SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE – SYLLABUS
(Under CBCS based on OBE) (with effect from 2021 – 2022)

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GRADUATE ATTRIBUTES

- **Disciplinary knowledge:** Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.

- **Communication Skills:** Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.

- **Critical thinking:** Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.

- **Problem solving:** Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non – familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations.

- **Analytical reasoning**: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.

- **Cooperation/Team work**: Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.

- **Scientific reasoning:** Ability to analyze, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open – minded and reasoned perspective.

- **Information/digital literacy:** Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data.

- **Self – directed learning:** Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.

- **Moral and ethical awareness/reasoning:** Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work.

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PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	To make the students successful in their professional careers, including entrepreneurship using their knowledge in Computer Science and Applications.
PEO 2	To help the students continue to learn and adopt latest technologies to solve real life problems.
PEO 3	To motivate the students pursue research and higher education.
PEO 4	To inculcate in students professional and ethical attitude, communication skills, teamwork skills, multi – disciplinary approach and an ability to relate computer Science issues with social awareness.
PEO 5	To prepare students to excel in post graduate programmes in Computer Science or to succeed in computing industry profession through quality education.

UNDERGRADUATE (UG) PROGRAMME OUTCOMES (POs)

Undergraduate (B.A.,**B.Sc.,**B.Com., B.C.A., B.B.A., etc.,) is a 3 – year degree programme with 6 semesters consisting the following Programme Outcomes (POs) under various criteria including critical thinking, problem solving, effective communication, societal/ citizenship/ ethical credibility, sustainable growth and employable abilities.

PO 1	**Critical Thinking**: Intellectual exploration of knowledge towards actions in clear and rational manner by understanding the logical connections between ideas and decisions.
PO 2	**Problem Solving**: Understanding the task/ problem followed by planning and narrow execution strategy that effectively provides the solution.
PO 3	**Effective Communication**: Knowledge dissemination by oral and verbal mechanisms to the various components of our society.
PO 4	**Societal/ Citizenship/ Ethical Credibility**: Realization of various value systems/ moral dimensions and demonstrate the empathetic social concern as well as equity in all the decisions, executions and actions.
PO 5	**Environmental Concern and Sustainable Growth**: Understanding the emerging environmental challenges and provide the possible contribution in sustainable development that integrates environment, economy and employment.
PO 6	**Skill Development and Employable Abilities**: Adequate training in relevant skill sector and creating employable abilities among the under graduates.

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PROGRAMME SPECIFIC OUTCOMES (PSOs)

On completion of **B.Sc. Computer Science** Programme, the students are expected to

PSO 1	develop as professionally competent citizens by applying the scientific knowledge of Computer Science with the ability to think clearly, rationally and creatively to support in evolving solutions to the social/public/scientific issues with responsible democratic participation
PSO 2	enterprise resourcefulness to identify, plan, formulate, design and evaluate solutions for complex computing problems that address the specific needs with appropriate consideration for Societal, Cultural, Environmental and Industrial domains.
PSO 3	develop holistically to ignite the lateral thinking ability in problem solving, acquisition of new skills, open – minded and organized way of facing problems with self - awareness and evolving analytical solutions
PSO 4	create and initiate innovations effectively and communicate efficiently with the computing community and society at large to bridge the gap between computing industry and academia
PSO 5	understand, assess and commit to professional and ethical principles, norms and responsibilities of the cyber world through Digital Literacy and gain the ability for work efficacy as a part of a team and engage effectively with diverse stakeholders
PSO 6	acquire ability and willingness to embark on new ventures and initiatives with critical thinking and desire for more continuous learning focusing on life skills.

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B.Sc. COMPUTER SCIENCE – II YEAR

COURSE STRUCTURE – III SEMESTER

S. No.	Subject Code	Subject Title	Hrs./ Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	21UACT31	**Part – I:Tamil** – காப்பியமும் நாடகமும்	6	3	25	75	100	3
	21UACH31	**Hindi** – Hindi – III						
	21UACS31	**Sanskrit** – Sanskrit – III						
2.	21UACE31	**Part – II: English** – English For Enrichment – III	6	3	25	75	100	3
3.	21UCSC31	**Part – III: Core – 5:** Object Oriented Programming Using C++	5	3	25	75	100	5
4.	21UCSCP3	**Part – III: Core – 6:** **Lab – III:** Object Oriented Programming Using C++	5	3	40	60	100	3
5.	21UCSA31	**Part – III: Allied – 3:** Operations Research - I	4	3	25	75	100	4
6.	21UCSSP1	**Part – IV:SBS – 3:Lab– IV:** Linux And Shell Programming	2	3	40	60	100	2
7.	21UCSN31	**Part – IV:NME – 1:** Office Automation	2	3	25	75	100	2
		TOTAL	**30**				**700**	**22**

COURSE STRUCTURE – IV SEMESTER

S. No.	Subject Code	Subject Title	Hrs./ Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	21UACT41	**Part – I: Tamil** – சங்க இலக்கியமும் அற இலக்கியமும்	6	3	25	75	100	3
	21UACH41	**Hindi** – Hindi – IV						
	21UACS41	**Sanskrit** – Sanskrit – IV						
2.	21UACE41	**Part – II: English** – English For Enrichment – IV	6	3	25	75	100	3
3.	21UCSC41	**Part – III: Core – 7:** Programming In Java	5	3	25	75	100	5
4.	21UCSCP4	**Part – III: Core – 8:** **Lab – V:**Java Programming	5	3	40	60	100	3
5.	21UCSA41	**Part – III: Allied – 4:** Operations Research - II	4	3	25	75	100	4
6.	21UCSSP2	**Part – IV:SBS – 4:** **Lab –VI:** Visual Programming	2	3	40	60	100	2
7.	21UCSN41	**Part – IV:NME – 2:** Introduction to Internet	2	3	25	75	100	2
8.		**Part – V:** Extension Activities	–	–	–	–	100	1
		TOTAL	**30**				**800**	**23**

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COURSE STRUCTURE – III SEMESTER

S. No.	Subject Code	Subject Title	Hrs./ Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	21UACT31	**Part – I:** **Tamil** – காப்பியமும் நாடகமும்	6	3	25	75	100	3
	21UACH31	**Hindi** – Hindi – III						
	21UACS31	**Sanskrit** – Sanskrit – III						
2.	21UACE31	**Part – II:** **English** – English For Enrichment – III	6	3	25	75	100	3
3.	21UCSC31	**Part – III: Core – 5:** Object Oriented Programming Using C++	5	3	25	75	100	5
4.	21UCSCP3	**Part – III: Core – 6:** **Lab – III:** Object Oriented Programming Using C++	5	3	40	60	100	3
5.	21UCSA31	**Part – III: Allied – 3:** Operations Research - I	4	3	25	75	100	4
6.	21UCSSP1	**Part – IV: SBS – 3:** **Lab– IV:** Linux And Shell Programming	2	3	40	60	100	2
7.	21UCSN31	**Part – IV: NME – 1:** Office Automation	2	3	25	75	100	2
		TOTAL	**30**				**700**	**22**

CA   – **Class Assessment (Internal)**

SE   – **Summative Examination**

SBS   – **Skill Based Subject**

NME   – **Non –Major Elective**

T   – **Theory**

P   – **Practical**

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSC31	OBJECT ORIENTED PROGRAMMING USING C++	CORE – 5	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	III	25	75	100

NATUREOF 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 introduce Object Oriented Programming concepts using C++ and improve their OOP Skill.
- To introduce the object oriented programming features – Encapsulation, Polymorphism and Inheritance.
- To develop programs for data file access using C++ streams

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 Procedure – oriented programming and the evolution of Object oriented programming	Upto K3
CO 2	identify basic concepts of OOP, benefits and its applications.	Upto K3
CO 3	write object oriented programs using classes and objects.	Upto K3
CO 4	design object oriented programs that can focus on reusability – Inheritance	Upto K3
CO 5	utilize compile time polymorphism and runtime polymorphism with pointers and virtual functions and File concepts	Upto K3

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

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OBJECT ORIENTED PROGRAMMING USING C++

UNIT – I:

Principles of object oriented programming (OOP)**:** Software evolution – Basic concepts of OOP – Benefits of OOP – Object Oriented Languages – Applications of OOP. Introduction to C++: Tokens, Keywords, Identifiers, Variables, Operators, Manipulators, Expressions and Control Structures in C++.

UNIT – II:

Function in C++ - Main Function – Function Prototyping – Call by reference – Return by reference – Inline functions – Default arguments-Function Overloading – Friend and Virtual Functions.

UNIT – III:

Classes and objects-Constructors-Parameterized constructor, copy constructor, constructor with default arguments, Dynamic constructor-

Destructors – Operator overloading.

UNIT – IV:

Inheritance – Single inheritance – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance. Pointers, Virtual Functions and Polymorphism – Managing I/O Operations.

UNIT – V:

Working with Files: Classes for File Stream Operations – Opening and Closing a File – End-of-file deletion – File pointers – Updating a File – Error Handling during File Operations**-**Command line Arguments.

TEXT BOOKS:

E. Balagurusamy, *Object Oriented Programming With C++,* 4th Edition, Tata McGraw – Hill, New Delhi, 2008

Unit I: Chapter 1,3 **Unit II:** Chapter 4, **Unit III:** Chapter 5 – 7,**Unit IV:** Chapters 8 – 10, **Unit V:** Chapters 11.

REFERENCE BOOKS:

1. *Object – Oriented Programming with C++,* PoornachandraSarang, 2nd Edition, PHI Learning Private Limited, New Delhi, 2009
2. *Object – Oriented Programming Using C++,*Alok Kumar Jagadev, Amiya Kumar Rath And Satchidananda Dehuri, Prentice – Hall of India Private Limited, New Delhi, 2007
3. *Al Stevens, C++ Programming* , 7Th Edition, Wiley Dream Tech India Pvt Ltd , 2003
4. *Classical Data Structures* – D. Samanta, PHI, 2008

DIGITAL TOOLS:

http://www.cplusplus.com,https://www.tutorialspoint.com/cplusplus/index.html
http://www.learncpp.com,https://www.mycplus.com

Mapping of CO with PSO

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

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

COURSE DESIGNER: Prof. K.P.GNANESH

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSCP3	**LAB : OBJECT ORIENTED PROGRAMMING USING C++**	**CORE – 6 LAB – III**	**–**	**5**	**3**

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	**III**	**40**	**60**	**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 introduce Object Oriented Programming concepts using C++ and improve their OOP Skill.
- To introduce the object oriented programming features – Encapsulation, Polymorphism and Inheritance.
- To develop programs for data file access using C++ streams
-

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 features like constructors and destructors, overloading – function and operators	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 pointers and virtual functions.	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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LAB: OBJECT ORIENTED PROGRAMMING USING C++

Programs to be written using the following concepts.

1. Simple Object oriented Programs

2. Inline and Friend functions

3. Arrays

4. Constructors (Copy, default and parameterized)

5. Static (Data member and Function)

6. Function Overloading

7. Operator Overloading

8. Types of Inheritance

9. Runtime polymorphism (Virtual Function)

10. Files

COURSE DESIGNER: Prof. K. P. GNANESH

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSA31	**OPERATIONS RESEARCH – I**	**ALLIED – 3**	**4**	**–**	**4**

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	**III**	**25**	**75**	**100**

NATURE OF COURSE	Employability	✓	Skill Oriented		Entrepreneurship	

COURSE DESCRIPTION:

This course is designed to teach various concepts of Operation Research to the students.

COURSE OBJECTIVES:

- To explain the brief history of Operation Research
- To explain how to formulate the general Linear Programming Problem and solve by Graphical method.
- To explain the algorithm and method to solve Simplex and Big – M method.
- To explain the Hungarian algorithm and method to solve Assignment problems
- To explain and Solve the various methods in Transportation 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	State the history of Operations Research	**Upto K3**
CO2	Describe Linear Programming Problem, Mathematical formulation of LPP and Solve the LPP by using Graphical method	**Upto K3**
CO3	Solve LPP by Simplex method and Big – M method	**Upto K3**
CO4	Illustrate various methods in finding the Initial solution for the Transportation problem and to find Optimum solution using MODI method	**Upto K3**
CO5	Demonstrate and solve Assignment problems and Travelling Salesman problem	**Upto K3**

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

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OPERATIONS RESEARCH – I

UNIT – I: Operations Research

Introduction- Role of OR in Business and Management – Role of OR in Engineering – Classification of Models – Some characteristics of a good model – Principles of Modelling – General methods for solving OR Models – Main Phases of OR - Limitation

UNIT – II: Linear Programming: Formulation and Graphical Method

Introduction – Requirements for employing LPP technique – Mathematical formulation of LPP – Basic Assumptions – Graphical method of the solution of a LPP – Some more cases –

UNIT – III: Simplex method

General LPP – Canonical and Standard forms of LPP – The Simplex method – The Simplex Algorithm – Artificial Variable Techniques: The Big-M method – The Two-Phase Method.

UNIT – IV: Transportation Model

Introduction – Mathematical formulation of a Transportation Problem – Methods for finding Initial Basic Feasible Solution: North West Corner Rule – Matrix Minima Method – Vogel's Approximation Method, Transportation Problem using MODI method – Unbalanced Transportation problem – Maximization case in Transportation problems

UNIT – V: Assignment Problem

Introduction – Mathematical formulation of an Assignment Problem – Assignment Algorithm (or) Hungarian method – Unbalanced Assignment models – Travelling Salesman problem.

TEXT BOOKS: *Resource Management Techniques*
Author : Prof. V. Sundaresan, K. S. Ganapathy Subramanian, K. Ganesan
Publications : A. R. Publications, 5th edition, 2011
Unit – 1: Sections: 1.1-1.9**, Pages:** 1.1 – 1.7
Unit – 2: Sections: 2.1-2.6, **Pages:** 2.1 – 2.41
Unit – 3: Sections: 3.1.1-3.1.4, 3.2, 3.2.1, 3.2.2, **Pages:** 3.1 –3.56
Unit – 4: Sections: 7.1, 7.2, 7.4, **Pages:** 7.1-7.25, 7.39-7.64
Unit– 5: Sections: 8.1, 8.2, 8.5, 8.6, 8.9 **Pages:** 8.1,8.2, 8.4-8.21, 8.33-8.49
REFERENCE BOOKS: (i) Linear Programming Problem , (ii) Operation Research
Author : Arumugamand Isaac , Kanti and Swarup, Manmohan
Publications : Prentice Hall, 2002, Harvard University Press, 2001.
DIGITAL TOOLS:
1. https://whatis.techtarget.com/definition/operations – research – OR
2. http://people.brunel.ac.uk/~mastjjb/jeb/or/morelp.html
3. https://www.secs.oakland.edu/~latcha/ME5400/Simplex_OregonState.pdf
4. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=4955
5. https://www.gatexplore.com/transportation – problem – study – notes/

Mapping of CO with PSO

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

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

COURSE DESIGNER: Dr. V. K. VIJAYAKUMAR

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSSP1	**LAB : LINUX AND SHELL PROGRAMMING**	**SBS – 3 LAB – IV**	–	**2**	**2**

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	**III**	**40**	**60**	**100**

NATUREOF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	

COURSE DESCRIPTION:

To give knowledge about Linux shell programming language

COURSE OBJECTIVE:

To give knowledge about writing programs using shell scripting language

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 simple programs using formula	**Upto K3**
CO 2	write simple programs using mathematical logics	**Upto K3**
CO 3	write programs using one dimension array data structures	**Upto K3**
CO 4	write programs using two dimension array data structures	**Upto K3**
CO 5	write programs for solving problems using Strings	**Upto K3**

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

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LAB: LINUX AND SHELL PROGRAMMING

LIST OF EXPERIMENTS

1. Find the sum of the digits of a given number

2. Perform basic arithmetic operations using case

3. Check whether a number is prime or not using while

4. Convert lowercase to uppercase using tr statement

5. Check pattern matching using grep

6. Find the number of users who have logged in

7. Check for palindrome

8. Find age of a person using set date

9. Write a menu driven program to display today's date,

   Processes of the system, user's of the system, list files of the system

10. Read 10 names from a file and sort in

    a. Ascending order b. Descending order

11. Write a menu driven program to check for file existence, file readable or not,

    file writeable or not,

12. Get mark details of a student and display total and grade

13. Prepare electricity bill

14. To set the attributes of a given file

15. Check the given file is a directory or not

16. To create and append a file

17. To compare two files

18. To perform string manipulation

COURSE DESIGNER: Dr. V. K. VIJAYAKUMAR

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSN31	OFFICE AUTOMATION	NME – 1	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	III	25	75	100

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	

COURSE DESCRIPTION:

To train students in automating the office work using MS – WORD, MS – EXCEL, MS – POWERPOINT and MS – ACCESS

COURSE OBJECTIVES:

- To create an awareness about fundamentals of computers to Non – Comp.Sc. students
- To give knowledge about document handling using MS – WORD, creating worksheets and graphs using MS – EXCEL
- To impart knowledge on Slide presentation using MS – POWER POINT
- To impart knowledge on creating and accessing database using MS – ACCESS

COURSE OUTCOMES (CO):

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 awareness about fundamentals of computers	Upto K3
CO 2	get knowledge about document handling using MS – WORD	Upto K3
CO 3	create worksheets and graphs using MS – EXCEL	Upto K3
CO 4	gain knowledge on Slide presentation using MS – POWER POINT	Upto K3
CO 5	receive knowledge on creating and accessing database using MS – ACCESS	Upto K3

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

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OFFICE AUTOMATION

UNIT – I:

MS Word: Introduction – Saving the file – Formatting the text – Alignment of Text – Applying Fonts – Spell Checking – Character Styles – Borders and Shading –Closing the file – Save As Option – Print Document – Editing the document – Editing the tools – Find and Replace – Page Numbering –Setting Header and Footer - Mail Merge – Inserting Clip Arts, Pictures, WordArt, Date & Time, WordArt– Table Creation – Merging and Splitting Columns – inserting & deleting cells , rows, columns

UNIT – II:

MS Power point: Introduction to presentation – Creating – Opening new presentation, Different presentation templates, Setting backgrounds, Selecting presentation layouts,. Formatting a Presentation – Adding style, Colour, gradient fills, Arranging objects, Slide Background, Slide layout. Adding Graphics to the Presentation– Inserting pictures, movies, tables etc into presentation, Drawing Pictures using Draw. Adding Effects to the Presentation– Setting Animation & transition effect.

UNIT – III:

MS Excel: Introduction – Creating a Worksheet – Saving a file – Copying Formula – Formulas that make decision – Typing with auto fill - Adding and deleting rows and columns – changing the size of rows and columns – add or remove work sheet

UNIT – IV:

Functions in Excel – Auto Calculate – Sum, Average – Maths & Trignometric Functions – Statistical Functions – Sorting – Pivot Table – Creating charts

UNIT – V:

MS Access: Introduction, Creating a Database, creating table – entering records – creating table fields – data types– primary key, Creating queries

TEXT BOOK:

Learning computer Fundamentals, *MS Office and Internet & Web Technology*– DineshMaidasani – FIREWALL MEDIA, First Edition 2005.

REFERENCE BOOK:

A Beginners Guide to Computers – Alexis Leon & Mathews Leon – Vikas Publishing House Pvt Ltd.

DIGITAL TOOLS:

https://support.microsoft.com/en – us/office/word – for – windows – training – 7bcd85e6 – 2c3d – 4c3c – a2a5 – 5ed8847eae73,https://onlinecourses.swayam2.ac.in/cec20_cs05/preview
https://www.tutorialspoint.com/ms_word_online_training/index.asp
https://www.w3schools.com/excel/,https://www.javatpoint.com/ms – word – tutorial
https://www.tutorialspoint.com/powerpoint/index.htm,
https://www.tutorialspoint.com/ms_access/index.htm

Mapping of CO with PSO

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

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

COURSE DESIGNER: Prof. D. V. JEYANTHI

Passed in the BOS Meeting held on 19/03/2022   **Signature of the Chairman**

SOURASHTRA COLLEGE, MADURAI – 625004
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COURSE STRUCTURE – IV SEMESTER

S. No.	Subject Code	Subject Title	Hrs./ Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	21UACT41	**Part – I:** **Tamil** – சங்க இலக்கியமும் அற இலக்கியமும்	6	3	25	75	100	3
	21UACH41	**Hindi** – Hindi – IV						
	21UACS41	**Sanskrit** – Sanskrit – IV						
2.	21UACE41	**Part – II:** **English** – English For Enrichment – IV	6	3	25	75	100	3
3.	21UCSC41	**Part – III:Core – 7:** Programming In Java	5	3	25	75	100	5
4.	21UCSCP4	**Part – III:Core – 8:** **Lab – V:** Java Programming	5	3	40	60	100	3
5.	21UCSA41	**Part – III:Allied – 4:** Operations Research - II	4	3	25	75	100	4
6.	21UCSSP2	**Part – IV:SBS – 4:** **Lab –VI:** Visual Programming	2	3	40	60	100	2
7.	21UCSN41	**Part – IV:NME – 2:** Introduction to Internet	2	3	25	75	100	2
8.		**Part – V:** Extension Activities	–	–	–	–	100	1
		TOTAL	**30**		**205**	**595**	**800**	**23**

CA   – **Class Assessment (Internal)**

SE   – **Summative Examination**

SBS   – **Skill Based Subject**

NME – **Non –Major Elective**

T   – **Theory**

P   – **Practical**

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSC41	PROGRAMMING IN JAVA	CORE – 7	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	IV	25	75	100

NATURE OF COURSE	Employability	✓	Skill Oriented		Entrepreneurship	

COURSE DESCRIPTION:

This course facilitates the students with the comparative knowledge of procedure oriented programming and applet programming paradigm. It also 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	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 classes and objects and Applet and Graphics programs.	Upto K3
CO 4	design object oriented programs ,multithreading, exception handling, interface, package and applet program that can focus on java features	Upto K3
CO 5	utilize compile time polymorphism and runtime polymorphism with overloading and interface and File concepts	Upto K3

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

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PROGRAMMING IN JAVA

UNIT – I:
Java Evolution: Java Features – How Java differs from C and C++ - Java and Internet – Java and World Wide Web – Web Browsers – Hardware and Software Requirements – Java Environment. **Overview of Java Language:** Simple Java Program – Java Program Structure – Java Tokens- Java Statements – Implementing a Java Program – Java Virtual Machine – Command Line Arguments. Constants – Variables – Data types – Declaration of Variables – Scope of Variables –Symbolic Constants – Type Casting.

UNIT – II:
Operators and Expressions: Types of Operators-Arithmetic Expressions – Evaluation of Expressions–Mathematical Functions. **Decision Making and Branching:** Decision Making with If statement – Simple If Statement – If else Statement – Nesting If Else Statement – the ElseIf Ladder – The switch Statement – **Decision Making and Looping:** The while statement – The do statement – The for statement – **Class, Objects and Methods:** Defining a Class – Creating Objects – Constructors – Methods Overloading – Inheritance – Overriding Methods – Final Variables and Methods – Final Classes –Finalizer Methods- Abstract Methods and Classes.
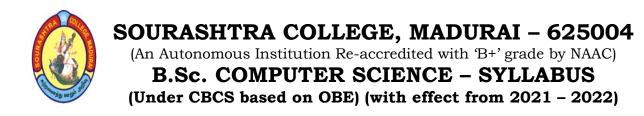
UNIT – III:
Arrays, Strings and Vectors: One-dimensional Arrays – creating an Array – Two dimensional Arrays –Strings – Vectors – Wrapper Classes – Enumerated Types. **Interfaces: Multiple Inheritance:** Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables. **Packages:** Java API Packages – Using system Packages – Naming Conventions – Creating Packages – Accessing a Package – Using a Package – Adding a Class to a Package – Hiding Classes – Static Import.

UNIT – IV:
Multithreaded Programming: Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread – Thread Priority – Implementing the Runnable Interface – **Managing Errors and Exceptions:** Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Throwing our own Exceptions– **Applet Programming:** How Applets differ from Applications – Building Applet Code – Applet Life Cycle – Creating an executable Applet – Designing a Web Page – Applet Tag – Adding Applet to HTML file – Running the Applet.

UNIT – V:
Graphics Programming: The Graphics Class – Lines and Rectangles – Circles and Ellipses, Drawing Arcs – Drawing Polygons – Line Graphs – Using Control Loops in Applets – Drawing Bar Charts. **Managing Input/Output Files in Java:** Concept of Streams – Stream Classes – Byte Stream Classes – Character Stream Classes – Using Streams – Other Useful I/O Classes – Using the file Class – I/O Exceptions – Creation of Files – Reading / Writing Characters – Reading / Writing Bytes.

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TEXT BOOK:

Programming with Java, A Primer, *3e*, E. Balagurusamy, TATA McGraw – Hill Company, 2008.**(Chapters: 1 to 16)**

UNIT I	**:**	Chapters: 1,2,3,4
UNIT II	**:**	Chapters: 5,6,7,8
UNIT III	**:**	Chapters: 9,10,11
UNIT IV	**:**	Chapters: 12,13,14
UNIT V	**:**	Chapters: 15.1 to 15.9, 16.1 to 16.12

REFERENCE BOOKS:

1. *Java and Object – Oriented Programming Paradigm*, Debasish Jana, Prentice – Hall of India Private Limited, New Delhi, 2008.
2. *JAVA2 – The Complete Reference*, Herbert schildt, Tata Mcgraw – Hill publishing

   Company ltd,New Delhi ,5 th edition,2008

DIGITAL TOOLS:

https://www.tutorialspoint.com/java/index.html
https://beginnersbook.com/java – tutorial – for – beginners – with – examples/
https://www.javatpoint.com/java – tutorial

Mapping of CO with PSO

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

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

COURSE DESIGNER: Prof. K. P. GNANESH

Passed in the BOS Meeting held on 19/03/2022   **Signature of the Chairman**

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSCP4	**LAB: JAVA PROGRAMMING**	**CORE – 8 LAB – V**	**5**	**–**	**3**

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	**IV**	**40**	**60**	**100**

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	

COURSE DESCRIPTION:

This course facilitates the students with the comparative knowledge of procedure oriented programming and applet programming paradigm. It also 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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LAB: JAVA PROGRAMMING
Programs to be written using the following concepts.

1. To perform addition of complex numbers using class and objects.
2. To perform multiplication of matrices using class and objects.
3. To perform area and volume calculation using method overloading and overriding.
4. Using command line arguments, test if the given string is palindrome or not.
5. 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 "InvalidName".
6. Using multilevel inheritance process student marks.
7. Implement multiple inheritance for payroll processing.
8. Create a package called "Arithmetic" that contains methods to deal with all arithmetic operations. Also, write a program to use the package.
9. Create two threads such that one of the thread print even no's and another prints odd no's up to a given range.
10. Define an exception called "Marks Out Of Bound" Exception, that is thrown if the entered marks are greater than 100.
11. String manipulation using string methods (Use of any five String methods preferred)
12. File – byte stream.
13. File – character stream.
14. Write an Applet illustrating sequence of events in an applet.
15. Write an Applet program to design a simple calculator.
16. Write an Interactive Applet program which will make the balls of various colours to move across the screen within the specified time limit. The number of balls and the time limit for ball animation should be obtained from the User when the applet starts.

COURSE DESIGNER: Prof. K. P. GNANESH

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSA41	OPERATIONS RESEARCH - II	ALLIED – 4	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	IV	25	75	100

NATURE OF COURSE	Employability	✓	Skill Oriented		Entrepreneurship	

COURSE DESCRIPTION:

This course is designed to teach various OR models that helps Corporate Managers to make efficient decisions in business and resource management.

COURSE OBJECTIVES:
- The techniques of operations research help managers allocate resources more effectively and enables them to better optimize the performance of their businesses.
- Operations research helps in improving the productivity of the organizations. ...
- OR helps smoother inventory planning and management
- Operations research is a decision science which helps management to make better decisions.

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	Replacement problems helps us to find the optimum period of replacement of various items	Upto K3
CO2	The main aim of an inventory management system is to keep the stock in such a way that it is neither overstock nor under stock.	Upto K3
CO3	The objective of a queuing model is to find out the optimum service rate and the number of servers so that the average cost of being in queuing system and the cost of service are minimised.	Upto K3
CO4	PERT/CPM is a powerful tool for planning, scheduling and controlling of projects.	Upto K3
CO5	Game theory is used extensively in various forms of collective bargaining and negotiation	UptoK3

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

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OPERATIONS RESEARCH – II

UNIT – I: REPLACEMENT MODELS

Introduction – Replacement policy for items whose maintenance cost increase with time, and money value is not considered Money value, Present worth factor (pwf) and discount Rate – Group Replacement Policy

(Example Problems only)

UNIT – II: INVENTORY MODELS

Introduction – Types of Inventory – Reasons for maintaining inventory - Costs involved in Inventory Problems – Variables in Inventory Problem – Lead Time, Re-order level - Deterministic Inventory Models – I, II, III & IV

(Example Problems only)

UNIT – III: QUEUEING MODELS

Introduction – Queueing system – Transient & steady states – Kendal's notation for representing queueing models – Poisson process – Model I: Birth – Death Model – Model II: Multi service model

(Example Problems only)

UNIT – IV: SCHEDULING BY PERT & CPM

Introduction – Basic Terminologies – Rules for constructing a Project Network -Network computations – PERT – Difference between PERT & CPM

(Example Problems only)

UNIT – V: GAME THEORY

Introduction – Two-person –zero-sum game – The Maximin-Minimax Principle – Saddle point and Value of the Game –Games without saddle points , Mixed strategies – Matrix Oddment method(Arithmetic method) for n X n games – Dominance property – Graphical method for 2Xn (or) m X 2 games

(Example Problems only)

TEXT BOOKS:
Resource Management Techniques
Author : Prof. V. Sundaresan, K. S. Ganapathy Subramanian, K. Ganesan
Publications : A. R. Publications, 5th edition, 2011
UNIT-I: Sections: 11.1-11.4; Pages: 11.1 – 11.32
UNIT-II: Sections: 12.1-12.7; Pages: 12.1 – 12.26
UNIT-III: Sections: 13.1-13.7; Pages: 13.1 – 13.33
UNIT-IV: Sections: 15.1-15.7; Pages: 15.1 – 15.46
UNIT-V: Sections: 16.1-16.7; Pages: 16.1 – 16.39

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REFERENCE BOOKS:
(i) Linear Programming Problem , (ii) Operation Research
Author : Arumugamand Isaac , Kanti and Swarup, Manmohan
Publications : Prentice Hall, 2002, Harvard University Press, 2001.

DIGITAL TOOLS:
1. https://whatis.techtarget.com/definition/operations – research – OR

2. http://people.brunel.ac.uk/~mastjjb/jeb/or/morelp.html

3. https://www.secs.oakland.edu/~latcha/ME5400/Simplex_OregonState.pdf

4. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=4955

5. https://www.gatexplore.com/transportation – problem – study – notes/

Mapping of CO with PSO

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

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

COURSE DESIGNER: Dr. V. K. VIJAYAKUMAR

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSSP2	LAB: VISUAL PROGRAMMING	SBS – 4 LAB – VI	–	2	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	IV	40	60	100

NATURE OF COURSE	Employability		Skill Oriented	✓	Entrepreneurship	

COURSE DESCRIPTION:

This course facilitates the students with the comparative knowledge of object oriented programming and procedure oriented programming. This course also facilitates the students to understand the projects using front end and back end concepts.

COURSE OBJECTIVES:
- To introduce simple controls
- To introduce data controls
- To develop projects using front end as VB and back end as MS Access

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 simple controls in VB	Upto K3
CO 2	write programs to design forms	Upto K3
CO 3	write programs using data controls	Upto K3
CO 4	write programs using animation controls	Upto K3
CO 5	write programs using data validity controls	Upto K3

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

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VISUAL PROGRAMMING

1. Creation of arithmetic calculator

2. Preparation of questionnaire

3. Program to draw geometric shapes

4. Program to create a mouse down event

5. Program to create color mixture using scroll bar control

6. Program using common dialog control to open a file & save a file

7. Program using timer control to animate an object

8. Program to create a file open dialog to load a picture

9. Program to design analog clock

10. Program to prepare eb bill using msflex grid control

11. Program using text box to validate its content

12. Program to create a menu with simple file & edit options

13. Processing of Student Mark List Using Data Control.

14. Processing of Employee Paybill Using ADO Control.

15. Creation of Student Information System Using DAO Control.

COURSE DESIGNER: Dr. T. D. VENKATESWARAN

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCSN41	**INTRODUCTION TO INTERNET**	**NME – 2**	**2**	**–**	**2**

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	**IV**	**25**	**75**	**100**

NATURE OF COURSE	Employability	☐	Skill Oriented	✓	Entrepreneurship	☐

COURSE DESCRIPTION:

　　This course aims to impart skills to design and develop web pages using HTML and to design website using open source package

COURSE OBJECTIVES:

- To give knowledge on the basic concepts of Internet
- To prepare the students to design their own web pages.
- To use and to customize the templates as per the requirement.
- To enable the students to develop dynamic web pages and to upload the documents.
- To give basic knowledge on social networks

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 Internet and Create simple web page using physical tags of HTML	**Upto K3**
CO 2	present the information in standard form in a web page using structure tags supported by the browsers	**Upto K3**
CO 3	design the layout for a web page using browser support tags	**Upto K3**
CO 4	develop a web site with the provision to go around all pages	**Upto K3**
CO 5	design a website using a theme available in Frame and Forms .	**Upto K3**

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

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INTRODUCTION TO INTERNET

UNIT – I:

Introduction – Internet – History – How the Web Works – Web Server and Clients – Connections – ISDN – Dialup or leased – DNS – Registering – Intranet – Overview of Web Browsers.

UNIT – II:

HTML – Basic Components of HTML – Formatting – URL – PROTOCOL – Server Name – Linking to other HTML Documents – Linking Inside the same document – FTP – GOPHER – FTP Commands.

UNIT – III:

Lists – Ordered lists – Unordered lists – Directory lists – Definition lists – Combining List types – Graphics and Web pages

UNIT – IV:

 Image Formats – Graphics In HTML – Images and Hyper link anchors – Image Maps.
Tables –Frames in HTML – Frame set Container.

UNIT – V:

HTML Forms – Input tag – Form elements – Background graphics and color – MS Internet – Extensions – Font Tag – Scrolling Marquees – Introduction to social network – Face book , Twitter, WhatsApp – Introduction to E – shopping.

TEXT BOOK:

Computer Fundamentals and Windows with Internet Technology. By N.KRISHNAN, PUBLISHER SCITECH

REFERENCE BOOKS:

1. *The Internet Book*, Douglas E.Comer Fourth Edition, PHI Learning Pvt. Ltd, New Delhi – 2009.
2. *Using the Internet the easy way*, Young Kai Seng Minerva Publications, First Edition, 2000.
3. www.wikipedia.com , www.w3schools.Com, www.webopedia.com

Mapping of CO with PSO

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

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

COURSE DESIGNER: Prof. K. P. GNANESH

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