pattern:
1
22
333
4444
55555
16. Write a Linux script to find the sum of digits and reversing of a given number.
17. Write a Linux script to display the student mark details.
18. Write a Linux script to prepare electricity bill.
19. Write a Linux script to sort the numbers in ascending order.
20. Write a Linux script
 - (i) To create and append a file
 - (ii) To compare two files.



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SYLLABUS

(Under CBCS based on OBE) (with effect from 2021 – 2022)

M.Sc. MICROBIOLOGY



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(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

M.Sc. MICROBIOLOGY – SYLLABUS

(Under CBCS based on OBE) (with effect from 2023 – 2024)

1

NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBC11	GENERAL MICROBIOLOGY AND MICROBIAL DIVERSITY	CORE – 1	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course covers a detailed analysis of the diversity of microorganisms, bacterial cell structure and function, microbial growth and metabolism, and the ways to control their growth by physical and chemical means.

COURSE OBJECTIVES:

- To acquire knowledge on the principles of different types of microscopes and their applications.
- To explain various pure culture techniques and discuss sterilization methods.
- To exemplify, isolate and cultivate microalgae from diverse environmental sources.
- To compare and contrast the structure of bacteria and fungi. Illustrate nutritional requirements and growth in bacteria.
- To discuss the importance and conservation of microbial diversity.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	examine various microbes employing the microscopic techniques learnt. Measure and compare the size of microbes.	Upto K6
CO 2	create aseptic conditions by following good laboratory practices.	Upto K6
CO 3	identify and cultivate the algae understanding their habitat. Analyze the morphology, classify and propagate depending on its economic importance.	Upto K6
CO 4	differentiate and appreciate the anatomy of various microbes. Plan the growth of microbes for different environmental conditions.	Upto K6
CO 5	categorize and cultivate a variety of extremophiles following standard protocols for industrial applications.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,



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2

K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE

GENERAL MICROBIOLOGY AND MICROBIAL DIVERSITY

UNIT – I:

History and Scope of Microbiology. Microscopy – Principles and applications. Types of Microscopes – Bright field, Dark-field, Phase-contrast, Fluorescence microscope, Transmission electron microscope (TEM) and Scanning electron microscope (SEM). Sample preparation for SEM& TEM. Atomic force, Confocal microscope. Micrometry – Stage, Ocular and its applications.

UNIT – II:

Microbial techniques – Safety guidelines in Microbiology Laboratories. Sterilization, Disinfection and its validation. Staining methods – Simple, Differential and Special staining. Automated Microbial identification systems – Pure cultures techniques – Cultivation of Anaerobic organisms.

Maintenance and preservation of pure cultures. Culture collection centres – National and International.

UNIT – III:

Algae – Distribution, morphology, classification, reproduction and economic importance. Isolation of algae from soil and water. Media and methods used for culturing algae, Strain selection and large-scale cultivation. Life cycle – *Chlamydomonas*, *Volvox Spirogyra* (Green algae), *Nostoc* (Cyanobacteria) *Ectocarpus*, *Sargassum* (Brown algae), *Polysiphonia*, *Batrachospermum* (Red algae).

UNIT – IV:

Bacterial Structure, properties and biosynthesis of cellular components – Cell wall. Actinomycetes and Fungi – Distribution, morphology, classification, reproduction and economic importance. Sporulation. Growth and nutrition – Nutritional requirements, Growth curve, Kinetics of growth, Batch culture, Synchronous growth, Measurement of growth and factors affecting growth.

UNIT – V:

Biodiversity – Introduction to microbial biodiversity – Thermophiles – Classification, Thermophilic Archaeobacteria and its applications. Methanogens – Classification, Habitats, applications. Alkaliphiles and Acidophiles – Classification, discovery basin, its cell wall and membrane. Barophiles – Classification and its applications. Halophiles – Classification, discovery basin, cell walls and membranes – purple membrane, compatible solutes. Microbial stress response – Osmoadaptation / halotolerance – Applications of halophiles.



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3

TEXT BOOKS:

1. Kanunga R. (2017). Ananthanarayanan and Panicker's Text book of *Microbiology*. (10th Edition). Universities Press (India) Pvt. Ltd.
2. Chan E.C.S., Pelczar M. J. Jr. and Krieg N. R. (2010). *Microbiology*. (5th Edition).Mc.Graw Hill. Inc, New York.
3. Prescott L. M., Harley J. P. and Klein D. A. (2004). *Microbiology*. (6th Edition).McGraw – Hill company, New York.
4. White D. Drummond J. and Fuqua C. (2011). *The Physiology and Biochemistry of Prokaryotes*, Oxford University Press, Oxford, New York.
5. Dubey R.C. and Maheshwari D. K. (2009). Textbook of *Microbiology*. S.Chand, Limited.

REFERENCES BOOKS:

1. Tortora G. J., Funke B. R. and Case C. L. (2015). *Microbiology: An Introduction* (12th Edition).Pearson, London, United Kingdom
2. Webster J. and Weber R.W.S. (2007). *Introduction to Fungi*. (3rd Edition). Cambridge University Press, Cambridge.
3. Schaechter M. and Leaderberg J. (2004). *The Desk encyclopedia of Microbiology*. Elseiver Academic Press, California.
4. Ingraham, J.L. and Ingraham, C.A. (2000) *Introduction to Microbiology*. (2nd Edition). Books / Cole Thomson Learning, UK.
5. Madigan M. T., Bender K.S., Buckley D. H. Sattley W. M. and Stahl (2018) *Brock Biology of Microorganisms*. (15th Edition). Pearson.

DIGITAL TOOLS:

1. <http://scienetlinks.com/tools/microbeworld>
2. <https://www.microbes.info/>
3. <https://www.asmscience.org/VisualLibrary>
4. <https://open.umn.edu/opentextbooks/BookDetail.aspx?bookId=404>
5. https://www.grsmu.by/files/file/university/cafedry//files/essential_microbiology.pdf

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4
CO1	3	3	2	2
CO2	3	2	2	2
CO3	3	3	3	2
CO4	3	2	2	3
CO5	3	3	2	2

3. Advanced Application

2. Intermediate Development

1. Introductory Level



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4

NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBC12	MICROBIAL PHYSIOLOGY	CORE – 2	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

It is an intensive course with the goal of integrating biochemistry and genetics to enhance the understanding of the microbial cell and the robust and diverse nature of life.

COURSE OBJECTIVES:

- To illustrate Bacterial nutrition and their utilization.
- To discuss cultivation methods and factors related to microbial growth.
- To demonstrate concepts of microbial metabolism.
- To impart the fundamentals and importance of biosynthetic pathways.
- To discuss the methods involved in Photosynthesis.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	apply knowledge about nutritional requirement, modes of nutrient transport in microorganisms to various disciplines of Microbiology.	Upto K6
CO 2	analyse microbial growth, factors influencing growth and its measurement techniques for applications in various industries.	Upto K6
CO 3	compare various metabolic pathways and discuss the properties and functions of enzymes.	Upto K6
CO 4	apply anaerobic respiration and biosynthetic pathways to enhance/control microbial growth.	Upto K6
CO 5	assimilate methods involved in microbial photosynthesis and bioluminescence.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



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M.Sc. MICROBIOLOGY – SYLLABUS

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5

MICROBIAL PHYSIOLOGY

UNIT – I:

Nutrition – Nutritional requirements and types in bacteria – Phototrophs, Chemotrophs, Autotrophs and Heterotrophs. Nutrient transport mechanisms– Passive diffusion, Facilitated diffusion, Active transport, Group translocation and Specific transport system.

UNIT – II:

Microbial growth – Growth curve and Measurement of Growth – Cell Number and Cell Mass and metabolic activity. Batch, Continuous, Synchronous and Asynchronous cultures, Factors affecting growth.

UNIT – III:

Enzymes – properties, functions and regulation. Basic concepts of metabolism, Oxidation – reduction reactions, Energy generation by anaerobic metabolism – Glycolysis, Pentose Phosphate pathway, ED pathway, Fermentation. Energy generation by Aerobic metabolism – TCA cycle, Glyoxylate pathway and Electron Transport chain, Mechanism of ATP synthesis – Chemiosmosis, Pasteur effect. Metabolism of lipids– β oxidation.

UNIT – IV:

Anaerobic Respiration. Nitrogen, Sulphur, Iron and Hydrogen Oxidation. Methanogenesis.

Biosynthesis – Gluconeogenesis, Peptidoglycan synthesis, Amino acids, Purines, Pyrimidines, Fatty acids, Triglycerides, Phospholipids and Sterols.

UNIT – V:

Photosynthesis – process, antenna of light-harvesting pigments, Photochemical reaction centers, Photosynthetic Electron Transport Chain–Cyclic and Non-cyclic. Oxygenic and Anoxygenic Photosynthesis. Calvin–Benson cycle. Bioluminescence – Process and application.

TEXT BOOKS:

1. Stanier R.Y., Ingraham, J.L., Wheelis, M.L and Painter, P.R. (2010). **General Microbiology**. 5th Edn. Macmillan Education Ltd. London.
2. Prescott. L.M., Harley. J.P., Klein. D.A. (1993). **Microbiology**. 2nd Edn. Wm. C. Brown publishers, Dubuque.
3. Moat, A.G. and Foster, J.W. (2003). **Microbial Physiology**. 4th Edn. John Wiley and Sons, New York.
4. Doelle, H.W. (1975) **Bacterial Metabolism**, 2nd Edn. Academic Press, London.
5. Caldwell, D.R (2000) **Microbial Physiology and Metabolism**, 2nd Edn. Star Publishing, Belmont, California.



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REFERENCE BOOKS:

1. Salle. A.J. (1992). *Fundamental Principles of Bacteriology*. 7th edn. McGraw Hill Inc. New York.
2. Madigan, M.T., Martinko, J.M., & Parker J. (2000). *Brock Biology of Microorganisms*. 9th Edn. Prentice Hall International, Inc, London.
3. Ingraham, J.L., & Ingraham, C.A. (2000). *Introduction to Microbiology*. 2nd Edn. Brook /Cole. Singapore.
4. Gottschalk, G. (1986). *Bacterial Metabolism*. 2nd Edn. Springer-Verlag, New York.
5. Rose, A.H. (1976). *An Introduction to Microbial Physiology*. 3rd Edn. Plenum, New York.

DIGITAL TOOLS:

1. <https://courses.lumenlearning.com/boundless-microbiology/chapter/microbial-nutrition/>
2. <https://www.lamission.edu/lifesciences/lecturenote/mic20/Chap06Growth.pdf>
3. <https://www.tandfonline.com/doi/abs/10.3109/07388558409082583?journalCode=ibty20>
4. <https://www.sciencedirect.com/topics/neuroscience/microbial-respiration>
5. <https://www.britannica.com/science/photosynthesis>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	2
CO2	2	3	2	3
CO3	3	3	3	2
CO4	3	2	2	3
CO5	3	3	3	2

3. Advanced Application

2. Intermediate Development

1. Introductory Level



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7

NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBCP1	PRACTICAL I – GENERAL MICROBIOLOGY, MICROBIAL DIVERSITY AND MICROBIAL PHYSIOLOGY	CORE – 3 PRACTICAL – I	–	6	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course provides a practical knowledge on General Microbiology, Microbial Diversity and Microbial Physiology

COURSE OBJECTIVES:

- To provide knowledge on the fundamentals, handling and applications of microscopy,
- To provide fundamental skills in sterilization methods. Identify microbes by different staining methods.
- To help the students prepare media for bacterial growth. Analyze microbial enzymes.
- To help the students perform plating techniques and methods involved in microbial preservation.
- To help the students measure bacterial growth, identify optimal growth parameters, cultivate bacteria, and perform antibiotic sensitivity.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	apply microscopic techniques and staining methods in the identification and differentiation of microbes.	Upto K6
CO 2	apply the knowledge on the sterilization of glass wares and media by different methods and measurement of cell growth.	Upto K6
CO3	prepare media for bacterial growth. Analyze microbial enzymes.	Upto K6
CO4	pertain plating techniques and methods involved in microbial preservation.	Upto K6
CO5	analyze microbial growth, optimal growth parameters, cultivate bacteria, and perform antibiotic sensitivity.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



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8

GENERAL MICROBIOLOGY, MICROBIAL DIVERSITY AND MICROBIAL PHYSIOLOGY

UNIT – I:

Microscopic Techniques: Light microscopy: Hay infusion broth. Wet mount to show different types of microbes, hanging drop. Micrometry. Dark field microscopy – Motility of Spirochetes. Washing and cleaning of glass wares: Sterilization methods: moist heat, dry heat, and filtration. Quality control check for each method.

UNIT – II:

Staining techniques – Simple staining, Gram's staining, Acidfast staining, Metachromatic granule staining, Spore, Capsule, Flagella.

UNIT – III:

Media Preparation: Preparation of liquid, solid and semisolid media. Agar deeps, slants, plates. Preparation of basal, enriched, selective and enrichment media. Preparation of Biochemical test media, media to demonstrate enzymatic activities.

UNIT – IV:

Purification and maintenance of microbes. Streak plate, pour plate, and slide culture technique. Aseptic transfer. Direct counts – Total cell count, Turbidometry. Viable count – pour plate, spread plate.

UNIT – V:

Bacterial growth curve. Effect of physical and chemical factors on growth. Anaerobic culture methods.

TEXT BOOKS:

1. Dubey R.C. and Maheshwari D. K. (2010). *Practical Microbiology*. S. Chand.
2. Cappuccino, J. and Sherman, N. (2002). *Microbiology: A Laboratory Manual*, (6th Edition). Pearson Education, Publication, New Delhi.
3. Cullimore D. R. (2010). *Practical Atlas for Bacterial Identification*. (2nd Edition). Taylor & Francis.
4. Moat, A.G. Foster, J.W. and Spector, M. P (2002) *Microbial Physiology*, 4th Edn. Wiley – Liss, New York.
5. Dawes, I. W. and Sutherland, I. W (1992) *Microbial Physiology*, 2nd Edn. Blackwell Scientific Publications, London.



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REFERENCE BOOKS:

1. Collee J. G., Fraser A.G. Marmion B. P. and Simmons A. (1996). *Mackie & McCartney Practical Medical Microbiology*. (14th Edition). Elsevier, New Delhi.
2. Stanier R.Y., Ingraham, J.L., Wheelis, M.L and Painter, P.R. (2010). *General Microbiology*. 5th Edn. Macmillan education Ltd. London.
3. Prescott. L.M., Harley. J.P., Klein. D.A. (1993). *Microbiology*. 2nd edn. Wm. C. Brownpublishers, Dubugue.
4. Gottschalk, G. (1986). *Bacterial Metabolism*. 2nd Edn. Springer–Verlag, New York.
5. Rose, A.H. (1976). An Introduction to *Microbial Physiology*. 3rd Edn. Plenum, New York.

DIGITAL TOOLS:

1. <http://textbookofbacteriology.net/>
2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC149666/>
3. <http://sciencenetlinks.com/tools/microbeworld>
4. <https://www.microbes.info/>
5. <https://www.asmscience.org/VisualLibrary>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	2
CO2	3	3	2	2
CO3	2	3	3	2
CO4	2	3	2	3
CO5	3	3	2	2

3. Advanced Application

2. Intermediate Development

1. Introductory Level



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10

NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBE11	FORENSIC SCIENCE	ELECTIVE 1 – I	5	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

This course helps the students to analyse the various places of crimes, the objects found in the scene. The students are taught to make interpretations and conclusions. Forensic science plays a crucial role in solving crime by finding evidence from the crime spot.

COURSE OBJECTIVES:

- To understand the Scope, need and learn the tools and techniques in forensic science.
- To help the students comprehend organizational setup of a forensic science laboratory.
- To help the students identify and Examine body fluids for identification.
- To help the students extract DNA from blood samples for investigation.
- To help the students recognize medico legal post mortem procedures and their importance.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	identify the scope and need of forensic science in the present scenario.	Upto K6
CO 2	plan for the organizational setup and functioning of forensic science laboratories.	Upto K6
CO 3	analyze the biological samples found at the crime scene.	Upto K6
CO 4	perform extraction and identification of DNA obtained from body fluids.	Upto K6
CO 5	discuss the concept of forensic toxicology.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



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11

FORENSIC SCIENCE

UNIT – I:

Forensic Science – Definition, history and development of forensic science. Scope and need of forensic science in present scenario. Branches of forensic science. Tools and techniques of forensic science. Duties of a forensic scientist.

UNIT – II:

Forensic science laboratories – Organizational setup of a forensic science laboratory. Central and State level laboratories in India. Mobile forensic science laboratory and its functions. Forensic microbiology – Types and identification of microbial organisms of forensic significance.

UNIT – III:

Forensic serology – Definition, identification and examination of body fluids – Blood, semen, saliva, sweat and urine. Forensic examination and identification of hair and fibre.

UNIT – IV:

DNA profiling – Introduction, history of DNA typing. Extraction of DNA from blood samples – Organic and Inorganic extraction methods. DNA fingerprinting – RFLP, PCR, STR. DNA testing in disputed paternity.

UNIT – V:

Forensic toxicology – Introduction and concept of forensic toxicology. Medico legal post mortem and their examination. Poisons – Types of poisons and their mode of action.

TEXT BOOKS:

1. Nanda B. B. and Tewari R. K. (2001) *Forensic Science in India: A Vision for the Twenty First Century*. Select Publishers, New Delhi. ISBN-10:8190113526/ISBN-13:9788190113526.
2. James S. H. and Nordby, J. J. (2015) *Forensic Science: An Introduction to Scientific and Investigative Techniques*. (5th Edition). CRC Press. ISBN-10:9781439853832 / ISBN-13:978-1439853832.
3. Li R. (2015) *Forensic Biology*. (2nd Edition). CRC Press, New York. ISBN-13:978-1-4398-8972-5.
4. Sharma B.R (2020) *Forensic science in criminal investigation and trials*. (6th Edition) Universal Press.
5. Richard Saferstein (2017). *Criminalistics– An introduction to Forensic Science*. (12th Edition). Pearson Press.



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REFERENCE BOOKS:

1. Nordby J. J. (2000). Dead Reckoning. *The Art of Forensic Detection– CRC Press*, New York. ISBN:0–8493–8122–3.
2. Saferstein R. and Hall A. B. (2020). *Forensic Science Hand book, Vol. I*, (3rd Edition). CRC Press, New York. ISBN–10:1498720196.
3. Lincoln, P.J. and Thomson, J. (1998). (2nd Edition). *Forensic DNA Profiling Protocols. Vol. 98*. Humana Press. ISBN: 978–0–89603–443–3.
4. Val McDermid (2014). *Forensics*. (2nd Edition). ISBN 9780802125156.
5. Vincent J. DiMaio., Dominick DiMaio. (2001). *Forensic Pathology* (2nd Edition). CRC Press.

DIGITAL TOOLS:

1. <http://clsjournal.ascls.org/content/25/2/114>
2. <https://www.ncbi.nlm.nih.gov/books/NBK234877/>
3. <https://www.elsevier.com/books/microbial-forensics/budowle/978-0-12-382006-8>
4. https://www.researchgate.net/publication/289542469_Methods_in_microbial_forensics
5. https://cisac.fsi.stanford.edu/events/microbial_forensics

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4
CO1	2	3	3	3
CO2	3	3	2	2
CO3	3	3	3	2
CO4	3	2	2	3
CO5	2	3	2	2

3. Advanced Application

2. Intermediate Development

1. Introductory Level



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M.Sc. MICROBIOLOGY – SYLLABUS

(Under CBCS based on OBE) (with effect from 2023 – 2024)

NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBE12	NANOBIOTECHNOLOGY	ELECTIVE 1 – II	5	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course begins with a review of various types of nanomaterials and an introduction to general terminologies. Subsequently the course covers synthesis methodologies, physical and chemical characterization of nanomaterials.

COURSE OBJECTIVES:

- To analyse nanomaterials based on the understanding of nanobiotechnology.
- To discuss the methods of fabrication of nanomaterials.
- To provide knowledge on characterization of nanomaterials.
- To help the students discover nanomaterials for targeted drug delivery.
- To explain nanomaterials in nanomedicine and environmental pollution.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	employ knowledge in the field of nanobiotechnology for development.	Upto K6
CO 2	identify various applications of nanomaterials in the field of medicine and environment.	Upto K6
CO 3	examine the prospects and significance of nanobiotechnology.	Upto K6
CO 4	identify recent advances in this area and create a career or pursue research in the field.	Upto K6
CO 5	design non-toxic nanoparticles for targeted drug delivery.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



SOURASHTRA COLLEGE, MADURAI- 625004

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M.Sc. MICROBIOLOGY – SYLLABUS

(Under CBCS based on OBE) (with effect from 2023 – 2024)

NANOBIOTECHNOLOGY

UNIT – I:

Introduction to nanobiotechnology, Nano size-changing phenomena at nano scale, Classification of nanomaterials based on their dimensions (0D, 1D, 2D and 3D materials) and based on realization of their applications (The First, second, third and fourth generation materials), Class of nanomaterials and their applications. Need for nanomaterials and the risks associated with the materials.

UNIT – II:

Fabrication of Nanomaterials–Top–down and Bottom–up approaches, Solid phase synthesis–milling, Liquid phase synthesis–Sol–gel synthesis, colloidal synthesis, micro emulsion method, hydrothermal synthesis and solvo thermal synthesis, Vapour/Gas phase synthesis–Inert gas condensation, flame pyrolysis, Laser ablation and plasma synthesis techniques. Microbial synthesis of nanoparticles.

UNIT – III:

Characterization of nanoparticles – Based on particle size/morphology– Dynamic light scattering (DLS), Scanning electron microscopy (SEM), Transmission electron microscopy (TEM), Atomic force microscopy (AFM), Based on surface charge–zeta potential, Based on structure –X–ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), Energy dispersive X–ray analysis (EDX), Based on optical properties– UV – Spectrophotometer, Based on magnetic properties–Vibrating sample magnetometer (VSM).

UNIT – IV:

Nanomaterial based Drug delivery and therapeutics–surface modified nano particles, MEMS/NEMS based devices, peptide/DNA coupled nanoparticles, lipid and inorganic nano particles for drug delivery, Metal/metaloxide nano particles as antibacterial, antifungal and antiviral agents. Toxicity of nanoparticles and Toxicity Evaluation.

UNIT – V:

Nanomaterials in diagnosis–Imaging, nanosensors in detection of pathogens. Treatment of surface water, ground water and waste water contaminated by toxic metal ions, organic and inorganic solutes and microorganisms.

TEXT BOOKS:

1. Brydson R. M., Hammond, C. (2005). *Generic Methodologies for Nanotechnology: Characterization. In Nanoscale Science and Technology*. John Wiley & Sons, Ltd.
2. Leggett G. J., Jones R. A. L. (2005). *Bionanotechnology. In Nanoscale Science and Technology*. John Wiley & Sons, Ltd.
3. Mohan Kumar G. (2016). *Nanotechnology: Nanomaterials and nanodevices*. Narosa Publishing House.
4. Goodsell D. S. (2004). *Bionanotechnology*. John Wiley & Sons, Inc.
5. Pradeep T. (2007). *Nano: The Essentials–Understanding nanoscience and nanotechnology*. Tata McGraw–Hill.



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REFERENCE BOOKS:

1. Nouailhat A. (2008). *An Introduction to Nanoscience and Nanotechnology*, Wiley.
2. Sharon M. and Maheshwar (2012). *Bio-Nanotechnology: Concepts and Applications*. New Delhi. Ane books Pvt Ltd.
3. Niemeyer C.M. and Mirkin C. A. (2005). *Nanobiotechnology*. Wiley Inter science.
4. Rehm, B. (2006). *Microbial Bionanotechnology: Biological Self-Assembly Systems and Biopolymer-Based Nanostructures*. Horizon Scientific Press.
5. Reisner, D.E. (2009). *Bionanotechnology: Global Prospects*. CRC Press

DIGITAL TOOLS:

1. <https://www.gale.com/nanotechnology>
2. <https://www.understandingnano.com/resources.html>
3. <http://dbtnanobiotech.com/index2.php>
4. <http://www.istl.org/11-winter/internet1.html>
5. <https://www.cdc.gov/niosh/topics/nanotech/default.html>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4
CO1	2	3	3	2
CO2	3	2	2	3
CO3	3	3	2	2
CO4	2	3	2	3
CO5	3	3	2	3

3. Advanced Application

2. Intermediate Development

1. Introductory Level



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NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBE13	MICROALGAL TECHNOLOGY	ELECTIVE 1– III	5	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course gives a detailed knowledge on Microalgal Technology.

COURSE OBJECTIVES:

- To characterize the different groups of algae.
- To describe the cultivation and harvesting of algae.
- To identify the commercial applications of various algal products.
- To apply microalgae for environmental applications.
- To employ microalgae as alternate fuels.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	acquire knowledge in the field of microalgal technology and their characteristics.	Upto K6
CO 2	identify the methods of algal cultivation and harvesting.	Upto K6
CO 3	recognize and recommend the use of microalgae as food, feed and fodder.	Upto K6
CO 4	promote microalgae in phycoremediation.	Upto K6
CO 5	compare and critically evaluate recent applied research in these microalgal applications.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



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M.Sc. MICROBIOLOGY – SYLLABUS

(Under CBCS based on OBE) (with effect from 2023 – 2024)

MICROALGAL TECHNOLOGY

UNIT – I:

Introduction to Algae – General characteristics. Classification of algae according to Fritsch. Salient features of different groups of algae. Distribution – Freshwater, brackish water and marine algae. Identification methods. An overview of applied Phycology. Economically important microalgae.

UNIT – II:

Cultivation of freshwater and marine microalgae – Growth media. Isolation and enumeration of microalgae. Laboratory cultivation and maintenance. Outdoor cultivation – Photobioreactors – construction, types and operation; raceway ponds – Heterotrophic and mixotrophic cultivation – Harvesting of microalgae biomass.

UNIT – III:

Microalgae in food and nutraceutical applications – Algal single cell proteins. Cultivation of *Spirulina* and *Dunaliella*. Microalgae as aquatic, poultry and cattle feed. Microalgal biofertilizers. Value-added products from microalgae. Pigments – Production of microalgal carotenoids and their uses. Phycobiliproteins – production and commercial applications. Polyunsaturated fatty acids as active nutraceuticals. Microalgal secondary metabolites – Pharmaceutical and cosmetic applications.

UNIT – IV:

Microalgae in environmental applications. Phycoremediation – Domestic and industrial waste water treatment. High-rate algal ponds and surface-immobilized systems – Treatment of gaseous wastes by microalgae. Sequestration of carbon dioxide. Scavenging of heavy metals by microalgae. Negative effects of algae. Algal blooms, algicides for algal control.

UNIT – V:

Microalgae as feed stock for production of biofuels – Carbon-neutral fuels. Lipid-rich algal strains – *Botryococcus braunii*. Drop-in fuels from algae – hydrocarbons and biodiesel, bioethanol, biomethane, biohydrogen and syngas from microalgae biomass. Biocrude synthesis from microalgae. Integrated biorefinery concept. Life cycle analysis of algae biofuels.

TEXT BOOKS:

1. Lee R.E. (2008). *Phycology*. Cambridge University Press.
2. Sharma O.P. (2011). *Algae*. Tata McGraw-Hill Education.
3. Shekh A., Schenk P., Sarada R. (2021). *Microalgal Biotechnology. Recent Advances, Market Potential and Sustainability*. Royal Society of Chemistry.
4. Lele. S.S., Jyothi Kishen Kumar (2008). *Algal bio process technology*. New Age International P(Ltd)
5. Das., Mihirkumar. *Algal Biotechnology*. Daya Publishing House, New Delhi.



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REFERENCE BOOKS:

- 1 Andersen R.A. (2005). *Algal culturing techniques*. Academic Press, Elsevier.
- 2 Bux F. (2013). *Biotechnological Applications of Microalgae: Biodiesel and Value-added Products*. CRC Press.
- 3 Singh B., Baudhh K., Bux, F. (2015). *Algae and Environmental Sustainability. Springer.*
- 4 Das D. (2015). *An algal biorefinery: An integrated approach. Springer.*
- 5 Bux F. and Chisti Y. (2016). *Algae Biotechnology: Products and Processes*. Springer.

DIGITAL TOOLS:

- 1 <https://www.classcentral.com/course/algae-10442>
- 2 https://onlinecourses.nptel.ac.in/noc19_bt16/preview
- 3 <https://freevidelectures.com/course/4678/nptel-industrial-biotechnology/46>
- 4 <https://nptel.ac.in/courses/103103207>
- 5 <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/microalgae>

Mapping of CO with PSO

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CO1	2	3	3	3
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3. Advanced Application 2. Intermediate Development 1. Introductory Level



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(Under CBCS based on OBE) (with effect from 2023 – 2024)

NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBE14	BIOINSTRUMENTATION	ELECTIVE 2 – I	5	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course is an interdisciplinary field requiring a knowledge of the basic principles in several areas including digital electronic systems, control systems, detection systems, and material biocompatibility.

COURSE OBJECTIVES:

- To explain the principles and working mechanisms of laboratory instruments.
- To discuss chromatography techniques and molecular biology techniques.
- To illustrate molecular techniques in biological applications.
- To acquire knowledge on spectroscopic techniques
- To demonstrate the use of radio isotopes in various techniques.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	make use of the laboratory instruments– laminar air flow, pH meter, centrifugation methods, biosafety cabinets following SOP.	Upto K6
CO 2	apply chromatography techniques in the separation of biomolecules.	Upto K6
CO 3	perform molecular techniques like mutagenesis and their detection.	Upto K6
CO 4	estimate molecules in biological samples by adopting UV spectroscopic techniques.	Upto K6
CO 5	cultivate organisms anaerobically.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



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M.Sc. MICROBIOLOGY – SYLLABUS

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BIOINSTRUMENTATION

UNIT – I:

Basic laboratory Instruments. Aerobic and anaerobic incubator – Biosafety Cabinets – Fume Hood, pH meter, Lyophilizer, Flow cytometry. Centrifugation techniques: Basic principles of centrifugation – Standard sedimentation coefficient – measurement of sedimentation coefficient; Principles, methodology and applications of differential, rate zonal and density gradient centrifugation – Applications in determination of molecular weight.

UNIT – II:

General principles of chromatography – Chromatographic Performance parameters; Types– Thin layer chromatography, Paper Chromatography, Liquid chromatography (LPLC & HPLC), Adsorption, ion exchange, Gel filtration, affinity, Gas liquid (GLC). Flash Chromatography and Ultra Performance convergence chromatography. Two dimensional chromatography. Stimulated moving bed chromatography (SEC).

UNIT – III:

Electrophoresis: Principle and applications – paper electrophoresis, Serum electrophoresis, starch gel electrophoresis, Disc gel, Agarose gel, SDS – PAGE, Immuno electrophoresis. Blotting techniques –Southern, northern and western blotting.

UNIT – IV:

Spectroscopic techniques: Principle, simple theory of absorption of light by molecules, electromagnetic spectrum, instrumentation and application of UV– visible, FTIR spectrophotometer, Atomic Absorption Spectrophotometer, Flame spectrophotometer, NMR, ESR, Emission Flame Photometry and GC–MS. Detection of molecules in living cells – FISH and GISH. Biophysical methods: Analysis of biomolecules by Spectroscopy UV/visible.

UNIT – V:

Radioisotopic techniques: Principle and applications of tracer techniques in biology. Radioactive isotopes – radioactive decay; Detection and measurement of radioactivity using ionization chamber, proportional chamber, Geiger– Muller and Scintillation counters, auto radiography and its applications. Commonly used isotopes in biology, labeling procedures and safety aspects.

TEXT BOOKS:

1. Sharma B. K. (2014). *Instrumental Method of Chemical Analysis*. Krishna Prakashan Media (P) Ltd.
2. Chatwal G. R and Anand S. K. (2014.) *Instrumental Methods of Chemical Analysis*. Himalaya Publishing House.
3. Mitchell G. H. (2017). *Gel Electrophoresis: Types, Applications and Research*. Nova Science Publishers Inc.
4. Holme D. Peck H. (1998). *Analytical Biochemistry*. (3rd Edition). Prentice Hall.
5. Jayaraman J. (2011). *Laboratory Manual in Biochemistry*. (2nd Edition). Wiley Easton Ltd., New Delhi.



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REFERENCE BOOKS:

1. Pavia D. L. (2012) *Spectroscopy* (4th Edition). Cengage.
2. Skoog A. and West M. (2014). *Principles of Instrumental Analysis*. (14th Edition). W.B.Saunders Co., Philadelphia.
3. Miller J. M. (2007). *Chromatography: Concepts and Contrasts* (2nd Edition) Wiley– Blackwell.
4. Gurumani N. (2006). *Research Methodology for Biological Sciences*. (1st Edition) MJP Publishers.
5. Ponmurugan P. and Gangathara P. B. (2012). *Biotechniques*. (1st Edition). MJP Publishers.

DIGITAL TOOLS:

1. <https://norcaloa.com/BMIA>
2. <http://www.biologydiscussion.com/biochemistry/centrifugation/centrifuge-introduction-types-uses-and-other-details-with-diagram/12489>
3. <https://www.watelectrical.com/biosensors-types-its-working-and-applications>.
4. <http://www.wikiscales.com/articles/electronic-analytical-balance/>
5. <https://study.com/academy/lesson/what-is-chromatography-definition-types-uses>.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4
CO1	3	3	2	2
CO2	2	3	2	3
CO3	3	2	2	3
CO4	3	3	3	3
CO5	3	3	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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M.Sc. MICROBIOLOGY – SYLLABUS

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NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBE15	HERBAL TECHNOLOGY AND COSMETIC MICROBIOLOGY	ELECTIVE 2 – II	5	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☒

COURSE DESCRIPTION:

This course talks in detail about Herbal Technology and Cosmetic Microbiology.

COURSE OBJECTIVES:

- To impart knowledge of Indian Medicinal Plants and their applications in microbiology.
- To promote the technical skills involved in preparation of different types of plant extracts.
- To explain methods to analyze the antimicrobial activity of medicinal plants.
- To acquire knowledge on cosmetic microbiology and role of microorganisms in cosmetics.
- To provide insight into pharmacopeia microbial assays and biosafety.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	identify the applications of Indian medicinal plants in treating diseases.	Upto K6
CO 2	identify and authenticate herbal plants.	Upto K6
CO 3	evaluate the antimicrobial activity of medicinal plants.	Upto K6
CO 4	describe the role of microorganisms and their metabolites in the preparation of cosmetics.	Upto K6
CO 5	validate procedures and biosafety measures in the mass production of cosmetics.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



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M.Sc. MICROBIOLOGY – SYLLABUS

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HERBAL TECHNOLOGY AND COSMETIC MICROBIOLOGY

UNIT – I:

Herbs, Herbal medicine – Indian medicinal plants: Scope and Applications of Indian medicinal plants in treating bacterial, fungal and viral diseases. Basic principles involved in Ayurvedha, Sidha, Unani and Homeopathy.

UNIT – II:

Collection and authentication of selected Indian medicinal plants: *Embllica officinalis*, *Withania somnifera*, *Phyllanthus amarus*, *Tinospora cordifolia*, *Andrographis paniculata*, *Piper longum*, *Ocimum sanctum*, *Azardirchata indica*, *Terminalia chebula*, *Allium sativum*. Preparation of extracts – Hot and cold methods. Preparation of stock solutions.

UNIT – III:

Antimicrobial activity of selected Indian medicinal Plants: – In vitro determination of antibacterial and fungal activity of selected whole medicinal plants/ parts – well-diffusion methods. MIC – Macro and micro dilution techniques. Antiviral activity– cell lines– cytotoxicity, cytopathic and non–cytopathic effect.

UNIT – IV:

History of Cosmetic Microbiology – Need for cosmetic microbiology, Scope of cosmetic microbiology, – Role of microbes in cosmetic preparation. Preservation of cosmetics. Antimicrobial properties of natural cosmetic products – Garlic, neem, turmeric, aloe vera and tulsi. Sanitary practices in cosmetic manufacturing – HACCP protocols in cosmetic microbiology.

UNIT – V:

Cosmetic microbiology test methods – Antimicrobial preservative efficacy, microbial content testing and biological toxicological testing. Validation methods – bioburden and Pharmacopeial microbial assays. Preservatives of cosmetics – Global regulatory and toxicological aspect of cosmetic preservatives.

TEXT BOOKS:

1. Ayurvedic Formulary of India. (2011). **Part 1, 2 & 3. Pharmacopoeia Commission for Indian Medicine and Homeopathy.** ISBN–10:8190648977.
2. Panda H. (2004). **Handbook on herbal medicines.** Asia Pacific Business Press Inc. ISBN:8178330911.
3. Mehra P. S. (2019). **A Textbook of Pharmaceutical Microbiology.** Dreamtech Press. ISBN 13:9789389307344.
4. Geis P. A. (2020). **Cosmetic microbiology: A Practical Approach.** (3rd Edition). CRC Press. ISBN:9780429113697.
5. Brannan D. K. (1997). **Cosmetic microbiology: A Practical Handbook.** CRC Press. ISBN–10:0849337135.



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REFERENCE BOOKS:

1. Indian Herbal Pharmacopoeia (2002). *Vol. I & II Indian Drug Manufacturers Association*, Mumbai.
2. British Herbal Pharmacopoeia. (1990). *Vol. I. British Herbal Medicine Association*. ISBN: 0903032090.
3. Verpoorte R. and Mukherjee, P. K. (2010). *GMP for Botanicals: Regulatory and Quality issues on Phytomedicines. In GMP for botanicals: regulatory and quality issues on phytomedicines*. (2nd edition). Saujanya Books, Delhi. ISBN-10:81-900788-5-2/8190078852. ISBN-13:978-81-900788-5-6/9788190078856.
4. Turner R. (2013). *Screening methods in Pharmacology*. Elsevier. ISBN: 9781483264233.
5. Cupp M. J. (2010). *Toxicology and Clinical Pharmacology of Herbal Products* (pp. 85-93). M. J. Cupp. Humana Press. Totowa, NJ, USA. ISBN-10:1617371904.

DIGITAL TOOLS:

- 1 https://www.academia.edu/50236711/Modern_Extraction_Methods_for_Preparation_of_Bioactive_Plant_Extracts
- 2 https://www.nhp.gov.in/introduction-and-importance-of-medicinal-plants-and-herbs_mtl
- 3 <https://pubmed.ncbi.nlm.nih.gov/17004305/>
- 4 <https://www.fda.gov/cosmetics/potential-contaminants-cosmetics/microbiological-safety-and-cosmetics>
- 5 <https://pubmed.ncbi.nlm.nih.gov/15156038/>

Mapping of CO with PSO

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CO1	3	3	2	3
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CO5	3	3	2	3

3. Advanced Application

2. Intermediate Development

1. Introductory Level



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NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBE16	ESSENTIALS OF LABORATORY MANAGEMENT AND BIOSAFETY	ELECTIVE – 2 – III	5	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course facilitates the students with the comparative knowledge of structured oriented programming and object oriented programming paradigm. It also provides the object oriented programming features which supports modular programming.

COURSE OBJECTIVES:

- To utilize containment principles to ensure biosafety.
- To enrich students' role and responsibilities of laboratory hazards and their control.
- To make the students know the importance of first aid technique for various common lab accidents.
- To acquire knowledge of biosafety level, risk assessment and maintain proper hygiene in the laboratory.
- To discuss the biosafety regulations and guidelines and implementation of safety programmes.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	employ skills on laboratory safety and avoid laboratory accidents.	Upto K6
CO 2	prevent laboratory hazards by practicing safety strategies.	Upto K6
CO 3	practice various first aid procedures during common laboratory accidents.	Upto K6
CO 4	ensure biosafety strategies in laboratory.	Upto K6
CO 5	recognize the importance of biosafety guidelines.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



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M.Sc. MICROBIOLOGY – SYLLABUS

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ESSENTIALS OF LABORATORY MANAGEMENT AND BIOSAFETY

UNIT – I:

Introduction to the laboratory and laboratory hazards – General laboratory facilities – Occupational safety– Lab accidents – Fires, chemical burns, slips and falls, Animal bites. Cuts from broken glass. Toxic fume inhalation. General laboratory rules, Good laboratory practice (GLP). Laboratory plan.

UNIT – II:

Common hazards in laboratory: Chemical hazards– Safe handling of chemicals and gases, hazard labels and symbols. Material safety datasheet (MSDS), Chemical handling – Fume hood, Storage of chemicals. Chemical Waste Disposal Guideline. Physical hazards – Physical agent data sheets (PADS), Electric hazards– Electrical shock, Electrical explosions, Electrical burns. Safe work practices. Potential ignition sources in the lab. Stages of Fire. Fire Extinguishers. Fire Response.

UNIT – III:

Prevention and First aid for laboratory accidents. Personal protective equipment (PPE), Proper attire (Eye/Face Protection, laboratory coats, gloves, respirators. Disposal/Removal of PPE. Emergency equipment safety – Showers/ Eye Washes. Laboratory security and emergency response. First aid for – Injuries caused by broken glass, Acid/Alkali splashes on the skin, swallowing acid/alkali, burns caused by heat, electric shock.

UNIT – IV:

Biosafety – Historical background. Blood borne pathogens (BBP) and laboratory – acquired infections. Introduction to biological safety cabinets. Primary containment for biohazards. Biosafety levels of specific microorganisms. Recommended biosafety. Levels for infectious agents and infected animals. Risk groups with examples – Risk assessment. Safety levels. Case studies – Safe working, hand hygiene. Laboratory instruments, packing, sending, transport, import and export of biological agents. Hygiene, disinfection, decontamination, sterilization.

UNIT – V:

Biosafety regulations and guidelines. Centers for disease control and prevention and the National institutes of health. Occupational safety and health administration. Recombinant DNA advisory committee (RDAC), Institutional biosafety committee (IBSC), Review committee on genetic manipulation (RCGM), Genetic engineering approval committee (GEAC). Implementation of biosafety guidelines.



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TEXT BOOKS:

1. Sateesh M. K. (2013). *Bioethics and Biosafety*, IK International Pvt Ltd. ISBN : 8190675702.
2. Muthuraj M. and Usharani B. (2019). *Biosafety in Microbiological Laboratories*. (1st Edition). Notion Press. ISBN 10: 1645878856
3. *Biosafety in Microbiological and Biomedical Laboratories – U.S. Health Department and Human Services*. (2016). (5th Edition). Lulu.com.
4. Kanai. L. Mukherjee. *Medical Laboratory Technology*(4th Edition). CBS Publishers.
5. Ramakrishnan (2012). *Manual of Medical Laboratory Techniques*. JP brothers.

REFERENCE BOOKS:

1. World Health Organization, *Biosafety Programme Management*. (2010). (4th Edition). WHO Publications.
2. Rashid N. (2013). *Manual of Laboratory Safety (Chemical, Radioactive, and Biosafety with Biocides)* (1st Edition).
3. Dayuan X. (2015). *Biosafety and Regulation for Genetically Modified Organisms*, Alpha Science International Ltd, ISBN-10 : 1842657917
4. Ochei J. Kolhatkar(2000). *A. (Medical Laboratory Science – Theory and Practice*. ISBN; 13:978–0074632239.
5. Lynne S. Garcia. *Clinical Laboratory Management* (2nd Edition). ASM Press

DIGITAL TOOLS:

1. [https://www.cdc.gov/labs/pdf/CDC– Biosafety microbiological BiomedicalLaboratories–2009–P.pdf](https://www.cdc.gov/labs/pdf/CDC–Biosafety%20microbiological%20BiomedicalLaboratories–2009–P.pdf)
2. [https://ucanapplym.s3.ap-south-1.amazonaws.com /RGU/notifications /E_learning /Online_study/PG–SEM–IV– Biosafety%20regulation.pdf](https://ucanapplym.s3.ap-south-1.amazonaws.com/RGU/notifications/E_learning/Online_study/PG–SEM–IV–Biosafety%20regulation.pdf)
3. <https://consteril.com/biosafety-levels-difference/>
4. [https://www.cdc.gov/labs/pdf/CDC– Biosafety microbiological Biomedical Laboratories–2009–P.pdf](https://www.cdc.gov/labs/pdf/CDC–Biosafety%20microbiological%20BiomedicalLaboratories–2009–P.pdf)
5. <https://www.who.int/publications/i/item/9789240011311>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	2
CO2	2	3	2	2
CO3	3	3	2	3
CO4	3	3	3	2
CO5	3	3	2	2

3. Advanced Application

2. Intermediate Development

1. Introductory Level



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NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBS11	ENTREPRENEURSHIP IN BIOBUSINESS	Skill Enhancement Course – 1	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☒

COURSE DESCRIPTION:

The Entrepreneurship in Biobusiness Course provides the conceptual basis for understanding entrepreneurship, the role and importance of entrepreneurship for economic development. It covers proposal preparation, funding and face challenges in biobusiness.

COURSE OBJECTIVES:

- To make the students understand basic concepts in the area of entrepreneurship, the role and importance of entrepreneurship for economic development.
- To make the students develop personal creativity and entrepreneurial initiative, adopting the key steps in the elaboration of business idea.
- To make the students understand the stages of the entrepreneurial process and the resources needed for the successful development of entrepreneurial ventures.
- To explain the central components of successful business strategies in biotechnology, and create a business plan.
- To make the students acquire knowledge about proposal preparation, funding and face challenges in biobusiness.



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COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	describe and apply several entrepreneurial ideas and business theories in practical framework.	Upto K6
CO 2	analyse the business environment in order to identify business opportunities, identify the elements of success of entrepreneurial ventures, evaluate the effectiveness of different entrepreneurial strategies and interpret their own business plan.	Upto K6
CO 3	express the mass production of microbial inoculants used as Biofertilizers and Bioinsecticides in response with field application and crop response.	Upto K6
CO 4	analyze the application and commercial production Monoclonal antibodies, Cytokines. TPH and teaching kits.	Upto K6
CO 5	integrate and apply knowledge of the regulation of biotechnology industries, utilize effective team work skills within an effective management team with a common objective, and gain effective team work skills, with an awareness of cultural diversity and social inclusiveness.	Upto K6

**K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE**



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ENTREPRENEURSHIP IN BIOBUSINESS

UNIT – I:

Bio Entrepreneurship – Introduction to bio-business, SWOT analysis of bio-business. Ownership. Development of Entrepreneurship. Stages in entrepreneurial process. Government schemes and funding. Small scale industries – Definition, characteristics, need and rationale.

UNIT – II:

Entrepreneurship opportunity in agricultural Microbiology – Business opportunity, Essential requirement, marketing, strategies, schemes, challenges and scope. Case study on Plant cell and tissue culture technique, polyhouse culture. Herbal bulk drug production, nutraceuticals, value added herbal products. Bioethanol production using agricultural waste, algal source. Integration of system biology for agricultural applications. Biosensor development in agri management.

UNIT – III:

Entrepreneurship opportunity in industrial biotechnology – Business opportunity, Essential requirement, marketing strategies, schemes, challenges, and scope. Pollution monitoring and Bioremediation for Industrial pollutants. Integrated compost production – microbe enriched compost. Bio pesticide/ insecticide production. Biofertilizers. Single cell protein.

UNIT – IV:

Therapeutic and Fermented products – Stem cell production, stem cell bank, production of monoclonal/polyclonal antibodies, secondary metabolite production – antibiotics, probiotic and prebiotics.

UNIT – V:

Project Management, Technology Management and Startup Schemes – Building Biotech business challenges in Indian context – biotech partners (BIRAC, DBT, Incubation centers. etc.), operational biotech parks in India. Indian Company act for Biobusiness – schemes and subsidies. Project proposal preparation, Successful start-ups–case study.

TEXT BOOKS:

1. Shimasaki C. (2014). *Biotechnology Entrepreneurship: Starting, Managing, and Leading Biotech Companies*– Academic Press. ISBN: 978-0-12-404730-3
2. Acton A. Q. (2021). *Biological Pigments – Advances in Research and Application*–(Scholarly Editions). Atlanta, Georgia. ISBN: 978-1-481-68574-0
3. Stanbury P. F. and Whitekar. A. *Principles of Fermentation Technology*, (3rd Edition). Butterworth–Heinemann. ISBN 10: 0080999530
4. Anil Kumar (2020). *Small Business and Entrepreneurship, Willey Distributions*, Dream Tech Press.
5. Angi Redy (2015). *An Unfinished Agenda*. ISBN 139780670087808.



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(Under CBCS based on OBE) (with effect from 2023 – 2024)

REFERENCE BOOKS:

1. Crueger, W, and Crueger. A. (2017). *Biotechnology: A Text Book of Industrial Microbiology*. (2nd Edition). Medtech. ISBN-10 : 9385998633
2. Teng P. S. (2008). *Bioscience Entrepreneurship in Asia*. World Scientific Publishing Company. 2008.
3. Agarwal S., Kumari S. and Khan S. (2021). *Bioentrepreneurship and Transferring Technology into Product Development*. Business Science Reference. ISBN-10:1799874125
4. Krishnamurthy A.G. *Dirubai Ambani Against All Odds*. McGraw Hills.
5. Peter F. Drucker. *Innovation and Entrepreneurship* (1985).

DIGITAL TOOLS:

1. <https://www.profitableventure.com/biotech-business-ideas/>
2. <https://www.bio-rad.com/webroot/web/pdf/lse/literature/Biobusiness.pdf>
3. <https://www.nature.com/articles/s41587-021-01110-3>
4. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3003900/>
5. <https://springhouse.in/government-schemes-every-entrepreneur/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4
CO1	2	3	3	3
CO2	3	2	3	2
CO3	2	3	2	2
CO4	3	3	3	3
CO5	3	3	3	2

3. Advanced Application

2. Intermediate Development

1. Introductory Level



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NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBC21	MEDICAL BACTERIOLOGY AND MYCOLOGY	CORE – 4	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course provides the students with basic theoretical and practical aspects of various groups of microorganisms to include bacteriology, virology, mycology and various immunodiagnostic methods to detect fungal infections.

COURSE OBJECTIVES:

- To make the students acquire knowledge on collection, transportation and processing of various kinds of clinical specimens.
- To explain morphology, characteristics and pathogenesis of bacteria.
- To discuss various factors leading to pathogenesis of bacteria.
- To make the students acquire knowledge on antifungal agents and their importance.
- To describe various diagnostic methods available for fungal disease diagnosis.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	collect, transport and process of various kinds of clinical specimens.	Upto K6
CO 2	analyze various bacteria based on morphology and pathogenesis.	Upto K6
CO 3	discuss various treatment methods for bacterial disease.	Upto K6
CO 4	employ various methods detect fungi in clinical samples and apply knowledge on antifungal agents.	Upto K6
CO 5	apply various immunodiagnostic method to detect fungal infections.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



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MEDICAL BACTERIOLOGY AND MYCOLOGY

UNIT – I:

Classification of medically important bacteria, Normal flora of human body, Collection, transport, storage and processing of clinical specimens, Microbiological examination of clinical specimens, antimicrobial susceptibility testing. Handling and maintenance of laboratory animals – Rabbits, guinea pigs and mice.

UNIT – II:

Morphology, classification, characteristics, pathogenesis, laboratory diagnosis and treatment of diseases caused by species of *Staphylococci*, *Streptococci*, *Pneumococci*, *Neisseriae*., *Bacillus*, *Corynebacteria*, *Mycobacteria* and *Clostridium*.

UNIT – III:

Morphology, classification, characteristics, pathogenesis, laboratory diagnosis and treatment of diseases caused by Enterobacteriaceae members, *Yersinia*, *Pseudomonas*, *Vibrio*, *Mycoplasma*, *Helicobacter*, *Rickettsiae*, *Chlamydiae*, *Bordetella*, *Francisella*., *Spirochaetes*– *Leptospira*, *Treponema* and *Borrelia*. Nosocomial, zoonotic and opportunistic infections –prevention and control.

UNIT – IV:

Morphology, taxonomy and classification of fungi. Detection and recovery of fungi from clinical specimens. Dermatophytes and agents of superficial mycoses. *Trichophyton*, *Epidermophyton* & *Microsporum*. Yeasts of medical importance – *Candida*, *Cryptococcus*. Mycotoxins. Antifungal agents, testing methods and quality control.

UNIT – V:

Dimorphic fungi causing Systemic mycoses, *Histoplasma*, *Coccidioides*, *Sporothrix*, *Blastomyces*. Fungi causing Eumycotic Mycetoma, Opportunistic fungi– Fungi causing secondary infections in immunocompromised patients. Immunodiagnostic methods in mycology– Recent advancements in diagnosis. Antifungal agents.

TEXT BOOKS:

1. Kanunga R. (2017). *Ananthanarayanan and Panicker's Text book of Microbiology*. (2017). Orient Longman, Hyderabad.
2. Greenwood, D., Slack, R. B. and Peutherer, J. F. (2012) *Medical Microbiology*, (18th Edition). Churchill Livingstone, London.
3. Finegold, S. M. (2000) *Diagnostic Microbiology*, (10th Edition). C.V. Mosby Company, St. Louis.
4. Alexopoulos C. J., Mims C. W. and Blackwell M. (2007). *Introductory Mycology*, (4th Edition). Wiley Publishers.
5. Chander J. (2018). *Textbook of Medical Mycology*. (4th Edition). Jaypee brothers Medical Publishers.



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REFERENCE BOOKS:

1. Salle A. J. (2007). *Fundamental Principles of Bacteriology*. (4th Edition). Tata McGraw–Hill Publications.
2. Collee J.C. Duguid J.P. Foraser, A.C, Marimon B.P, (1996). *Mackie & McCartney Practical Medical Microbiology*. 14thedn, Churchill Livingstone.
3. Cheesbrough M. (2006). *District Laboratory Practice in Tropical countries.– Part 22ndedn*.Cambridge University Press.
4. Topley and Wilson's. (1998). *Principles of Bacteriology*. 9th edn. Edward Arnold,London.
5. Murray P.R., Rosenthal K.S. and Michael A. (2013). *Medical Microbiology*. P faller.7th edn. Elsevier, Mosby Saunders.

DIGITAL TOOLS:

1. <http://textbookofbacteriology.net/nd>
2. <https://microbiologysociety.org/members–outreach–resources/links.html>
3. <https://www.pathoelective.com/micro–resources>
4. <http://mycology.cornell.edu/fteach.html>
5. <https://www.adelaide.edu.au/mycology/>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3
CO2	3	3	2	2
CO3	3	3	2	2
CO4	3	3	3	2
CO5	3	3	3	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBC22	MEDICAL VIROLOGY AND PARASITOLOGY	CORE – 5	6	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This scientific discipline is concerned with the study of the biology of viruses and viral diseases. The Course also talks about the protozoans and helminthes present in stool and blood specimens.

COURSE OBJECTIVES:

- To describe the replication strategy and cultivation methods of viruses.
- To make the students acquire knowledge about oncogenic virus and human viral infections.
- To make the students develop diagnostic skills, in the identification of virus infections.
- To impart knowledge about parasitic infections.
- To make the students develop diagnostic skills, in the identification of parasitic infections.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	cultivate viruses by different methods and aid in diagnosis. Perform purification and viral assay.	Upto K6
CO 2	investigate the symptoms of viral infections and presumptively identify the viral disease.	Upto K6
CO 3	diagnose various viral diseases by different methods. (serological, conventional and molecular)	Upto K6
CO 4	educate public about the spread, control and prevention of parasitic diseases.	Upto K6
CO 5	identify the protozoans and helminthes present in stool and blood specimens. Perform serological and molecular diagnosis of parasitic infections.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



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MEDICAL VIROLOGY AND PARASITOLOGY

UNIT – I:

General properties of viruses – Structure and Classification – viroids, prions, satellite RNAs and virusoids. Cultivation of viruses – embryonated eggs, experimental animals and cell cultures. Purification and Assay of viruses – Physical and Chemical methods (Electron Microscopy, Protein and Nucleic acids studies.) Infectivity Assays (Plaque and end-point).

UNIT – II:

Virus Entry, Host Defenses Against Viral Infections, Epidemiology, pathogenic mechanisms, Pathogenesis, laboratory diagnosis, treatment for the following viruses: DNA Viruses– Pox , Herpes , Adeno , Papova and Hepadna , RNA Viruses– Picorna, Orthomyxo, Paramyxo, Rhabdo, Rota, HIV and other Hepatitis viruses, Arbo – Denguevirus, Ebola virus, Emerging and reemerging viral infections.

UNIT – III:

Bacterial viruses – Φ X 174, M13, MU, T4, lambda, Pi; Structural organization, life cycle and phage production. Lysogenic cycle–typing and application in bacterial genetics. Diagnosis of viral infections –conventional serological and molecular methods. Antiviral agents and viral vaccines.

UNIT – IV:

Introduction to Medical Parasitology – Classification, host– parasite relationships. Epidemiology, life cycle, pathogenic mechanisms, laboratory diagnosis, treatment for the following: Protozoa causing human infections – *Entamoeba*, Aerobic and Anaerobic amoebae, *Giardia*, *Trichomonas*, *Balantidium*, *Toxoplasma*, *Cryptosporidium*, *Leishmania*, and *Trypanosoma*.

UNIT – V:

Classification, life cycle, pathogenicity, laboratory diagnosis and treatment for parasites – Helminthes – Cestodes – *Taenia Solium*, *T. Saginata*, *T. Echinococcus*. Trematodes – *Fasciola Hepatica*, *Fasciolopsis Buski*, *Paragonimus*, *Schistosomes*. Nematodes – *Ascaris*, *Ankylostoma*, *Trichuris*, *Trichinella*, *Enterobius*, *Strongyloides* and *Wuchereria*. Other parasites causing infections in immune compromised hosts and AIDS. Cultivation of parasites. Diagnosis of parasitic infections – Serological and molecular diagnosis. Anti–protozoan drugs.

TEXT BOOKS:

1. Kanunga R. (2017). *Ananthanarayanan and Panicker's Text book of Microbiology*. (10th Edition). Universities Press (India) Pvt. Ltd.
2. Dubey, R.C. and Maheshwari D.K. (2010). *A Text Book of Microbiology*. S. Chand & Co.
3. Rajan S. (2007). *Medical Microbiology*. MJP publisher.
4. Paniker J. (2006). *Text Book of Parasitology*. Jay Pee Brothers, New Delhi.
5. Arora, D. R. and Arora B. B. (2020). *Medical Parasitology*. (5th Edition). CBS Publishers & Distributors Pvt. Ltd. New Delhi.



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REFERENCE BOOKS:

1. Carter J. (2001). *Virology: Principles and Applications* (1st Edition). Wiley Publications.
2. Willey J., Sandman K. and Wood D. Prescott *Microbiology*. (11th Edition). McGraw Hill Book.
3. Jawetz E., Melnick J. L. and Adelberg E. A. (2000). *Review of Medical Microbiology*. (19th Edition). Lange Medical Publications, U.S.A.
4. Finegold S.M. (2000). *Diagnostic Microbiology*. (10th Edition). C.V. Mosby Company, St. Louis.
5. Levanthal R. and Cheadle R. S. (2012). *Medical Parasitology*. (6th Edition). S.A. Davies Co. Philadelphia.

DIGITAL TOOLS:

1. <https://en.wikipedia.org/wiki/Virology>
2. <https://academic.oup.com/femsre/article/30/3/321/546048>
3. <https://www.sciencedirect.com/science/article/pii/S0042682215000859>
4. <https://nptel.ac.in/courses/102/103/102103039/>
5. <https://www.healthline.com/health/viral-diseases#contagiousness>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4
CO1	1	3	3	3
CO2	3	3	2	2
CO3	3	3	2	2
CO4	3	2	3	2
CO5	3	3	2	3

3. Advanced Application

2. Intermediate Development

1. Introductory Level



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NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBCP2	PRACTICAL II – MEDICAL MICROBIOLOGY	CORE – 6	–	6	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	40	60	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☒

COURSE DESCRIPTION:

The practical provides practical training to the students in the fields of Medical Microbiology, of different clinical samples, transport, culture, examination and identification of arthropod vectors.

COURSE OBJECTIVES:

- To develop skills in the diagnosis of bacterial infections and antimicrobial sensitivity.
- To impart knowledge on fungal infections and its diagnosis.
- To make the students know about cultivation, identification and assay of viruses for diagnostics and vaccine production
- To diagnose parasitic infections.
- To make the students identify medically important vectors.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand collection of different clinical samples, transport, culture and examination.	Upto K6
CO 2	identify medically important fungus from the clinical samples.	Upto K6
CO 3	perform and Interpret serological tests for viral diseases.	Upto K6
CO 4	exam and identify ova and cyst in samples.	Upto K6
CO 5	understand collection and identification of arthropod vectors.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



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PRACTICAL II – MEDICAL MICROBIOLOGY

UNIT – I:

Staining of clinical specimens – Wet mount, Differential and Special staining methods. Isolation and identification of bacterial pathogens from clinical specimens – cultivation in basal, differential, enriched, selective and special media – Biochemical identification tests. Enumeration of bacteria in urine to detect significant bacteriuria. Antimicrobial sensitivity testing – Kirby Bauer method and Stokes method. Minimum inhibitory concentration (MIC) test. Minimum bactericidal concentration (MBC) test.

UNIT – II:

Identification and Classification of common fungi. Examination of different fungi by Lactophenol cotton blue staining. Examination of different fungi by KOH staining. Cultivation of fungi and their identification – *Mucor*, *Rhizopus*, *Aspergillus*, *Penicillium*. Microscopic observation of different asexual fungal spores. Microscopic observation of fungal fruiting bodies. Identification of Dermatophytes.

UNIT – III:

Isolation and characterization of bacteriophage from natural sources by phage titration. Cultivation of viruses – Egg Inoculation methods. Diagnosis of Viral Infections – ELISA – HIA. Spotters of viral inclusions and CPE–stained smears.

UNIT – IV:

Examination of parasites in clinical specimens – Ova/cysts in faeces. Concentration: methods – Flootation methods– simple Saturated salt solution method – Zinc sulphate methods – Sedimentation methods– Formal ether method. Blood smear examination for malarial parasites. Thin smear by Leishman's stain – Thick smear by J.B. stain.

UNIT – V:

Identification of common arthropods of medical importance–spotters of *Anopheles*, *Glossina*, *Phlebotomus*, *Aedes*, Ticks and mites.

TEXT BOOKS:

1. Cullimore D. R. (2010). *Practical Atlas for Bacterial Identification*, 2nd Edn. Publisher–Taylor and Francis.
2. Abbott A.C. (2010). *The Principles of Bacteriology*. Nabu Press.
3. Parija S. C. (2012). *Textbook of Practical Microbiology*. Ahuja Publishing House.
4. Cappuccino, J. and Sherman, N. (2002) *Microbiology: A Laboratory Manual*, (6th Edition). Pearson Education, Publication, New Delhi.
5. Morag C. and Timbury M.C. (1994). *Medical Virology*. 4th edn. Blackwell Scientific Publishers.



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REFERENCE BOOKS:

1. Collee J. G., Fraser A.G. Marmion B. P. and Simmons A. (1996). *Mackie & McCartney Practical Medical Microbiology*. (14th Edition). Elsevier, NewDelhi.
2. Chart H. (2018). *Practical Laboratory Bacteriology*. CRC Press.
3. Moore V. A. (2017). *Laboratory Directions for Beginners in Bacteriology*. Triste Publishing Ltd.
4. Cheesbrough M. (2006). *District Laboratory Practice in Tropical countries–Part 22nd Edition*.Cambridge University Press.
5. Murray P.R., Rosenthal K.S. and Michael A. (2013). *Medical Microbiology. Pfaller*. 7th Edition. Elsevier, Mosby Saunders

DIGITAL TOOLS:

1. <http://textbookofbacteriology.net/>
2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7173454/>
3. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3768729/>
4. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC149666/>
5. <https://www.intechopen.com/books/current-issues-in-molecular-virology-viral-genetics-and-biotechnological-applications/vaccines-and-antiviral-agents>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4
CO1	2	3	3	2
CO2	3	3	2	3
CO3	3	3	2	2
CO4	3	2	3	2
CO5	3	3	2	3

3. Advanced Application

2. Intermediate Development

1. Introductory Level



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NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBE21	EPIDEMIOLOGY	ELECTIVE 3 – I	5	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This course is designed to provide students with an overview of the principles and practices of infectious diseases epidemiology with focus on how the presence and control of communicable diseases affects public health locally, nationally, and internationally.

COURSE OBJECTIVES:

- To describe the role of epidemiology in public health.
- To explain about epidemiology tools and disease surveillance methods.
- To make the students analyze various communicable and non-communicable diseases in India.
- To discuss on mechanism of antimicrobial resistance.
- To outline on National health programmes that have been designed to address the issues.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	apply the knowledge acquired on concepts of epidemiology to clinical and public health environment.	Upto K6
CO 2	plan various strategies to trace the epidemiology.	Upto K6
CO 3	plan the control of communicable and non-communicable diseases.	Upto K6
CO 4	analyze the implications of drug resistance in the society and design the control of antimicrobial resistance and its management.	Upto K6
CO 5	employ National control programs related to Communicable and Non-Communicable diseases with the public.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



SOURASHTRA COLLEGE, MADURAI- 625004

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M.Sc. MICROBIOLOGY – SYLLABUS

(Under CBCS based on OBE) (with effect from 2023 – 2024)

EPIDEMIOLOGY

UNIT – I:

Fundamentals of epidemiology – Definitions of epidemiology – Epidemiology of infectious diseases in Public Health. Natural history of disease – Historical aspects of epidemiology. Common risk factors – Epidemiologic Triad – Agent factors, host factors and environmental factors. Transmission basics – Chain of infection, portal of entry. Modes of transmission – Direct and indirect. Stages of infectious diseases. Agents and vectors of communicable diseases of public health importance and dynamics of disease transmission. Epidemiology of Zoonosis – Factors, routes of transmission of bacterial, viral, parasitic and fungal zoonotic agents. Control of zoonosis.

UNIT – II:

Tools of Epidemiology – Measures of Disease – Prevalence, incidence. Index case. Risk rates. Descriptive Epidemiology – Cohort studies, measuring infectivity, survey methodology including census procedures. Surveillance strategies – Disease surveillance, geographical indication system, outbreak investigation in public health and contact investigation.

UNIT – III:

Epidemiological aspects of diseases of national importance – Background to communicable and non-communicable diseases. Vector borne diseases in India. Diarrhoeal diseases. Zoonoses. Viral haemorrhagic fevers. Mycobacterial infections. Sexually transmitted diseases. Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS). Emerging disease threats – Severe Acute Respiratory Syndrome (SARS), Covid-19, Ebola, MDR-TB, Malaria, Mucor mycosis, Avian flu. Dengue, Swine Flu, Chikungunya. Epidemiology, prevention, and control of non-communicable diseases – Asthma, Coronary heart disease, Malignancy, diabetes mellitus, respiratory diseases, eye diseases, Dental disorders. Emerging and Re-emerging Diseases.

UNIT – IV:

Mechanisms of Antimicrobial resistance – Multidrug Efflux pumps, Extended Spectrum β -lactamases (ESBL). Hospital acquired infections – Factors, infection sites, mechanisms, Role of Multidrug resistant pathogens. Role of *Pseudomonas*, *Acinetobacter*, *Clostridium difficile*, HBV, HCV, Rotavirus, *Cryptosporidium* and *Aspergillus* in Nosocomial infections. Prevention and management of nosocomial infections.

UNIT – V:

National Programmes related to Communicable and Non-Communicable diseases – National Malaria Eradication Programme, Revised National Tuberculosis Control Programme, Vector Borne Disease Control Programme, National AIDS Control Programme, National Cancer Control Programme and National Diabetes Control Programme. Biochemical and immunological tools in epidemiology – Biotyping, Serotyping, Phage typing, FAME (Fatty acid methyl ester analysis), Curie Point PyMS (Pyrolysis Mass spectrometry), Protein profiling, Molecular typing methods.



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TEXT BOOKS:

1. Dicker R., Coronado F., Koo. D. and Parrish. R. G. (2012). *Principles of Epidemiology in Public Health Practice.*, (3rd Edition). CDC.
2. Gerstman B. (2013). Epidemiology Kept Simple: *An Introduction to Classic and Modern Epidemiology.* (3rd Edition). Wiley Blackwell.
3. Greenwood, D., Slack, R. B. and Peutherer, J. F. (2012) *Medical Microbiology*, (18th Edition). Churchill Livingstone, London.
4. Jawetz E., Melnick J. L. and Adelberg E. A. (2000). *Review of Medical Microbiology.* (19th Edition). Lange Medical Publications, U.S.A.
5. Dimmok N. J. and Primrose S. B. (1994). *Introduction to Modern Virology.* 5th edn. Blackwell Scientific Publishers.

REFERENCE BOOKS:

1. Bhopal R. S. (2016). *Concepts of Epidemiology – An Integrated Introduction to the Ideas, Theories, Principles and Methods of Epidemiology.* (3rd Edition). Oxford University Press, New York.
2. Celentano D. D. and Szklo M. (2018). *Gordis Epidemiology.* (6th Edition). Elsevier, USA.
3. Cheesbrough, M. (2004). *District Laboratory Practice in Tropical Countries – Part 2*, (2nd Edition). Cambridge University Press.
4. Ryan K. J. and Ray C. G. (2004). *Sherris Medical Microbiology.* (4th Edition), McGraw Hill, New York.
5. Topley W.W. C., Wilson, G. S., Parker M. T. and Collier L. H. (1998). *Principles of Bacteriology.* (9th Edition). Edward Arnold, London.

DIGITAL TOOLS:

1. <https://www.scielo.br/j/rbca/a/mjDFGTtfWtBm786ZmR9TG9d/?lang=en>
2. <https://hal.archives-ouvertes.fr/hal-00902711/document>
3. <https://www.who.int/csr/resources/publications/whocdscsreph200212.pdf>
4. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7187955/>
5. https://www.who.int/diseasecontrol_emergencies/publications/idhe_2009_london_outbreaks.pdf

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	2
CO2	3	2	2	3
CO3	2	3	2	2
CO4	3	3	3	3
CO5	3	3	2	2

3. Advanced Application

2. Intermediate Development

1. Introductory Level



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NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBE22	CLINICAL AND DIAGNOSTIC MICROBIOLOGY	ELECTIVE 3 – II	5	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☒

COURSE DESCRIPTION:

This Course discusses Clinical and Diagnostic Microbiology in detail.

COURSE OBJECTIVES:

- To describe appropriate safety protocol and laboratory techniques for handling specimens and biomedical waste management.
- To develop working knowledge of techniques used to identify infectious agents in the clinical microbiology lab.
- To elucidate various diagnostic procedures in microbiology.
- To make the students acquire knowledge on different methods employed to check antibiotic sensitivity.
- To make the students gain knowledge on hospital acquired infections and their control measures.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	apply Laboratory safety procedures and hospital waste disposal strategies.	Upto K6
CO 2	collect various clinical specimens, handle, preserve and process safely.	Upto K6
CO 3	identify the causative agents of diseases by conventional and molecular methods following standard protocols.	Upto K6
CO 4	assess the antimicrobial susceptibility pattern of pathogens.	Upto K6
CO 5	trace the sources of nosocomial infection and recommend control measures.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



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M.Sc. MICROBIOLOGY – SYLLABUS

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CLINICAL AND DIAGNOSTIC MICROBIOLOGY

UNIT – I:

Microbiology Laboratory Safety Practices –General Safety Guidelines, Handling of Biological Hazards, Infectious health care waste disposal – Biomedical waste management, Emerging and Re-emerging infections.

UNIT – II:

Diagnostic procedures – General concept of Clinical specimen collection, transport, storage and general processing in Microbiology laboratory – Specimen acceptance and rejection criteria.

UNIT – III:

Diagnosis of microbial diseases – Clinical, differential, Microbiological, immunological and molecular diagnosis of microbial diseases. Modern and novel microbial diagnostic methods. Automation in Microbial diagnosis.

UNIT – IV:

Antibiotic sensitivity tests – Disc diffusion – Stokes and Kirby Bauer methods, E test – Dilution – Agar dilution & broth dilution – MBC/MIC – Quality control for antibiotics and standard strains.

UNIT – V:

Nosocomial infections – common types, sources, reservoir and mode of transmission, pathogenesis and control measures. Hospital Infection Control Committee (HICC) – Functions.

TEXT BOOKS:

1. Collee J. G., Fraser A.G. Marmion B. P. and Simmons A. (1996). ***Mackie & McCartney Practical Medical Microbiology***. (14th Edition). Elsevier, New Delhi. ISBN-10:0443047219 / ISBN-13-978-0443047213.
2. Tille P. M. (2021). ***Bailey and Scott's Diagnostic Microbiology***. (15th Edition). Elsevier. ISBN:9780323681056.
3. Jawetz E., Melnick J. L. and Adelberg E. A. (2000). ***Review of Medical Microbiology***. (19th Edition). Lange Medical Publications, U.S.A.
4. Mukherjee K.L. (2000). ***Medical Laboratory Technology. Vol. 1-3***. (2nd Edition). Tata McGraw-Hill Education. ISBN-10:0074632604.
5. Sood R. (2009). ***Medical Laboratory Technology – Methods and Interpretations***. (6th Edition). Jaypee Brothers Medical Publishers (P) Ltd. New Delhi. ISBN:9788184484496.



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REFERENCE BOOKS:

1. Murray P. R., Baron E. J., Jorgenson J. H., Pfaller M. A. and Tenover F. C. (2003). *Manual of Clinical Microbiology*. (8th Edition). American Society for Microbiology, Washington, DC. ISBN:1-555810255-4.
2. Bennett J. E., Dolin R. and Blaser M. J. (2019). *Principles and Practice of Infectious Diseases*. (9th Edition). Elsevier. EBook ISBN:9780323550277. Hardcover ISBN:9780323482554.
3. Ridgway G. L., Stokes E. J. and Wren M. W. D. (1987). *Clinical Microbiology* 7th Edition. Hodder Arnold Publication. ISBN-10:0340554231/ISBN-13:9780340554234.
4. Koneman E.W., Allen S. D., Schreckenber P. C. and Winn W. C. (2020). *Koneman's Color Atlas and Textbook of Diagnostic Microbiology*. (7th Edition). Jones & Bartlett Learning. ISBN:1284322378 9781284322378.
5. Cheesbrough, M. (2004). *District Laboratory Practice in Tropical Countries – Part 2*, (2nd Edition). Cambridge University Press. ISBN-13:978-0-521-67631-1 ISBN-10:0-521-67631-2.

DIGITAL TOOLS:

1. <https://www.ncbi.nlm.nih.gov/books/NBK20370/>
2. <https://www.msdmanuals.com/en-in/home/infections/diagnosis-of-infectious3disease/diagnosis-of-infectious-disease>
3. <https://journals.asm.org/doi/10.1128/JCM.02592-20>
4. <https://www.sciencedirect.com/science/article/pii/S2221169116309509>
5. http://www.textbookofbacteriology.net/normalflora_3.html

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	2
CO2	3	3	2	2
CO3	2	3	3	2
CO4	3	3	3	3
CO5	3	3	2	2

3. Advanced Application

2. Intermediate Development

1. Introductory Level



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NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBE23	BIOREMEDIATION	ELECTIVE 3 – III	5	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

Bioremediation is a branch of biotechnology that employs the use of living organisms, like microbes and bacteria, in the removal of contaminants, pollutants, and toxins from soil, water, and other environments.

COURSE OBJECTIVES:

- To describe the nature and importance of bioremediation and use in real world applications.
- To describe the typical composition of waste water and application of efficient technologies for water treatment.
- To explain the fundamentals of treatment technologies and the considerations for its design and implementation in treatment plants.
- To explain the potential of microbes in ore extraction and acquaint students with methods of reducing health risks caused by xenobiotics.
- To familiarize the students the role of plants and their associated microbes in remediation and management of environmental pollution.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	differentiate Ex-situ bioremediation and In-situ bioremediation. Assess the roles of organisms in bioremediation.	Upto K6
CO 2	distinguish microbial processes necessary for the design and optimization of biological processing unit operations.	Upto K6
CO 3	identify, formulate and design engineered solutions to environmental problems.	Upto K6
CO 4	explore microbes in degradation of toxic wastes and playing role on biological mechanisms.	Upto K6
CO 5	establish the mechanisms of Arbuscular mycorrhizal fungi and Plant growth promoting <i>Rhizobacteria</i> in phytoremediation.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



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BIOREMEDIATION

UNIT – I:

Bioremediation – process and organisms involved. Bioaugmentation – Ex-situ and in-situ processes; Intrinsic and engineered bioremediation. Major pollutants and associated risks; organic pollutant degradation. Microbial aspects and metabolic aspects. Factors affecting the process.

UNIT – II:

Microbes involved in aerobic and anaerobic processes in nature. Water treatment – BOD, COD, dissolved gases, removal of heavy metals, total organic carbon removal. Secondary waste water treatments – use of membrane bioreactor. Aquaculture effluent treatment. Aerobic sludge and landfill leachate process. Aerobic digestion.

UNIT – III:

Composting of solid wastes, anaerobic digestion – methane production and important factors involved, Pros and cons of anaerobic process, sulphur, iron and nitrate reduction, hydrocarbon degradation, degradation of nitroaromatic compounds. Bioremediation of dyes, bioremediation in paper and pulp industries. Aerobic and anaerobic digesters – design. Various types of digester for bioremediation of industrial effluents.

UNIT – IV:

Microbial leaching of ores – process, microorganisms involved and metal recovery with special reference to copper and iron. Biotransformation of heavy metals and xenobiotics. Petroleum biodegradation – reductive and oxidative. Dechlorination. Biodegradation of plastics and super bug.

UNIT – V:

Phytoremediation of heavy metals in soil – Basic principles of phytoremediation – Uptake and transport, Accumulation and sequestration. Phytoextraction. Phytodegradation. Phytovolatilization. Rhizodegradation. Phytostabilization – Organic and synthetic amendments in multi metal contaminated mine sites. Role of Arbuscular mycorrhizal fungi and plant growth promoting Rhizobacteria in phytoremediation.



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TEXT BOOKS:

1. Bhatia H.S. (2018). *A Text book on Environmental Pollution and Control*. (2nd Edition). Galgotia Publications.
2. Chatterjee A. K. (2011). *Introduction to Environmental Biotechnology*. (3rd Edition). Printice–Hall, India.
3. Pichtel, J. (2014). *Waste Management Practices: Municipal, Hazardous, and Industrial*, 2nd edition, CRC Press.
4. Liu, D.H.F and Liptak, B.G (2005). *Hazardous Wastes and Solid Wastes*, Lewis Publishers.
5. Rajendran, P. & Gunasekaran, P. (2006). *Microbial Bioremediation*. 1st edition. MJP Publishers

REFERENCE BOOKS:

1. Sangeetha J., Thangadurai D., David M. and Abdullah M.A. (2016). *Environmental Biotechnology: Biodegradation, Bioremediation, and Bioconversion of Xenobiotics for Sustainable Development*. (1st Edition). Apple Academic Press.
2. Singh A. and Ward O. P. (2004). *Biodegradation and Bioremediation*. Soil Biology. Springer.
3. Singh A., Kuhad R. C., and Ward O. P. (2009). *Advances in Applied Bioremediation*. (1st Edition). Springer–Verlag Berlin Heidelberg, Germany.
4. Atlas, R.M & Bartha, R. (2000). *Microbial Ecology*. Addison Wesley Longman Inc.
5. Rathoure, A.K. (Ed.). (2017). *Bioremediation: Current Research and Applications*. 1stedition. I.K. International Publishing House Pvt. Ltd.

DIGITAL TOOLS:

1. Bioremediation– Objective, Principle, Categories, Types, Methods, Applications (microbenotes.com)
2. <https://agris.fao.org/agris-search>
3. <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/bioremediation>
4. <https://www.intechopen.com/chapters/70661>
5. <https://microbiologysociety.org/blog/bioremediation-the-pollution-solution.html>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	2
CO2	3	3	2	2
CO3	3	3	2	2
CO4	3	3	2	2
CO5	3	3	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level



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NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBE24	BIOINFORMATICS	ELECTIVE 4 – I	5	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☒

COURSE DESCRIPTION:

Bioinformatics, as related to genetics and genomics, is a scientific subdiscipline that involves using computer technology to collect, store, analyze and disseminate biological data and information, such as DNA and amino acid sequences or annotations about those sequences.

COURSE OBJECTIVES:

- To discuss various biological data mining concepts, tools.
- To elucidate the principles and applications of sequence alignment methods and tools.
- To demonstrate different phylogenetic tree construction methods and its uses in phylogenetic analysis.
- To make the students acquaint with various approaches in predicting 3D and 2D structure of proteins.
- To describe various tools and techniques used in molecular docking, immune informatics and subtractive genomics.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	access to databases that provides information on nucleic acids and proteins.	Upto K6
CO 2	invent algorithms for sequence alignment.	Upto K6
CO 3	construct phylogenetic tree.	Upto K6
CO 4	predict the structure of proteins.	Upto K6
CO 5	design drugs by predicting drug ligand interactions and molecular docking.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



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BIOINFORMATICS

UNIT – I:

Biological Data Mining – Exploration of Data Mining Tools. Cluster Analysis Methods. Data Visualization. Biological Data Management. Biological Algorithms – Biological Primary and Derived Databases. Concept of Alignment, Pairwise Sequence Alignment (PSA), Multiple Sequence Alignment (MSA), BLAST, CLUSTALW, Scoring Matrices, Percent Accepted Mutation (PAM), Blocks of Amino Acid Substitution Matrix (BLOSUM).

UNIT – II:

Phylogenetic Tree Construction – Concept of Dendrograms. Evolutionary Trees – Distance Based Tree Reconstruction – Ultrametric trees and Ultrametric distances – Reconstructing Trees from Additive Matrices – Evolutionary Trees and Hierarchical Clustering – Character Based Tree Reconstruction – Maximum Parsimony Method, Maximum likelihood method – Reliability of Trees – Substitution matrices – Evolutionary models.

UNIT – III:

Computational Protein Structure prediction – Secondary structure – Homology modelling– Fold recognition and ab initio 3D structure prediction – Structure comparison and alignment – Prediction of function from structure. Geometrical parameters – Potential energy surfaces – Hardware and Software requirements–Molecular graphics – Molecular file formats– Molecular visualization tools.

UNIT – IV:

Prediction of Properties of Ligand Compounds – 3D Autocorrelation – 3D Morse Code– Conformation Dependent and Independent Chirality Codes – Comparative Molecular Field Analysis – 4 D QSAR – HYBOT Descriptors – Structure Descriptors – Applications – Linear Free Energy Relationships – Quantity Structure – Property Relationships – Prediction of the Toxicity of Compounds.

UNIT – V:

Molecular Docking– Flexible – Rigid docking– Target– Ligand preparation– Solvent accessibility– Surface volume calculation, Active site prediction– Docking algorithms– Genetic, Lamarckian – Docking analyses– Molecular interactions, bonded and nonbonded – Molecular Docking Software and Working Methods. Genome to drug discovery – Subtractive Genomics – Principles of Immunoinformatics and Vaccine Development.



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TEXT BOOKS:

1. Lesk A. M. (2002). *Introduction to Bioinformatics*. (4th Edition). Oxford University Press.
2. Lengauer T. (2008). *Bioinformatics– from Genomes to Therapies* (Vol-1). Wiley– VCH.
3. Rastogi S. C., Mendiratta N. and Rastogi P. (2014). *Bioinformatics – Methods and Applications (Genomics, Proteomics and Drug Discovery)* (4th Edition). Prentice–Hall of India Pvt.Ltd.
4. Attwood, T.K. and Parry–Smith, D.J. (1999). *Introduction to Bioinformatics. Addison.* Wesley Longman Limited, England.
5. Mount D.W., (2013). *Bioinformatics Sequence and Genome Analysis*, 2ndedn.CBSPublishers, New Delhi.

REFERENCE BOOKS:

1. Baxevanis A. D. and Ouellette F. (2004). *Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins*. (2nd Edition). John Wiley and Sons.
2. Bosu O. and Kaur S. (2007). *Bioinformatics – Database, Tools, and Algorithms*. Oxford University Press.
3. David W. M. (2001). *Bioinformatics Sequence and Genome Analysis* (2nd Edition). CBS Publishers and Distributors(Pvt.)Ltd.
4. Xiong J, (2011). *Essential bioinformatics*, First south Indian Edition, Cambridge University Press.
5. Harshawardhan P.Bal, (2006). *Bioinformatics Principles and Applications*, TataMcGraw–Hill Publishing Company Limited.

DIGITAL TOOLS:

1. <https://www.hslls.pitt.edu/obrc/>
2. <https://www.hslls.pitt.edu/obrc/index.php?page=dna>
3. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1669712/>
4. <https://www.ebi.ac.uk/>
5. <https://www.kegg.jp/kegg/kegg2.html>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4
CO1	1	3	3	2
CO2	3	2	3	3
CO3	3	2	3	2
CO4	3	3	2	2
CO5	3	3	2	3

3. Advanced Application

2. Intermediate Development

1. Introductory Level



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NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBE25	BIOSAFETY, BIOETHICS AND IPR	ELECTIVE 4 – II	5	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

NATURE OF COURSE	Employability ☐	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This Course provides a broad coverage of three areas of patenting-**intellectual property rights (IPR)**, **biosafety** and **bioethics**.

COURSE OBJECTIVES:

- To create a research environment and encourage investigation, analysis and study the bioethical principles, values, concepts, and social and juridical implications in the areas of science, biotechnology and medicine.
- To discuss various aspects of biosafety regulations, IPR and bioethics concerns arising from the commercialization of biotechnological products.
- To familiarize the students with fundamental aspects of Intellectual property Rights in the development and management of innovative projects in industries.
- To help the students acquire knowledge about bioethics, biodiversity and Genetically modified foods and food crops
- To provide students with an understanding of bioethics in research associated with medicine

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	execute the role of IPR, Patent, Trademarks and its importance.	Upto K6
CO 2	develop patent procedure, patent filling and its mapping.	Upto K6
CO 3	become Patent attorneys and Patent officers.	Upto K6
CO 4	apply bioethics in GMO, food crops and its biodiversity.	Upto K6
CO 5	analyse the importance of bioethics in research associated with HGP, clinical research, stem cell therapy.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



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BIOSAFETY, BIOETHICS AND IPR

UNIT – I:

Intellectual Property Rights: Different forms of Intellectual Property Rights – their relevance, importance to industry, Academia. Role of IPR's in Biotechnology, Patent Terminology – Patents, trademarks, copyrights, industrial designs, geographical indications, trade secrets, non-disclosure agreements. Patent life and geographical boundaries. International organizations and IPR – Overview of WTO, TRIPS, WIPO, GATT, International conventions, Trade agreements, Implication of TRIPS for developing countries.

UNIT – II:

Process involved in patenting. Patent Search – Procedural steps in patenting, process of filing, PCT application, pre-grant & post-grant opposition, PCT and patent harmonization including Sui-generis system, patent search methods, patent databases and libraries, online tools, Country-wise patent searches (USPTO, EPO, India etc.), patent mapping.

UNIT – III:

Patentability of biotechnology inventions – Patentability of biotechnology inventions in India, statutory provisions regarding biotechnological inventions under the current Patent Act 1970 (as Amended 2005). Biotechnological inventions as patentable subject matter, territorial nature of patents – from territorial to global patent regime, interpreting TRIPS in the light of biotechnology inventions, feasibility of a uniform global patent system, merits and demerits of uniform patent law, relevance of the existing international patent, tentative harmonisation efforts, implications of setting up a uniform world patent system.

UNIT – IV:

Introduction to bioethics – need of bioethics, applications and issues related to bioethics, social and cultural issues. Bioethics and biodiversity – conserving natural biodiversity, convention on protecting biodiversity, protocols in exchanging biological material across borders. Bioethics & GMO's – issues and concerns pertaining to genetically modified foods and food crops, organisms and their possible health implications and mixing up with the gene-pool.

UNIT – V:

Bioethics in medicine – Protocols of ethical concerns related to prenatal diagnosis, gene therapy, organ transplantation, xeno transplantation, ethics in patient care, informed consent. Bioethics and cloning – permissions and procedures in animal cloning, human cloning, risks and hopes. Bioethics in research: stem cell research, human genome project, use of animals in research, human volunteers for clinical research, studies on ethnic races. the Nuremberg code.



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TEXT BOOKS:

1. Usharani B., Anbazhagi S. and Vidya C. K. (2019). *Biosafety in Microbiological Laboratories*. (1st Edition). Notion Press. ISBN-101645878856
2. Satheesh M. K. (2009). *Bioethics and Biosafety*. (1st Edition). J. K International Publishing House Pvt. Ltd: Delhi. ISBN: 9788190675703
3. Goel D. and Parashar S. (2013). IPR, *Bio safety and Bioethics*. (1st Edition). Pearson education: Chennai. ISBN-13: 978-8131774700
4. Raj Mohan joshi. *Biosafety and Bioethics*. Wiley Publications.
5. Sibi. G. *Intellectual Property Rights, Bioethics, Biosafety and Entrepreneurship in Biotechnology*. (2021). Wiley Publications.

REFERENCE BOOKS:

1. Nithyananda K. V. (2019). *Intellectual Property Rights: Protection and Management*, India, IN: Cengage Learning India Private Limited.
2. Neeraj, P. and Khusdeep, D. (2014). *Intellectual Property Rights*, India, IN: PHI learning Private Limited,
3. Ahuja, V K. (2017). *Law relating to Intellectual Property Rights*, India, IN: LexisNexis.
4. Tony Hope (2004). *Medical Ethics: A very Short Introduction*. Oxford Publication.
5. Goel Parashar. *IPR, Biosafety and Bioethics* (2013). Pearson Publications.

DIGITAL TOOLS:

1. <http://www.bdu.ac.in/cells/ipr/docs/ipr-eng-ebook.pdf>.
2. https://www.wipo.int/edocs/pubdocs/en/intproperty/489/wipo_pub_489.pdf.
3. <https://www.cdc.gov/training/quicklearns/biosafety/>
4. <https://bioethics.msu.edu/what-is-bioethics>
5. https://www.wto.org/english/tratop_e/trips_e/intell_e.htm

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	2
CO2	2	3	2	2
CO3	3	3	2	3
CO4	3	3	2	3
CO5	3	2	2	3

3. Advanced Application

2. Intermediate Development

1. Introductory Level



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NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBE26	CLINICAL RESEARCH AND CLINICAL TRIALS	ELECTIVE 4 – III	5	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☒	Entrepreneurship ☐

COURSE DESCRIPTION:

This Course deals with Clinical Research and Clinical Trials.

COURSE OBJECTIVES:

- To provide an overview of history and methods involved in conducting clinical research.
- To design the principles involved in ethical, legal, and regulatory issues in clinical research on human subjects.
- To describe principles and issues involved in monitoring patient-oriented research.
- To formulate a well-defined quality assurance and quality control plans.
- To help the students acquire business development skills in the area of clinical research.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	apprehend the Drug Development process and different phases of clinical trials.	Upto K6
CO 2	recognize the ethics and regulatory perspectives on clinical research trials activities.	Upto K6
CO 3	accentuate about clinical trials management concepts and documentation process.	Upto K6
CO 4	accomplish quality assurance and quality control to ensure the protection of human subjects and the reliability of clinical trial results.	Upto K6
CO 5	nurture skills recitation to commercial start up and industriousness.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



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CLINICAL RESEARCH AND CLINICAL TRIALS

UNIT – I:

Introduction to Clinical Research: Clinical Research: An Overview, Different types of Clinical Research. Clinical Pharmacology: Pharmacokinetics, Pharmacodynamics, Pharmacoepidemiology, Bioavailability, Bioequivalence, Terminologies and definition in Clinical Research. Drug Development Process: Drug Discovery Pipeline, Drug Discovery Process. Preclinical trial, Human Pharmacology (Phase-I), Therapeutic Exploratory trail (Phase-II), Therapeutic Confirmatory Trail (Phase-III) and Post marketing surveillance (Phase-IV).

UNIT – II:

Ethical Considerations and Guideline in Clinical Research: Historical guidelines in Clinical Research–Nuremberg code, Declaration of Helsinki, Belmont report. International Conference on Harmonization (ICH)–Brief history of ICH, Structure of ICH & ICH Harmonization Process, Guidelines for Good Clinical Practice. Regulation in Clinical Research– Drug and cosmetic act, FDA, Schedule-Y– Ethics Committee and their responsibilities. Clinical Research Regulatory Submission & approval Process– IND, NDA and ANDA submission Procedure. DCGI submission procedure. Other Regulatory authorities– EMEA, MHRA, PhRMA.

UNIT – III:

Clinical Trial Management: Key Stakeholders in Clinical Research, Ethics Committees and Institutional Review Board, Responsibilities of Sponsor. Responsibilities of Investigator, Protocol in Clinical Research Clinical Trial Design, Project Planning Project Managements – Informed Consent, Investigator's Brochure (IB), Selection of an Investigator and Site, Patient screening, Inclusion and exclusion criteria, Randomization, Blinding. Essential Documents in clinical research –IB, ICF, PIS, TMF, ISF, CDA & CTA.

UNIT – IV:

Quality Assurance, Quality Control & Clinical Monitoring: Defining the terminology– Quality, Quality system, Quality Assurance & Quality Control–QA audit plan. 21 CFR Part 11, Site Auditing, Sponsor Compliance and Auditing, SOP For Clinical Research–CRF Review & Source Data Verification, Drug Safety Reporting Corrective and preventative action process.

UNIT – V:

Business Development in the Clinical Research Industry: Introduction & Stages of Business Development–Start-up Phase, Growth Phase, Maturity Phase, Decline Phase. Outsourcing in Clinical Research, Reasons for outsourcing to contract research organizations, The India Advantage, Scope and Future of CRO, List of Clinical Research Organizations in India, List of IT companies offering services in Clinical Research. Role of business development manager.



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TEXT BOOKS:

1. Gallin J. I., Ognibene F. P. and Johnson L. L. (2007). *Principles and Practice of Clinical Research*. (4th Edition). Elsevier, 2007. ISBN-10: 0128499052
2. Friedman L. M., Furberg C. D. and Demets D. (1998). *Fundamentals of Clinical Trials, Vol: XVIII*. (3rd Edition). Springer Science & Business Media.
3. Hulley S. B., Cummings S. R., Browner W. S., Grady D. G. and Newman T. B. (2013). *Designing Clinical Research*. (4th Edition). Jaypee Medical. ISBN-13: 978-1608318049.
4. Reed, G. (2004). *Prescott and Dunn's Industrial Microbiology*, 4th edn, CBS publication and distributors.
5. Himanshu B. *Text book of Clinical Research*, Pee Vee books.

REFERENCE BOOKS:

1. Friedman L.M., Furberg C.D., DeMets D. and Reboussen, D.M. (2015). *Fundamentals of Clinical Trials*, Springer.
2. Browner W. S., (2012). *Publishing and Presenting Clinical Research*. (3rd Edition). Lippincott Williams and Wilkins.
3. Rondel R. K., Varley S. A. and Webb C. F. (2008). *Clinical Data Management*. (2nd Edition). Wiley.
4. Pepler, H.J. and Pearlman, D. (1979). *Fermentation Technology, Vol 1 & 2*, 2nd Edition Academic Press, London.
5. El-Mansi, E.M.T., Bryce, C.F.A., Demain, A.L. and Allman, A.R. (2007). *Fermentation Microbiology and Biotechnology*. 2nd Edition, CRC press, Taylor and Francis Group.

DIGITAL TOOLS:

1. [https://www.hzu.edu.in/uploads/2020/10/Textbook-of-Clinical-Trials-Wiley-\(2004\).pdf](https://www.hzu.edu.in/uploads/2020/10/Textbook-of-Clinical-Trials-Wiley-(2004).pdf)
2. <https://www.routledge.com/A-Practical-Guide-to-Managing-Clinical-Trials/Pfeiffer-Wells/p/book/9780367497828>
3. <https://www.auctoresonline.org/journals/clinical-research-and-clinical-trials>
4. https://www.who.int/health-topics/clinical-trials#tab=tab_1
5. <https://www.cancerresearchuk.org/about-cancer/find-a-clinical-trial/what-clinical-trials-are/types-of-clinical-trials>

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4
CO1	2	3	3	3
CO2	3	2	2	2
CO3	3	3	2	3
CO4	3	3	3	3
CO5	3	3	2	2

3. Advanced Application

2. Intermediate Development

1. Introductory Level



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NEW COURSE

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23PMBS21	VERMITECHNOLOGY	Skill Enhancement Course – 2	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

NATURE OF COURSE	Employability ☒	Skill Oriented ☐	Entrepreneurship ☒

COURSE DESCRIPTION:

Vermitechnology includes the study and commercial application of technologies that utilise earthworms for degrading waste organic materials for sanitation and agricultural re-use.

COURSE OBJECTIVES:

- To introduce the concepts of vermicomposting.
- To explain the physiology, anatomy and biology of earthworms.
- To help the students acquire the knowledge of the vermicomposting process.
- To explain the trouble shooting, harvesting and packaging of vermin composts.
- To help the students gain knowledge on applications of vermin composts and their value added products.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	compare and contrast the uses of vermicom post to the soil.	Upto K6
CO 2	recommend different species of earthworms after acquiring knowledge on its biology.	Upto K6
CO 3	design the vermicomposting process.	Upto K6
CO 4	assess the Best Practices of Vermicomposting	Upto K6
CO 5	recommend the applications of vermicom post to different soils and for different crops.	Upto K6

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY,
K4 – ANALYZE, K5 – EVALUATE, K6 – CREATE



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M.Sc. MICROBIOLOGY – SYLLABUS

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VERMITECHNOLOGY

UNIT – I:

Introduction to Vermiculture – Definition, classification, history, economic importance– In sustainable agriculture, organic farming, earthworm activities, soil fertility & texture, soil aeration, water impenetration, decomposition & moisture, bait & food and their value in maintenance of soil structure. Its role in the bio transformation of the residues generated by human activity and production of organic fertilizers. Choosing the right worm. Useful species of earthworms. Local species of earthworms. Exotic species of earthworms. Factors affecting distribution of earthworms in soil.

UNIT – II:

Earthworm Biology and Rearing – Key to identify the species of earthworms. Biology of *Eisenia fetida*. a) Taxonomy Anatomy, physiology and reproduction of Lumbricidae. b) Vital cycle of *Eisenia fetida*: alimentation, fecundity, annual reproducer potential and limiting factors (gases, diet, humidity, temperature, PH, light, and climatic factors). Biology of *Eudrilus eugeniae*. c) Taxonomy Anatomy, physiology and reproduction of Eudrilidae. d) Vital cycle of *Eudrilus eugeniae*: alimentation, fecundity, annual reproducer potential and limit factors (gases, diet, humidity, temperature, PH, light, and climatic factors).

UNIT – III:

Vermicomposting Process – Feeds for Vermitech systems– Animal manures– Kitchen Waste and Urban waste– Paper pulp and card board solids– Compost and waste products– Industrial Wastes. Vermicomposting Basic process– Initial pre– composting phase– Mesophilic phase– Maturing and stabilization phase– Mechanism of Earthworm action. Methods of vermicomposting– a) windrows system; b) wedge system; c) container system– pits, tanks & cement rings; commercial model; beds or bins–top fed type, stacked type, d) Continuous flow system.

UNIT – IV:

Vermicomposting – Trouble Shooting–Temperature–Aeration– Acidity– Pests and Diseases– Ants, rodents, Birds, Centipedes, sour crop, Mite pests. Odour problems. Separation techniques– Light Separation–Sideways Separation–Vertical Separation– Gradual transfer. Harvesting Earthworms– manual method– migration method. Packing & Nutritional analysis of vermicompost.

UNIT – V:

Applications of Vermiculture – Vermiculture Bio–technology, use of vermi castings in organic farming/horticulture, as feed/bait for capture/culture fisheries; forest regeneration. Application quantity of vermicompost in Agricultural fields– crops, fruits, vegetables & flowers. By–products and value – added products– Verm wash– vermicompost tea–vermi meal – enriched vermicompost–pelleted vermicompost.



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TEXT BOOKS:

1. Ismail S. A. (2005). *The Earthworm Book, Second Revised Edition*. Other India Press, Goa, India.
2. Rathoure A. K., Bharati P. K. and Ray J. (2020). *Vermitechnology, Farm and Fertilizer*. Vermitechnology, Farm and Fertilizer Discovery Publishing House Pvt Ltd.
3. Christy M. V. 2008. *Vermitechnology*, (1st Edition), MJP Publishers.
4. The complete technology book on *Vermiculture and Vermicompost with manufacturing Process, machinery equipment details and Plant Layout*. AB Press.
5. Keshav Singh (2014). *A Textbook of Vermicompost: Vermiwash and Biopesticide*.

REFERENCE BOOKS:

1. Roy D. (2018). *Handbook of Vermitechnology*. Lambert Academic Publishing.
2. Kumar A. (2005). *Verms and Vermitechnology*, A.P.H. Publishing Corporation, New Delhi.
3. Lekshmy M. S., Santhi R. (2012). *Vermitechnology*, Sara Publications, New Delhi, India.
4. Edwards CA, Arancon NQ Sherman RL. (2011) *Vermiculture Technology: Earthworms, Organic Wastes, and Environmental Management*. 1st edn. CRC Press.
5. Ismail, S.A. (1997). *Vermiculture–The Biology of Earthworm*. 1st edn. Orient longman.

DIGITAL TOOLS:

1. <https://en.wikipedia.org/wiki/Vermicompost>
2. <http://stjosephs.edu.in/upload/papers/9567411a78c63d4ccfbbe85e6aa22840.pdf>
3. https://www.kngac.ac.in/elearning-portal/ec/admin/contents/4_18K4ZEL02_2021012803204629.pdf
4. <https://composting.ces.ncsu.edu/vermicomposting-2/>
5. <https://rodaleinstitute.org/science/articles/vermicomposting-for-beginners/>

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3. Advanced Application

2. Intermediate Development

1. Introductory Level



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METHODS OF EVALUATION		
Internal Evaluation	Continuous Internal Assessment Test	25 Marks
	Assignments / Snap Test / Quiz	
	Seminars	
	Attendance and Class Participation	
External Evaluation	End Semester Examination	75 Marks
Total		100 Marks

METHODS OF ASSESSMENT	
Recall (K1)	Simple definitions, MCQ, Recall steps, Concept definitions
Understand / Comprehend (K2)	MCQ, True/False, Short essays, Concept explanations, Short summary or overview
Application (K3)	Suggest idea/concept with examples, Suggest formulae, Solve problems, Observe, Explain
Analyze (K4)	Problem-solving questions, Finish a procedure in many steps, Differentiate between various ideas, Map knowledge
Evaluate (K5)	Longer essay/ Evaluation essay, Critique or justify with pros and cons
Create (K6)	Check knowledge in specific or offbeat situations, Discussion, Debating or Presentations