ABOUT THE DEPARTMENT

The Department of MCA was established in August 1998 with the approval of AICTE and affiliation with Madurai Kamaraj University. The department employs a blend of time– tested and innovative methods to transform the students into highly competent software professionals. Currently, Sourashtra College stands at the forefront, offering computer– related courses to cater to the educational needs of students, especially those from rural and underprivileged backgrounds. The department is on a path towards creating history in the realm of Information Technology.

Studying MCA at Sourashtra College is a uniquely rewarding experience. The dedicated staff members have a clear objective to provide individualized instruction, equipping learners with essential skills. The faculty place strong emphasis on preparing students for job requirements, covering both theoretical and practical aspects of the academic programme, along with on– the– job training. The warm Student– Teacher relationship enriches the learning atmosphere on the campus.

MCA has proven to be an outstanding course for securing lucrative employment opportunities in esteemed organizations. It has become the most sought– after job– oriented programme across all colleges, attracting numerous students aspiring to hold prestigious technical positions in India and abroad. Globalization has further intensified the demand for this course, and many parents believe that their children must pursue the prestigious MCA programme.

VISION

Our vision is to excel in providing high– quality education and nurturing competitive software professionals with strong moral values. We are committed to contributing to the development of a vibrant nation, with a special focus on empowering minority communities.

MISSION

- Our mission is to pioneer a dynamic learning environment that harnesses innovative pedagogical methods across various computer science domains, emphasizing real– world applications.
- We aim to bridge the gap between academia and industry by crafting curricula aligned with industry and societal demands.
- We are committed to providing state– of– the– art physical and digital resources that foster the comprehensive development of our faculty and students.
- Our ambition is to empower our students with the skills needed to excel in their professions, adapting to the ever– evolving demands of society.
- We aspire to instill an entrepreneurial spirit and a lifelong learning mindset in our students.

ELIGIBILITY

Candidates, who have completed BCA, B.Sc (CS), IT, Mathematics, or any degree with a minimum duration of 3 years, including Mathematics at the +2 level or at the graduate level, are eligible for admission to the MCA course.

A minimum of 50% marks in the qualifying examination is required (with additional bridge courses as per university norms), including 10 + 2 + 3 or 4– years Bachelor's pattern or 10 + 3 years Diploma + 3 years Bachelor's degree pattern.

DURATION OF THE COURSE

The MCA programme spans two academic years, comprising four semesters, with two semesters in each academic year.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

The Master of Computer Applications Postgraduates of the Sourashtra College will:

PEO 1	foster the development of essential skills for both a successful professional career and advanced academic pursuits by acquiring knowledge in the fields of computing, mathematics, and information communication technology.
PEO 2	enhance the capacity to strategize, analyze, design, code, test, implement, and maintain software products proficiently.
PEO 3	cultivate excellence in professionalism, ethical conduct, effective communication, teamwork, and the adoption of cutting– edge ICT tools and techniques.
PEO 4	be empowered to critically assess real– world challenges, conceptualize and construct computational models and systems, ensuring their practicality, suitability, cost– effectiveness, and societal acceptability in diverse interdisciplinary domains.
PEO 5	be equipped with the competencies necessary to pursue advanced studies and establish a research– focused career, contributing to both academia and industry through multidisciplinary research efforts.
PEO 6	get strengthened with the abilities needed to initiate entrepreneurial ventures and startup initiatives within various domains of computer science and information technology.

POSTGRADUATE (PG) PROGRAMME OUTCOMES (POs)

Postgraduate **M.C.A**. is a 2 – year degree Programme with 4 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	**Computational Proficiency:** Apply foundational knowledge in computing, specialized computing areas, mathematics, and relevant domain expertise to conceptualize and model computing solutions for defined problems and requirements.
PO 2	**Problem Solving Skill**: Identify, define, investigate through literature review, and solve intricate computing challenges, drawing well– supported conclusions using core principles from mathematics, computer science, and related disciplinary knowledge.
PO 3	**Solution Design and Development**: Devise and assess solutions for complex computing problems, as well as design and evaluate systems, components, or processes that align with specific needs, taking into account considerations related to public health, safety, culture, society, and the environment.
PO 4	**Investigation of Complex Computing Issues:** Employ research– based knowledge and methodologies, including experimental design, data analysis, and information synthesis, to arrive at valid conclusions when investigating intricate computing problems.
PO 5	**Modern Tool Usage:** Utilize, choose, adapt, and apply suitable techniques, resources, and contemporary computing tools proficiently in intricate computing tasks, while recognizing their limitations.
PO 6	**Professional Ethics:** Demonstrate an understanding of and commitment to professional ethics, cyber regulations, and the ethical norms governing the practice of computing as a responsible computing professional.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

On completion of **MCA Programme**, the students are expected/will be able to

PSO 1	demonstrate a strong grasp of fundamental concepts in related subjects, encompassing Computer Fundamentals, Computer Programming, and various Network Techniques.
PSO 2	exhibit proficiency in comprehending, assessing, and analyzing design and algorithmic principles within the domains of computer architecture, Operating Systems, Computer Networks, Software Engineering, Design and Analysis of Algorithms, Compiler Design, Artificial Intelligence, and related fields.
PSO 3	apply acquired knowledge from Data Analysis, Software Development, and other relevant areas to effectively design and address interdisciplinary problems.
PSO 4	cultivate the ability to adapt, evaluate, and implement cutting– edge industry practices while understanding and guiding the aspirations and attitudes of young minds towards higher education, research, and successful entrepreneurship.
PSO 5	evaluate their capabilities in methodical planning, development, testing, and execution of intricate computing applications, particularly in areas such as Social Media and Analytics, Web Application Development, and Data Interpretation.
PSO 6	recognize the importance of and possess the capability for self– directed learning, ensuring continuous development as a computing professional.

SOURASHTRA COLLEGE, MADURAI– 625004

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

MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2025-2026 onwards)

DISTRIBUTION OF CREDITS

SEMESTER	COURSES	NO. OF COURSES	HOURS	CREDITS	TOTAL CREDITS
I–IV	CORE	16	4	2–4	51
I–IV	ELECTIVE	6	4	3	18
III	NME (NON–MAJOR ELECTIVE)	1	4	3	4
IV	SELF–STUDY COURSE	1	–	1	1
II	INTERNSHIP/ MINI PROJECT/ INDUSTRIAL ACTIVITY	1	2	2	2
IV	SEC (SKILL ENHANCEMENT COURSE)	3	2	2	6
IV	PROJECT	1	20	10	10
IV	EXTENSION ACTIVITY	1	–	1	1
TOTAL					93

***Additional credit will be given to any Online Course taken in SWAYAM Portal**

Bridge Course on Basics in Computer Science (For Non–IT Students)
Course duration: 30Hours

Course Modules:
Module 1: Computer Organization and Architecture
Module 2: Data Structures and Algorithms
Module 3: Problem Solving Techniques
Module 4: Operating Systems
Module 5: Object oriented programming
Module 6: Database Management System
Module 7: Software Engineering
Module 8: Computer Networks

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MASTER OF COMPUTER APPLICATIONS

COURSE STRUCTURE – SEMESTER – I

S. No.	Course Code	Course Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	25MCAC11	**Core – 1: PCC** Discrete Mathematics	4	3	25	75	100	4
2.	25MCAC12	**Core – 2: PCC** Python Programming	4	3	25	75	100	4
3.	25MCAC13	**Core – 3: PCC** Linux and Shell Programming	4	3	25	75	100	4
4.	25MCACP1	**Core – 4: PCC** Python Programming Lab	4	3	40	60	100	2
5.	25MCACP2	**Core – 5: PCC** Linux and Shell Programming Lab	4	3	40	60	100	2
6.	25MCASP1	**SEC – 1:** Soft Skill Development Lab	2	3	40	60	100	2
7.		**Elective – I*: PEC**	4	3	25/ 40	75/ 60	100	3
	25MCAE11/ 25MCAEP1	Data Engineering and Management / Data Engineering and Management Lab						
	25MCAE12/ 25MCAEP2	Social Networks/ Social Networks Lab						
8.		**Elective – II*: PEC**	4	3	25/ 40	75/ 60	100	3
	25MCAE13/ 25MCAEP3	Software Development Technologies /Software Development Technologies Lab						
	25MCAE14/ 25MCAEP4	Network Protocols/ Network Protocols Lab						
		Total	**30**				**800**	**24**

***One elective course to be chosen from FOUR courses**

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

SOURASHTRA COLLEGE, MADURAI– 625004

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MASTER OF COMPUTER APPLICATIONS (M.C.A)

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SEMESTER – II

S. No.	Course Code	Course Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	25MCAC21	**Core – 6: PCC** Data Structures and Algorithms	4	3	25	75	100	4
2.	25MCAC22	**Core – 7: PCC** Big Data Analytics	4	3	25	75	100	4
3.	25MCAC23	**Core – 8: PCC** Soft Computing	4	3	25	75	100	4
4.	25MCACP3	**Core – 9: PCC** Data Structures and Algorithms Lab	4	3	40	60	100	2
5.	25MCACP4	**Core – 10: PCC:** Big Data Analytics Lab	4	3	40	60	100	2
6.		**Elective – III*: PEC**	4	3	25/ 40	75/ 60	100	3
	25MCAE21 25MCAEP5	Internet of Things / Internet of Things Lab/						
	25MCAE22 25MCAEP6	Computer Vision / Computer Vision Lab						
7.		**Elective – IV*: PEC**	4	3	25/ 40	75/ 60	100	3
	25MCAE23 25MCAEP7	Cyber Security/ Cyber Security Lab/						
	25MCAE24 25MCAEP8	Block chain Technologies / Block chain Technologies Lab						
8.	25MCACV1	**Core – 11: PCC:** Mini– Project	2	3	40	60	100	2
9.		***SWAYAM/NPTEL/ INTERNSHIP**	–	–	–	100	100	1
		Total	**30**				**700**	**24**

***One elective course to be chosen from FOUR courses**

***Extra– Credit Course**

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MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2025-2026 onwards)

COURSE STRUCTURE – SEMESTER – I

S. No.	Course Code	Course Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	25MCAC11	**Core – 1: PCC** Discrete Mathematics	4	3	25	75	100	4
2.	25MCAC12	**Core – 2: PCC** Python Programming	4	3	25	75	100	4
3.	25MCAC13	**Core – 3: PCC** Linux and Shell Programming	4	3	25	75	100	4
4.	25MCACP1	**Core – 4: PCC** Python Programming Lab	4	3	40	60	100	2
5.	25MCACP2	**Core – 5: PCC** Linux and Shell Programming Lab	4	3	40	60	100	2
6.	25MCASP1	**SEC – 1:** Soft Skill Development Lab	2	3	40	60	100	2
7.	**Elective – I*: PEC**		4	3	25/ 40	75/ 60	100	3
	25MCAE11/ 25MCAEP1	Data Engineering and Management / Data Engineering and Management Lab						
	25MCAE12/ 25MCAEP2	Social Networks/ Social Networks Lab						
8.	**Elective – II*: PEC**		4	3	25/ 40	75/ 60	100	3
	25MCAE13/ 25MCAEP3	Software Development Technologies /Software Development Technologies Lab						
	25MCAE14/ 25MCAEP4	Network Protocols/ Network Protocols Lab						
		Total	**30**				**800**	**24**

***One elective course to be chosen from FOUR courses**

SEC – Skill Enhancement Course
CA – Class Assessment (Internal)
SE – Summative Examination
SEC – Skill Enhancement Course
PCC – Professional Competency Course (Core)
PEC – Professional Elective Course
T – Theory
P – Practical

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MASTER OF COMPUTER APPLICATIONS (M.C.A)

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAC11	DISCRETE MATHEMATICS	CORE – 1 PCC	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

Curriculum Design and Development	Employability			Skill Oriented	✓	Entrepreneurship						
	National		Local		Regional		Global				✓	
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values	✓		

COURSE DESCRIPTION

Discrete mathematics delves into the exploration of mathematical structures characterized by their discrete, isolated, or distinct nature, diverging from the realm of calculus, which primarily addresses continuous change. The Discrete Mathematics course serves as an introductory gateway, acquainting students with fundamental discrete mathematical concepts. Topics covered include sets, logic, probability, recurrence relations, induction, and graph theory.

COURSE OBJECTIVES

- To know the concepts of relations and functions.
- To distinguish among different normal forms and quantifiers.
- To solve recurrence relations and permutations & combinations.
- To know and solve matrices, rank of matrix & characteristic equations.
- To study the graphs and its types.

COURSE OUTCOMES (COs):

On the successful completion of the course, students will be able

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the concepts of relations and functions distinguish among normal forms	Upto K5
CO 2	analyze and evaluate the recurrence relations	Upto K5
CO 3	distinguish among various normal forms and predicate calculus	Upto K5
CO 4	solve and know various types of matrices	Upto K5
CO 5	evaluate and solve various types of graphs	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY
K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

DISCRETE MATHEMATICS

UNIT– I: RELATIONS

Binary relations – Operations on relations– properties of binary relations in a set – Equivalence relations – Representation of a relation by a matrix – Representation of a relation by a digraph – **Functions** – Definition and examples – Classification of functions– Composition of functions– Inverse function

UNIT– II: MATHEMATICAL LOGIC

Logical connectives – **Well – formed formulas** – Truth table of well– formed formula – Algebra of proposition – Quine's method – **Normal forms of well– formed formulas** – Disjunctive normal form – Principal Disjunctive normal form – Conjunctive normal form – Principal conjunctive normal form – **Rules of Inference for propositional calculus – Quantifiers** – Universal Quantifiers – Existential Quantifiers

UNIT– III: RECURRENCE RELATIONS

Formulation – solving recurrence Relation by Iteration – solving Recurrence Relations – Solving Linear Homogeneous Recurrence Relations of Order Two – Solving Linear Non homogeneous Recurrence Relations. **Permutations**– Cyclic permutation – Permutations with repetitions – permutations of sets with indistinguishable objects – **Combinations** – Combinations with repetition

UNIT– IV: MATRICES

Special types of matrices – Determinants – Inverse of a square matrix– Cramer's rule for solving linear equations– Elementary operations– Rank of a matrix– solving a system of linear equations– characteristic roots and characteristic vectors– Cayley– Hamilton Theorem– problems

UNIT– V: GRAPHS

Connected Graphs – Euler Graphs – Euler line– Hamiltonian circuits and paths –planar graphs – Complete graph – Bipartite graph – Hyper cube graph – Matrix representation of graphs

TEXT BOOK:

N.Chandrasekaran and M.Umaparvathi, ***Discrete Mathematics***, PHI Learning Private Limited, New Delhi, 2010.

REFERENCE BOOKS:

1. Kimmo Eriksson & Hillevi Gavel, ***Discrete Mathematics and Discrete Models***, Student literature AB, 2015.
2. Kenneth H. Rosen, ***Discrete Mathematics and Applications***, Mc Graw Hill, 2012

DIGITAL TOOLS:

- https://faculty.ksu.edu.sa/sites/default/files/rosen_discrete_mathematics_and_its_applications_7th_edition.pdf
- https://www.coursera.org/specializations/mathematics– machine– learning
- www.coursera.org/learn/datasciencemathskills

Mapping of CO with PSO

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

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

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MASTER OF COMPUTER APPLICATIONS (M.C.A)

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(For the students admitted from the academic year 2025-2026 onwards)

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAC12	PYTHON PROGRAMMING	CORE – 2 PCC	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓
	National		Local		Regional		Global				✓
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓

COURSE DESCRIPTION:

This Course describes the basics of the python programming language. The students may acquire the knowledge in object–oriented concepts and python packages. They are able to develop applications using Django.

COURSE OBJECTIVES:

- To acquire programming skills in core Python.
- To teach Strings and function.
- To develop object–oriented skills in Python.
- To make the students comprehend various Python Packages.
- To develop web applications using Django.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	comprehend the programming skills in python and develop applications using conditional branches and loop.	Upto K5
CO 2	create python applications with strings and functions.	Upto K5
CO 3	understand and implement the Object Oriented Programming paradigm with the concept of objects and classes, Inheritance and polymorphism.	Upto K5
CO 4	evaluate the use of Python packages to perform numerical computations and data visualization.	Upto K5
CO 5	design interactive web applications using Django.	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY
K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

PYTHON PROGRAMMING

UNIT– I:

Introduction: Fundamental ideas of Computer Science – Strings, Assignment and Comments – Numeric Data types and Character sets – Expressions – Loops and Selection Statements: Definite iteration: the for Loop – selection: if and if–else statements – Conditional iteration: the while Loop

UNIT– II:

Strings and Text Files: Accessing Characters and substrings in strings – Data encryption– Strings and Number systems– String methods – Text – Lists and Dictionaries: Lists – Dictionaries – Design with Functions: A Quick review – Problem Solving with top–Down Design – Design with recursive Functions – Managing a Program‟s namespace – Higher–Order Functions

UNIT– III:

Design with Classes: Getting inside Objects and Classes – Data–Modeling Examples – Building a New Data Structure – The Two – Dimensional Grid – Structuring Classes with Inheritance and Polymorphism–Graphical User Interfaces– The Behavior of terminal–Based programs and GUI–Based programs – Coding Simple GUI–Based programs – Windows and Window Components – Command Buttons and responding to events

UNIT– IV:

Working with Python Packages: NumPy Library–Ndarray– Basic Operations – Indexing, Slicing and Iteration – Array manipulation – Pandas – The Series – The Data Frame – The Index Objects – Data Vizualization with Matplotlib– The Matplotlib Architecture – Pyplot– The Plotting Window – Adding Elements to the Chart – Line Charts – Bar Charts – Pie charts

UNIT– V:

Django: Installing Django– Building an Application – Project Creation – Designing the Data Schema – Creating an administration site for models – Working with QuerySets and Managers – Retrieving Objects – Building List and Detail Views

TEXT BOOKS:

1. K.A. Lambert, ***Fundamentals of Python: first programs***, Second Edition, Cengage Learning, 2018 **(Unit – I, II and III)**
2. Fabio Nelli, ***Python Data Analytics: With Pandas, NumPy, and Matplotlib***, Second Edition, Kindle Edition, 2018 **(Unit – IV)**
3. Antonio Mele, ***Django 3 By Example***, Third Edition, 2020 **(Unit – V)**

REFERENCE BOOKS:

1. ***Core Python Programming*** – Second Edition,R. Nageswara Rao, Dreamtech Press.
2. ***Python for Data Analysis***, William McKinney, Second Edition, O'Reilly Media Inc.

DIGITAL TOOLS:

- https://mrcet.com/downloads/digital_notes/CSE/III%20Year/PYTHON%20PROGRAMMING%20NOTES.pdf
- https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SCS1619.pdf
- https://cs50.harvard.edu/python/2022/notes/0/

Mapping of CO with PSO

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

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

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MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2025-2026 onwards)

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAC13	LINUX AND SHELL PROGRAMMING	CORE – 3 PCC	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓
	National		Local		Regional		Global				✓
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓

COURSE DESCRIPTION:

The goal is to familiarize students with the fundamental inner workings and functionalities of the LINUX operating system, enabling them to create system programs utilizing system calls and introducing them to utilities and Shell Programming.

COURSE OBJECTIVES:

- To teach principles of operating system including File handling utilities, Basic Linux commands, Scripts and filters.
- To familiarize fundamentals of shell (bash), shell programming, pipes, Control structures, arithmetic in shell interrupt processing, functions, debugging shell scripts.
- To impart fundamentals of file concepts kernel support for file, File structure related system calls (file API"s).
- To facilitate students in understanding Inter process communication, semaphore and shared memory.
- To explore real–time problem solution skills in Shell programming.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand, apply and analyze the concepts and methodology of Linux shell programming	Upto K5
CO 2	comprehend, impart and apply fundamentals of control structure and script controls	Upto K5
CO 3	understand, analyses and evaluate the functions, graphical desktop interface and editors	Upto K5
CO 4	collaborate, apply and review the concepts and methodology of regular expression and advanced gawk	Upto K5
CO 5	comprehend, use and illustrate the advance concepts such as alternate shell script, data connectivity and bash scripting using python	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY
K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

LINUX AND SHELL PROGRAMMING

UNIT – I:

Basic bash Shell Commands: Interacting with the shell–Traversing the file system–Listing files and directories–Managing files and directories–Viewing file contents.

Basic Script Building: Using multiple commands–Creating a script file–Displaying messages– Using variables–Redirecting input and output–Pipes–Performing math–Exiting the script.

Using Structured Commands: Working with the if–then statement–Nesting ifs–Understanding the test command–Testing compound conditions–Using double brackets and parentheses–Looking at case.

UNIT – II:

More Structured Commands: Looping with for statement–Iterating with the until statement– Using the while statement–Combining loops–Redirecting loop output.

Handling User Input: Passing parameters–Tracking parameters–Being shifty–Working with options–Standardizing options–Getting user input.

Script Control: Handling signals–Running scripts in the background–Forbidding hang–ups – Controlling a Job–Modifying script priority–Automating script execution.

UNIT – III:

Creating Functions: Basic script functions–Returning a value–Using variables in functions– Array and variable functions–Function recursion–Creating a library–Using functions on the command line.

Writing Scripts for Graphical Desktops: Creating text menus–Building text window widgets– Adding X Window graphics.

Introducing Sed and Gawk: Learning about the sed Editor–Getting introduced to the gawk Editor–Exploring sed Editor basics.

UNIT – IV:

Regular Expressions: Defining regular expressions–Looking at the basics–Extending our patterns–Creating expressions.

Advanced Sed: Using multiline commands–Understanding the hold space–Negating a command– Changing the flow–Replacing via a pattern–Using sed in scripts–Creating sed utilities.

Advanced gawk: Reexamining gawk–Using variables in gawk–Using structured commands– Formatting the printing–Working with functions.

UNIT – V:

Working with Alternative Shells: Understanding the dash shell–Programming in the dash shell– Introducing the zsh shell–Writing scripts for zsh.

Writing Simple Script Utilities: Automating backups–Managing user accounts–Watching disk space

Producing Scripts for Database, Web, and E–Mail: Writing database shell scripts–Using the Internet from your scripts–Emailing reports from scripts

Using Python as a Bash Scripting Alternative: Technical requirements–Python Language– Hello World the Python way–Pythonic arguments–Supplying arguments–Counting arguments– Significant whitespace–Reading user input–Using Python to write to files–String manipulation.

TEXT BOOKS:

1. Richard Blum, Christine Bresnahan, ***Linux Command Line and Shell Scripting BIBLE***, Wiley Publishing, 3rd Edition 2015.**Chapters:** 3, 11 to 14, 16 to 25.
2. Mokhtar Ebrahim, Andrew Mallett, ***Mastering Linux Shell Scripting***, Packt Publishing, 2nd Edition, 2018. **Chapter:** 14.

REFERENCE BOOKS:

1. ClifFlynt, Sarath Lakshman, Shantanu Tushar, ***Linux Shell Scripting Cookbook***, Packt Publishing, 3rd Edition, 2017.
2. Stephen G.Kochan, Patrick Wood, ***Shell Programming in Unix, Linux, and OS X***, Addison Wesley Professional, 4th Edition, 2016.
3. Robert Love, ***Linux System Programming***, O'Reilly Media, Inc, 2013

DIGITAL TOOLS:

- https://mis.alagappauniversity.ac.in/siteAdmin/dde– admin/uploads/5/__PG_BCA_Computer%20Applications_10154%20BCA%20UNIX%20&%20SHELL%20PROGRAMMING%20LAB%20FINAL_3555.pdf
- https://archive.org/details/0314– pdf– blum– linux– command– line– and– shell– scripting– bible– wiley– 2008/page/n9/mode /2up
- https://www.lpude.in/SLMs/Master%20of%20Computer%20Applications/Sem_1/DECAP448_LINUX_AND_SHELL_SCRIPTING.pdf

Mapping of CO with PSO

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

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

SOURASHTRA COLLEGE, MADURAI– 625004

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

MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2025-2026 onwards)

805

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCACP1	PYTHON PROGRAMMING LAB	CORE – 4 PCC – LAB	–	4	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	40	60	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓
	National		Local		Regional		Global				✓
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓

COURSE DESCRIPTION:

This lab–based course is designed to provide students with practical experience in Python programming, enabling them to develop computational problem–solving skills.

COURSE OBJECTIVES:

- To master the fundamentals of writing python scripts
- To create program using elementary data items
- To implement Python programs with conditionals and loops
- To use functions for structuring Python programs
- To develop web programming with Django

COURSE OUTCOME:

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	comprehend the programming skills in python and write scripts	Upto K5
CO 2	create python applications with elementary data items, lists, dictionaries and tuples	Upto K5
CO 3	implement the Object Oriented Programming programming concepts such as objects and classes, Inheritance and polymorphism	Upto K5
CO 4	assess the use of Python packages to perform numerical computations and perform data visualization	Upto K5
CO 5	create interactive web applications using Django	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

PYTHON PROGRAMMING LAB

1. Program using elementary data items, lists, dictionaries and tuples
2. Program using conditional branches, loops
3. Program using functions
4. Program using classes and objects
5. Program using inheritance
6. Program using polymorphism
7. Program using Numpy
8. Program using Pandas
9. Program using Matplotlib
10. Program for creating dynamic and interactive web pages using forms

DIGITAL TOOLS:

- https://mlritm.ac.in/assets/cse/cse_lab_manuals/R20_cse_manuals/Python%20Lab%20Manual.pdf
- https://www.rgmcet.edu.in/assets/img/departments/CSE/materials/R19/2–1/Python%20Lab.pdf
- https://mrcet.com/pdf/Lab%20Manuals/CSE/(R18A0588)%20Python%20Programming%20%20Lab%20Manual.pdf

Mapping of CO with PSO

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

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

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807

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCACP2	LINUX AND SHELL PROGRAMMING LAB	CORE – 5 PCC – LAB	–	4	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	40	60	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓	
	National		Local		Regional		Global				✓	
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓	

COURSE DESCRIPTION:

This practical course introduces students to the fundamentals of Shell scripting, focusing on automating tasks and managing system operations effectively in a Linux/Unix environment. The lab includes hands–on exercises to develop proficiency in writing Shell scripts for real–world scenarios.

COURSE OBJECTIVES:

- To enable the students to study and understand the efficiency of Linux shell script.
- To demonstrate the File Backup process.
- To develop and implement the shell script for GUI processing.
- To develop and implement the shell script for IPC and Networking.
- To demonstrate PostgreSQL.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand, apply and analyze the concepts and methodology of Linux shell programming	Upto K5
CO 2	comprehend, impart and apply fundamentals of control structure and script controls	Upto K5
CO 3	understand, analyses and evaluate the functions, graphical desktop interface and editors	Upto K5
CO 4	collaborate, apply and review the concepts and methodology of regular expression and advanced gawk	Upto K5
CO 5	comprehend, use and analyze the advance concepts such as alternate shell script, dy and bash scripting using PostgreSQL	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

LINUX AND SHELL PROGRAMMING LAB

1. Write a Shell Script program to calculate the number of days between two dates.
2. Write a Shell Script program to check systems on local network using control structures with user input.
3. Write a Shell Script program to check systems on local network using control structures with file input.
4. Write a Shell Script program to demonstrate the script control commands.
5. Write a Shell Script program to demonstrate the Shell script function.
6. Write a Shell Script program to demonstrate the Regular Expressions.
7. Write a Shell Script program to demonstrate the sed and awk Commands.
8. Write a Shell Script program to demonstrate the File Backup process through creating a daily archive location.
9. Write a Shell Script program to create a following GUI tools.
   a) Creating text menus
   b) Building text window widgets
10. Write a Shell Script program to demonstrate to connect a PostgreSQL database and performing CRUD operations.

DIGITAL TOOLS:

- https://mrcet.com/pdf/Lab%20Manuals/CSE/LINUX%20PROGRAMMING%20LAB.pdf
- https://www.cmrec.ac.in/downloads/academic2017–18/cse/lab/iv/lp.PDF
- https://www.nrcmec.org/pdf/Manuals/CSE/student/4–1%20lp16–17.pdf

Mapping of CO with PSO

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

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809

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCASP1	SOFT SKILL DEVELOPMENT LAB	SEC – 1 LAB	–	2	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	40	60	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓	
	National		Local		Regional		Global				✓	
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓	

COURSE DESCRIPTION:

The focus of the course is to develop a wide variety of soft skills starting from communication, to working in different environments, developing emotional sensitivity, learning creative and critical decision making, developing awareness of how to work with and negotiate with people and to resolve stress and conflict in ourselves and others.

COURSE OBJECTIVES:

- To enable students to gain basic communication skills in professional and social contexts effectively.
- To enable students, acquire useful words and apply them in situational context.
- To develop listening and reading skills through comprehension passages.
- To enrich the leadership qualities and interpersonal communication.
- To enhance essential characteristics in writing.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to:

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	learn to create compelling resumes and prepare effectively for job interviews.	Upto K5
CO 2	learn to manage oneself during communication, acquire strong communication skills, and build self–confidence.	Upto K5
CO 3	develop (verbal/oral) effective presentation skills.	Upto K5
CO 4	develop skills to participate effectively in group discussions.	Upto K5
CO 5	understand the concept of personality and successfully navigate interviews.	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

SOFT SKILL DEVELOPMENT LAB

EXERCISES

1. Characteristics of Technical Writing
2. Development of Employability Skills
3. Vocabulary Development
4. Sentence Completion
5. Error Spotting
6. Interpretation of Verbal Analogy
7. Interpretation of Reading (Comprehension – Conception)
8. Interpretation of Reading (Comprehension – Reasoning)
9. Practice for writing E– mails/Technical Blogs/Forums
10. PPT Preparation / Demonstration of Technical Presentation
11. Preparation of Resume
12. Preparation for Job Interviews / Mock Interview Section
13. Group Discussion Skills
14. Developing Listening Skill (Comprehension)
15. Practice for Short Speeches / Situational Conversation
16. English through Mass Media
17. Essential Grammar
18. Communicating and collaborating with peer members
19. Team Empowerment
20. Persuasive Communication

TEXT BOOKS:

1. Uma Narula, ***Development Communication: Theory and Practice***, Revised Edition, Har– Aanad Publication, 2019.
2. Annette Capel and Wendy Sharp, ***Cambridge English: Objective*** First, Fourth Edition, Cambridge University Press, 2013.
3. Emma Sue– Prince, ***The Advantage: The 7 Soft Skills You Need to Stay One Step Ahead***, First Edition, FT Press, 2013.

REFERENCE BOOKS:

1. Michael McCarthy and Felicity O'Dell, ***English Vocabulary in Use: 100 Units of Vocabulary Reference and Practice***, Cambridge University Press, 1996.
2. Murphy, Raymond, ***Intermediate English Grammar***, Second Edition, Cambridge University Press, 1999.

DIGITAL TOOLS:

- https://amolshakadwipi.files.wordpress.com/2018/09/soft– skills– lab– manual_snjb.pdf
- http://osou.ac.in/eresources/GE6674–Communication% 20and% 20Soft% 20Skills%20Laboratory – 1526017507.pdf
- https://mu.ac.in/wp– content/uploads/2022/05/MCA– Soft– Skills– Development– Lab– 3.pdf

Mapping of CO with PSO

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

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812

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAE11	DATA ENGINEERING AND MANAGEMENT	ELECTIVE – 1 PEC	4	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓	
	National		Local		Regional		Global				✓	
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓	

COURSE DESCRIPTION:

This course provides student with an understanding of a typical Data Engineering lifecycle model. It focuses on creating the infrastructure and processes that allow organizations to effectively manage and utilize their data for various purposes, including analytics, reporting, machine learning, and decision–making.

COURSE OBJECTIVES:

- To understand Data Management concepts.
- To get brief knowledge on Data Modeling.
- To analyse the techniques used in Distributed Databases.
- To assess Distributed database and Business Modelling.
- To get familiar with CRM tools.

COURSE OUTCOMES (COs):

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	comprehend the Data Management concepts and analyse the relationship with the enterprise	Upto K5
CO 2	analyze Data Modelling concepts and assess its quality	Upto K5
CO 3	understand and implement business modelling techniques	Upto K5
CO 4	evaluate the use of Artificial Intelligence and Machine Learning in CRM	Upto K5
CO 5	develop CRM applications in cloud	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY
K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

DATA ENGINEERING AND MANAGEMENT

UNIT – I: DATABASE DEVELOPMENT

Database architecture of an information system–Overview of the database development process–Conceptual data modeling–Relational data analysis–Roles of a data model–Physical database design. DATA MANAGEMENT: Problems encountered without data management–Data management responsibilities–Data management activities–Roles within data management–Benefits of data management–Relationship between data management and enterprise

UNIT – II: CORPORATE DATA MODELLING

Need for a corporate data model–Nature of a corporate data model– Develop a corporate data model – Corporate data model principles. DATA DEFINITION AND NAMING: Elements of a data definition–Data naming conventions. DATA QUALITY: Issues associated with poor data quality–Causes of poor data quality–Dimensions of data quality–Data model quality–Improving data quality. DATA ACCESSIBILITY: Data security–Data integrity–Data recovery

UNIT – III: USE OF PACKAGED APPLICATION SOFTWARE

Application software packages–Impact on data management. DISTRIBUTED DATA AND DATABASES: Rationale for distributing data–Perfect distributed database system–Top down fragmentation and partitioning. Bottom up integration–The management of replication. BUSINESS INTELLIGENCE: Data warehousing–Multidimensional model of data–Standard reporting tools–Online analytical processing OLAP–Relational schema for a data warehouse.

UNIT – IV: CRM

Three main pillars of CRM. GETTING TO KNOW YOUR CUSTOMER: 360–degree client view. UTILIZING ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN YOUR CRM STRATEGY: Evolution of AI–Current state of AI – Teaming up AI with people–Applying AI to your CRM solution–ethical aspects of AI–An example of AI in CRM processes.

UNIT – V: CLOUD VERSUS ON PREMISE VERSUS HYBRID

Factors influencing vendor selection–Hybrid deployment–what are your options. CRM DIFFERENTIATORS: It's not about the feature list; it's about the ecosystem–Fourth industrial revolution and CRM–AI and smart cloud–To cloud or not to cloud–Leveraging smart cloud into CRM–Big data–Social selling and advertising–Implementation tools–Sustainable CRM platform.

TEXT BOOKS:

1. Keith Gordon, ***Principles of Data Management Facilitating Information Sharing***, BCS Learning, 2013. (Chapters:1–5, 7,8,12,13,14)
2. Max Fatouretchi, ***The Art of CRM***, Packt Publishing, 2019. (Chapters: 1,2,5,8,9)

REFERENCE BOOKS:

1. Peter Ghavami, ***Big Data Management_ Data Governance Principles for Big Data Analytics***, De Gruyter, 2020.
2. Francis Buttle, Stan Maklan, ***Customer Relationship Management Concepts and Technologies***, Routledge, 2019.

DIGITAL TOOLS:

- https://www.simplilearn.com/tutorials/big–data–tutorial/what–is–data–engineering
- https://www.analyticsvidhya.com/blog/2018/11/data–engineer–comprehensive–list–resources–get–started/
- https://www.datacamp.com/category/data–engineering

Mapping of CO with PSO

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

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

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SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2025-2026 onwards)

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAEP1	DATA ENGINEERING AND MANAGEMENT LAB	ELECTIVE – I PEC – LAB	–	4	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	40	60	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓
	National		Local		Regional		Global				✓
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓

COURSE DESCRIPTION:

A data engineering and management lab teaches students how to design and operate infrastructure and database systems for managing and analyzing large datasets.

COURSE OBJECTIVES:

To help the students

- acquire basic scripting knowledge in MongoDB
- learn CRUD Operation on MongoDB database
- comprehend MongoDB using DbVisualizer
- be familiar with Zoho CRM features
- customize their application using Zoho CRM

COURSE OUTCOMES (COs):

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	comprehend the scripting knowledge in MongoDB and perform basic operations in shell prompt	Upto K5
CO 2	implement, Create, Read, Update and Delete Operations on MongoDB database	Upto K5
CO 3	analyze MongoDB using DbVisualizer	Upto K5
CO 4	assess Zoho CRM features for managing the customer relationships	Upto K5
CO 5	create a customized application in Zoho CRM	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

DATA ENGINEERING AND MANAGEMENT LAB

LIST OF PROGRAMS

1. Write a script to create a MongoDB database and perform insert operation
2. Write a MongoDB script to perform query operations
3. Write a MongoDB Script to perform update operations
4. Write a MongoDB Script to update documents with aggregation pipeline
5. Write a MongoDB script to delete single and multiple documents
6. Write a MongoDB script to perform string aggregation operations
7. Design a Data Model for MongoDB using DbVisualizer
8. Perform CRUD operations using DbVisualizer
9. Create a Zoho CRM account and organize your Tasks, Meetings and Deals
10. Create and maintain a project using Zoho CRM features

DIGITAL TOOLS:

- https://moodle.sit.ac.in/blog/mongodb–lab–manual–bds456b–2/#P10a
- https://bdalab.iba.edu.pk/files1/f20/mongo/lab.pdf
- https://www.isical.ac.in/~malaybhattacharyya/Courses/DBMS/Spring2020/Lab%20V.pdf
- https://www.youtube.com/watch?v=_eMl_hkBIWk&ab_channel=Clientric
- https://www.youtube.com/watch?v=xYaTRA8XOOc&ab_channel=BluRoot

Mapping of CO with PSO

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

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817

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAE12	SOCIAL NETWORKS	ELECTIVE – 1 PEC	4	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓	
	National		Local		Regional		Global				✓	
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓	

COURSE DESCRIPTION:

This course introduces students to a variety of existing, new and emerging concepts, strategies, and technologies utilized in today's online environment. It covers various social networking platforms, content, and tools, and related security and privacy issues in social media. Students will learn how to use social media to reach personal and professional goals.

COURSE OBJECTIVES:

- To teach about Social media, Social networking and Webcasts
- To make the students understand and build a Word Press Powered Website
- To analyse the Social Networking & Micro– Blogging.
- To teach and analyse the Widgets & Badges.
- To explore the importance of Website optimization.

COURSE OUTCOMES (COs):

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand, impart and summarize the concepts of Social media, Social networking and Webcasts	Upto K5
CO 2	comprehend, design and develop a Word Press Powered Website	Upto K5
CO 3	understand, implement and perform evaluation of Social Networking and Micro– Blogging	Upto K5
CO 4	collaborate, implement and analyse the Widgets and Badges in social networking environment	Upto K5
CO 5	understand, illustrate and perform evaluation of web optimization for social networks	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

SOCIAL NETWORKS

UNIT – I:

Introduction: Social Media Strategy– Important First Decisions – Websites, Blogs – RSS Feeds Mapping – Preparation – Multimedia Items Gathering Content for Blog Posts RSS Feeds & Blogs– RSS Feeds– The Feed Reader– The Feed– Options for Creating an RSS Feed– Planning Feed– Blogs– Options for Starting. Blog and RSS Feed– Feed or Blog Content– Search Engine Optimization (SEO) – Feed Burner– RSS Feed and Blog Directories– An Optimization Plan for Blog or RSS Feed

UNIT – II:

Building a Word Press Powered Website: Word Press as A CMS – Diversity of Word Press Sites– The Anatomy of a Word Press Site – a Brief Look at the Word Press Dashboard Planning – Site Themes Plug– ins setting up Sidebars Building Pages – Posting Blog Entries. Podcasting, Vidcasting, & Webcasting – Publishing Options for Podcast – Creating and Uploading Podcast Episodes – Publishing Podcast Optimizing Podcast – Webcasting

UNIT – III:

Social Networking & Micro– Blogging: Facebook– The Facebook Profile – Myspace LinkedIn– Twitter– Niche Social Networking Sites– Creating Own Social Network– Promoting Social Networking Presence– Social Bookmarking & Crowd– Sourcing – Social Bookmarking– A Social Bookmarking Strategy– Crowd– Sourced News Sites– Preparation And Tracking Progress Media Communities– Image Sharing Sites– Image Sharing Strategy– Video Sharing Sites– Video Sharing Strategy– Searching And Search Engine Placement– Connecting With Others

UNIT – IV:

Widgets & Badges: Highlighting Social Web Presence– Sharing And Syndicating Content Making Site More Interactive– Promoting Products And Making Money– Using Widgets In Word Press– Widget Communities And Directories– Working Widgets Into Strategy Social Media Newsrooms– Building Social Media Newsroom – Populating The Newsroom– Social Media News Releases– Social Media Newsroom Examples. More Social Tools– Social Calendars– Social Pages Wikis– Social Search Portals– Virtual Worlds

UNIT – V:

Website optimization: A Website Optimization Plan– Streamlining Web Presence– An Integration Plan– Looking to the Future– Life streaming: The Future of Blogging– Distributed Social Networking– Social Ranking, Relevancy, and ―Defriending– Web 3.0 or The Semantic Web– Mobile Technology– Measuring Your Success– A Qualitative Framework– A Quantitative Framework– Tools to Help You Measure– Come To Your Own Conclusions

TEXT BOOK:

Deltina Hay —***A Survival Guide To social Media and Web 2.0 Optimization***, Dalton Publishing, 2009

REFERENCE BOOKS:

1. Miriam Salpeter — ***Social Networking for Career Success Learning Express***, 2011.
2. Miles, Peggy, — ***Internet World Guide to Webcasting*** Wiley, 2008

DIGITAL TOOLS:

- **https://www.academia.edu/43633442/C21Social_Media**
- **https://nibmehub.com/opac– service/pdf/read/social% 20media% 20analytics% 20strategy%20_%20 using%20data%20to% 20optimize %20business%20performance.pdf**
- **https://digilib.stiestekom.ac.id/assets/dokumen/ebook/feb_1deaf4764b7016c926fa758495ad16595b700948_1654689504.pdf**

Mapping of CO with PSO

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

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SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2025-2026 onwards)

820

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAEP2	SOCIAL NETWORKS LAB	ELECTIVE – I PEC – LAB	–	4	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	40	60	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓
	National		Local		Regional		Global				✓
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓

COURSE DESCRIPTION:

In the Social Media Analytics Lab, students will gain the essential skills to harness the power of social media data for insightful analysis of organizations and their audiences. This course empowers students to provide actionable, data– driven recommendations and inform strategic decision– making in the realm of social media.

COURSE OBJECTIVES:

- To understand the role of social media data and analytics in helping organizations achieve their goals and understand their publics.
- To identify and select key performance indicators to accurately measure the success of social media efforts.
- To analyze social media data using native analytics (e.g. Facebook, Twitter, Instagram) and social media measurement tools.
- To explore the tools, techniques, and methodologies necessary to extract valuable insights, measure performance, and enhance social media strategies, equipping you with the expertise to thrive in the digital age.

COURSE OUTCOMES (COs):

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	develop proficiency in collecting, processing, and analyzing social media data from various platforms.	Upto K5
CO 2	learn to extract meaningful insights from social media data to gain a deeper understanding of an organization's audience and performance.	Upto K5
CO 3	acquire the skills to make data– driven recommendations that inform and enhance social media strategies for organizations.	Upto K5
CO 4	understand key metrics and KPIs (Key Performance Indicators) relevant to social media analytics and measurement.	Upto K5
CO 5	gain insights into optimizing content strategies based on data– driven findings and audience preferences.	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

SOCIAL NETWORKS LAB

LIST OF PROGRAMS

1. Explore various Social Media platform (Facebook, Twitter, YouTube etc) and Social Media analytics tools (Facebook insights, google analytics netlytics etc)
2. Explore Social Media Analytics technique and engagement metrics (page level, post level, member level).
   Choose any social media platform and perform practical no :3,4,5 for the same
3. Perform Data Collection from any of the social media platform of your choice (Twitter, Facebook, LinkedIn, YouTube, Web blogs etc).
4. Perform Pre processing of the collected data and store it. Hint: Data Cleaning and Storage – Pre process, filter and store social media data for business (Using Python, etc).
5. Analyze and Visualize the Social Media Data collected (Reference to Prac 3 and 4) Hint: Can include analysis of competitor activities using data.
6. Perform Hyperlink Analytics (Extract, Analyze and Interpret Hyperlinks)
7. Perform Text Analytics (Extract Analyze textual context of Social media platform)
8. Perform Action Analytics (Analyze likes, mentions of a product, idea or service).
9. Perform location Analytics (Mine the location of people, data, resources & visualize them).
10. Analyze how Individual/Organization use Social Media and Social media privacy 10 policies. (Analyze anyone Individual or Organization/Business usage on different platforms and privacy policy settings)

DIGITAL TOOLS:

- https://www.studocu.com/in/document/university– of– mumbai/computer–engineering/sma– manual/56108486
- https://github.com/ArtaXerxess/Social– Media– Analytics–Lab/tree/main/sma%20lab%201

Mapping of CO with PSO

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

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

SOURASHTRA COLLEGE, MADURAI– 625004

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

MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2025-2026 onwards)

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAE13	SOFTWARE DEVELOPMENT TECHNOLOGIES	ELECTIVE – II PEC	4	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓	
	National		Local		Regional		Global				✓	
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓	

COURSE DESCRIPTION:

This course provides a comprehensive overview of modern software development technologies and practices, focusing on microservices, cloud computing, DevOps, and API development. It is designed to equip students with the knowledge and practical skills required to build, deploy, and maintain scalable, secure, and efficient applications in contemporary development environments.

COURSE OBJECTIVES:

To

- teach and Implement Micro services
- analyse the Azure Kubernetes Service
- teach and analyse .NET DevOps for Azure and its applications
- build code for .NET core applications
- get familiarized with Azure pipelines

COURSE OUTCOMES (COs):

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand, apply and summarize the basic concepts of Micro services communication Microsoft Azure and Dev Ops for software development life cycle	Upto K5
CO 2	illustrate, and implement Azure Kubernetes Service tools for software development life cycle	Upto K5
CO 3	recognize, analyse and summarize the functionalities of .NET Dev Ops for Azure applications	Upto K5
CO 4	understand, design and evaluate the principles and architecture service tools for software development life cycle	Upto K5
CO 5	comprehend, implement and review the functionalities of API and API gateways for cloud and Azure applications	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

SOFTWARE DEVELOPMENT TECHNOLOGIES

UNIT – I: IMPLEMENTING MICROSERVICES

Client to microservices communication, Interservice communication, data considerations, security, monitoring, microservices hosting platform options. Azure Service Fabric: Introduction, core concepts, supported programming models, service fabric clusters, develop and deploy applications of service fabric. Monitoring Azure Service Fabric Clusters: Azure application, resource manager template, Adding Application Monitoring to a Stateless Service Using Application Insights, Cluster monitoring, Infrastructure monitoring.

UNIT – II: AZURE KUBERNETES SERVICE (AKS)

Introduction to kubernetes and AKS, AKS development tools, Deploy applications on AKS. Monitoring AKS: Monitoring, Azure monitor and analytics, monitoring AKS clusters, native kubernetes dashboard, Prometheus and Grafana. Securing Microservices: Authentication in microservices, Implenting security using API gateway pattern, Creating application using Ocrlot and securing APIs with Azure AD. Database Design for Microservices: Data stores, monolithic approach, Microservices approach, harnessing cloud computing, database options on MS Azure, overcoming application development challenges. Building Microservices on Azure Stack: Azure stack, Offering IaaS, PaaS on–premises simplified, SaaS on Azure stack.

UNIT – III:.NET DEVOPS FOR AZURE

DevOps introduction, Problem and solution. Professional Grade DevOps Environment: The state of DevOps, professional grade DevOps vision, DevOps architecture, tools for professional DevOps environment, DevOps centered application. Tracking work: Process template, Types of work items, Customizing the process, Working with the process. Tracking code: Number of repositories, Git repository, structure, branching pattern, Azure repos configuration, GIT and Azure.

UNIT – IV: BUILDING THE CODE

Structure of build, using builds with .NET core and Azure pipelines, Validating the code: Strategy for defect detection, Implementing defect detection. Release candidate creation: Designing release candidate architecture, Azure artifacts workflow for release candidates, Deploying the release: Designing deployment pipeline, Implementing deployment in Azure pipelines. Operating and monitoring release: Principles, Architectures for observability, Jumpstarting observability.

UNIT – V: INTRODUCTION TO APIS

Introduction, API economy, APIs in public sector. API Strategy and Architecture: API Strategy, API value chain, API architecture, API management. API Development: Considerations, Standards, kick–start API development, team orientation. API Gateways: API Gateways in public cloud, Azure API management, AWS API gateway. API Security: Request–based security, Authentication and authorization.

TEXT BOOKS:

1. Harsh Chawla and Hemant Kathuria, ***Building Microservices Applications on Microsoft Azure– Designing, Developing, Deploying, and Monitoring***, Apress, 2019.
2. Jeffrey Palermo, ***NET DevOps for Azure A Developer"s Guide to DevOps Architecture the Right Way***, Apress, 2019.
3. Thurupathan and Vijayakumar, ***Practical API Architecture and Development with Azure and AWS – Design and Implementation of APIs for the Cloud***, Apress, 2018.

REFERENCE BOOKS:

1. Karl Matthias and Sean P. Kane, ***Docker: Up and Running***, O'Reilly Publication, Second Edition 2018.
2. Len Bass, Ingo Weber, Liming Zhu, ***Dev Ops, A Software Architects Perspective***, Addison Wesley–Pearson Publication, First Edition 2015.
3. John Ferguson Smart, ***Jenkins, The Definitive Guide***, O'Reilly Publication, First Edition 2011.

DIGITAL TOOLS:

- www.intelivita.com/blog/software–development–technologies/
- https://www.geeksforgeeks.org/software–development/
- https://www.intelivita.com/blog/software–development–technologies/#:~:text=Software%20development%20technologies%20are%20the%20tools%20and%20methods,frameworks%20and%20libraries%2C%20databases%2C%20and%20cloud%20computing%20platforms.

Mapping of CO with PSO

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

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

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SYLLABUS (Under CBCS based on OBE)

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAEP3	SOFTWARE DEVELOPMENT TECHNOLOGIES LAB	ELECTIVE – II PEC	–	4	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	40	60	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓
	National		Local		Regional		Global				✓
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓

COURSE DESCRIPTION:

A software development lab course teaches helps you learn how to create, design, deploy, and support computer software.

COURSE OBJECTIVES:

To make the students

- understand the concept of DevOps with associated technologies and methodologies.
- be familiar with Jenkins, which is used to build & test software Applications
- understand Continuous integration in Devops environment.
- understand Docker to build, ship and run containerized images
- use Docker to deploy and manage Software applications running on Container

COURSE OUTCOMES (COs):

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand and analyse the importance of Jenkins to Build, Deploy and Test Software Applications	Upto K5
CO 2	synthesise and summarize the importance of Software Configuration Management in DevOps	Upto K5
CO 3	identify, analyze and illustrate the Containerization of OS images and deployment of applications over Docker	Upto K5
CO 4	design, analyze and develop the Pull based Software Configuration Management	Upto K5
CO 5	design, analyze and develop Puppet Manifest	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

SOFTWARE DEVELOPMENT TECHNOLOGIES LAB
LIST OF EXPERIMENTS

1. Deploy Version Control System / Source Code Management, install git and create a GitHub account.
2. Perform various GIT operations on local and Remote repositories using GIT Cheat–Sheet
3. Continuous Integration: install and configure Jenkins with Maven/Ant/Gradle to setup a build Job.
4. Build the pipeline of jobs using Maven / Gradle / Ant in Jenkins, create a pipeline script to Test and deploy an application over the tomcat server.
5. Implement Jenkins Master–Slave Architecture and scale your Jenkins standalone implementation by implementing slave nodes.
6. Setup and Run Selenium Tests in Jenkins Using Maven.
7. Implement Docker Architecture and Container Life Cycle, install Docker and execute docker commands to manage images and interact with containers.
8. Implement Docker file instructions, build an image for a sample web application using Docker file.
9. Install and Configure Pull based Software Configuration Management and provisioning tools using Puppet.
10. Implement LAMP/MEAN Stack using Puppet Manifest.

DIGITAL TOOLS:

- https://mrcet.com/pdf/Lab%20Manuals/CSE/SE%20LAB%5bR22A0585%5d.pdf
- https://cse.mait.ac.in/pdf/LAB%20MANUAL/SE.pdf
- https://www.indeed.com/career–advice/finding–a–job/software–development–project

Mapping of CO with PSO

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

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

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAE14	NETWORK PROTOCOLS	ELECTIVE – II PEC	4	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓
	National		Local		Regional		Global				✓
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓

COURSE DESCRIPTION:

A network protocol course provides students with hands–on experience with network principles and protocols. Students typically learn how to configure and test network devices.

COURSE OBJECTIVES:

- To make the students understand the basic concepts of Transmission Control Protocol/Internet Protocol and associated functions
- To make them explore to describe the internet architecture and its processes associated with the data transfer and to provide the quality of service
- To make them understand technologies and services associated with network protocols along along with the challenges of dat transfer.
- To help them understand understand the importance and functioning of Routing Protocols over communication service.
- To empower the learners to comprehend and manage the issues associated with IP protocols like data traffic problems, security and mobility.

COURSE OUTCOMES (COs):

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand, analyse and examine the concepts of Communication Protocols with its architecture and functions	Upto K5
CO 2	illustrate and apply the appropriate internet architecture along with efficient protocol models for the user defined communication environment	Upto K5
CO 3	comprehend, categorize and formulate the appropriate IP routing protocol to establish a efficient data transfer	Upto K5
CO 4	comprehend, analyse and evaluate the concepts of Virtual wired service and IP/optical networking with its functions and deployment	Upto K5
CO 5	elucidate, analyse and inspect the IP traffic engineering and its models along with the security mechanisms	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

NETWORK PROTOCOLS

UNIT – I:

Transmission Control Protocol/Internet Protocol: Fundamental Architecture – Internet Protocol Basics – Routing – Transport–Layer Protocols : Transmission Control Protocol – User Datagram Protocol – Stream Control Transmission Protocol – Real–Time Transport Protocol.

UNIT – II:

Internet Architecture: Internet Exchange Point – History of Internet Exchange Points – Internet Service Provider Interconnection Relationships – Peering and Transit – IP Routing Protocols: Overview of Routing Protocols – Routing Information Protocol – Open Shortest Path First – Border Gateway Protocol – Multiprotocol Label Switching.

UNIT – III:

IP Quality Of Service : Introduction – Quality of Service in IP Version 4 – Integrated Services – Differentiated Services – Quality of Service with Nested Differentiated Services Levels – IP Multicast and Anycast: Addressing – Multicast Routing – Routing Protocols –Anycasting– IPv6 Anycast Routing Protocol: Protocol Independent Anycast—Sparse Mode – Transport over Packet: Draft–Martini Signaling and Encapsulation – Layer–2 Tunneling Protocol.

UNIT – IV:

Virtual Private Wired Service – Types of Private Wire Services – Generic Routing Encapsulation – Layer–2 Tunneling Protocol – Layer–3 Virtual Private Network 2547bis, Virtual Router – IP and Optical Networking: IP/Optical Network Evolution – Challenges in Legacy Traditional IP/Optical Networks – Automated Provisioning in IP/Optical Networks – Control Plane Models for IP/Optical Networking – Next–Generation MultiLayer Network Design Requirements – Benefits and Challenges in IP/Optical Networking – IP Version 6: Addresses in IP Version 6 – IP Packet Headers – IP Address Resolution – IP Version 6 Deployment: Drivers and Impediments.

UNIT – V:

IP Traffic Engineering: Models of Traffic Demands – Optimal Routing with Multiprotocol Label Switching – Link–Weight Optimization with Open Shortest Path First – Extended Shortest–Path–Based Routing Schemes – IP Network Security: Introduction – Detection of Denial–of–Service Attack – IP Trace back– Edge Sampling Scheme – Advanced Marking Scheme – Mobility Support for IP: Mobility Management Approaches – Security Threats Related to IP Mobility – Mobility Support in IPv6 – Reactive Versus Proactive Mobility Support – Relation to Multihoming – Protocols Supplementing.

TEXT BOOK:

Advanced Internet Protocols, Services and Applications, Eiji Oki, Roberto Rojas–Cessa, Mallikarjun Tatipamula, Christian Vogt, Copyright © 2012 by John Wiley & Sons, Inc.

REFERENCE BOOKS:

1. ***TCP/IP Protocol Suite***, BehrouzA.Forouzan, Fourth Edition, Tata Mcgraw–Hill Edition 2010.
2. ***Computer Communications and Networking Technologies*** – Michael A. Gallo & William M. Hancock– BROOKS&COLE
3. ***Computer Networks and Internets*** –Douglas E. Comer– PEARSON.
4. ***Data and Computer Communications***, Eighth Edition– William Stallings– Pearson Education.
5. ***Network Security Bible***, 2nd edition, Eric Cole, Wiley Publishers.
6. ***Data communication and networks*** –James Irvine and David Harley– Publishers: Wiley India

DIGITAL TOOLS:

- https://netacad.fit.vutbr.cz/wp–content/uploads/ccna/ccna1/v50/lectures/CCNA1_Chapter3.pdf
- https://bkarak.wizhut.com/www/lectures/networks–07/NetworkProtocolsHandbook.pdf
- https://www.geeksforgeeks.org/types–of–network–protocols–and–their–uses/
- https://www.tutorialspoint.com/communication_technologies/communication_technologies_network_protocols.htm

Mapping of CO with PSO

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

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

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAEP4	NETWORK PROTOCOLS LAB	ELECTIVE – II PEC – LAB	–	4	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	40	60	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓
	National		Local		Regional		Global				✓
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓

COURSE DESCRIPTION:

A network protocol lab course provides students with hands–on experience with network principles and protocols. Students typically learn how to configure and test network devices.

COURSE OBJECTIVES:

- To understand and implement the basic concepts of Transmission Control Protocol/Internet Protocol and associated functions.
- To acquire programming skills in Implement various technologies and services associated with network protocols along with the challenges of data transfer.
- Implement the importance and functioning of Routing Protocols over communication service.
- To acquire skills to connect two routers and any two switches.
- To comprehend related to SSH protocols and accessing the remote device.

COURSE OUTCOMES (COs):

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	comprehend the programming skills the SSH protocols and accessing the remote device.	Upto K5
CO 2	understand and implement the various functioning of Routing Protocols over communication service.	Upto K5
CO 3	evaluate the use of FTP server.	Upto K5
CO 4	design to Connect any two switches and get the status of each switches.	Upto K5
CO 5	solve to Connect two routers and get packets from the routers.	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

NETWORK PROTOCOLS LAB

LIST OF PROGRAMS:

1. Implement the following commands a. ipconfig b. ping c. traceroute d. netsat e. nslookup
2. Implement the following server commands a. ifconfig b. ip c. tracepath d. ss e. tcpdum
3. Connect and place the given file in the FTP server
4. Install packet tracer and connect a computer to router, switch and get a Icmp request
5. Implement the SSH protocols and accessing the remote device
6. Connect any two switches and get the status of each switches
7. Connect two routers and get packets from the routers.
8. Get the access of the router by connecting with working computer
9. Identify the route password of server and get the connection using telnet
10. Install wire shark for capture and analyse the packets (TCP /UDP)

DIGITAL TOOLS:

- https://cse.cet.ac.in/wp–content/uploads/2019/10/Network_Lab_Manual.pdf
- https://gpbalasore.org.in/wp–content/uploads/2023/03/Networking–Lab–Manual–for–Academic–Year–2022–23–2.pdf
- https://networklessons.com/labs/network–fundamentals–lab–1

Mapping of CO with PSO

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

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

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COURSE STRUCTURE – II SEMESTER

S. No.	Course Code	Course Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	25MCAC21	**Core – 6: PCC** Data Structures and Algorithms	4	3	25	75	100	4
2.	25MCAC22	**Core – 7: PCC** Big Data Analytics	4	3	25	75	100	4
3.	25MCAC23	**Core – 8: PCC** Soft Computing	4	3	25	75	100	4
4.	25MCACP3	**Core – 9: PCC** Data Structures and Algorithms Lab	4	3	40	60	100	2
5.	25MCACP4	**Core – 10: PCC:** Big Data Analytics Lab	4	3	40	60	100	2
6.	**Elective – III*: PEC**		4	3	25/ 40	75/ 60	100	3
	25MCAE21 25MCAEP5	Internet of Things / Internet of Things Lab/						
	25MCAE22 25MCAEP6	Computer Vision / Computer Vision Lab						
7.	**Elective – IV*: PEC**		4	3	25/ 40	75/ 60	100	3
	25MCAE23 25MCAEP7	Cyber Security/ Cyber Security Lab/						
	25MCAE24 25MCAEP8	Block chain Technologies / Block chain Technologies Lab						
8.	25MCACV1	**Core – 11: PCC:** Mini– Project	2	3	40	60	100	2
9.		***SWAYAM/NPTEL**	–	–	–	100	100	1
		Total	**30**				**700**	**24**

***One elective course to be chosen from FOUR courses**

CA – Class Assessment (Internal)
SE – End Summative Examination
SEC – Skill Enhancement Course
PCC – Professional Competency Course (Core)
PEC – Professional Elective Course (Elective)
T – Theory
P – Practical

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAC21	DATA STRUCTURES AND ALGORITHMS	CORE – 6 PCC	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓
	National		Local		Regional		Global				✓
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓

COURSE DESCRIPTION:

This Course describes different data structures and how to use them effectively for solving problems. It is expected that the students have basic experience in any high – level programming language.

COURSE OBJECTIVES:

- To get a clear understanding of various ADT structures.
- To understand how to implement different ADT structures with real– time scenarios.
- To analyze the various data structures with their different implementations.
- To get an idea of applying right models based on the problem domain.
- To realize, and understand how and where to implement modern data structures with Python language.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand various ADT concepts	Upto K5
CO 2	become familiar with implementation of ADT models with Python language and understand how to develop ADT for the various real– time problems	Upto K5
CO 3	apply with proper ADT models with problem understanding	Upto K5
CO 4	apply and Analyze right models based on the problem domain	Upto K5
CO 5	evaluate modern data structures with Python language	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

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DATA STRUCTURES AND ALGORITHMS

UNIT– I:

Abstract Data Types: Introduction– The Date Abstract Data Type– Bags– Iterators. **Arrays**: Array Structure– Python List– Two Dimensional Arrays– Matrix Abstract Data Type. **Sets, Maps:** Sets– Maps– Multi– Dimensional Arrays.

UNIT– II:

Algorithm Analysis: Experimental Studies– Seven Functions– Asymptotic Analysis. **Recursion:** Illustrative Examples– Analyzing Recursive Algorithms– Linear Recursion– Binary Recursion– Multiple Recursion.

UNIT– III:

Stacks, Queues, and Deques: Stacks– Queues– Double– Ended Queues. **Linked Lists:** Singly Linked Lists– Circularly Linked Lists– Doubly Linked Lists. **Trees:** General Trees– Binary Trees– Implementing Trees– Tree Traversal Algorithms.

UNIT– IV:

Priority Queues: Priority Queue Abstract Data Type– Implementing a Priority Queue– Heaps– Sorting with a Priority Queue. **Maps, Hash Tables, and Skip Lists:** Maps and Dictionaries– Hash Tables– Sorted Maps– Skip Lists– Sets, Multisets, and Multimaps.

UNIT– V:

Search Trees: Binary Search Trees– Balanced Search Trees– AVL Trees– Splay Trees. **Sorting and Selection:** Merge sort– Quick sort– Sorting through an Algorithmic Lens– Comparing Sorting Algorithms– Selection. **Graph Algorithms:** Graphs– Data Structures for Graphs– Graph Traversals– Shortest Paths– Minimum Spanning Trees.

TEXT BOOKS:

1. Rance D. Necaise, ***Data Structures and Algorithms Using Python***, John Wiley & Sons, 2011. (Unit – 1) **Chapters:** 1, 2, 3.
2. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, ***Data Structures and Algorithms in Python***, John Wiley & Sons, 2013. (Unit – 2, 3, 4, and 5) **Chapters:** 3 to 12, and 14.

REFERENCE BOOKS:

1. Dr. Basant Agarwal; Benjamin Baka, ***Hands – On Data Structures and Algorithms with Python: Write complex and powerful code using the latest features of Python 3.7***, Packt Publishing, 2018.
2. Magnus Lie Hetland, ***Python Algorithms: Mastering Basic Algorithms in the Python Language***, Apress, 2014.

DIGITAL TOOLS:

- https://www.researchgate.net/publication/372345381_Data_Structures_and_Algorithms_Python
- https://nibmehub.com/opac–service/pdf/read/Data%20Structures%20and%20Algorithms%20Using%20Python.pdf
- https://nibmehub.com/opac–service/pdf/read/Data%20Structures%20and%20Algorithms%20in%20Python.pdf

Mapping of CO with PSO

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

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

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

SOURASHTRA COLLEGE, MADURAI– 625004

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

MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2025-2026 onwards)

835

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAC22	BIG DATA ANALYTICS	CORE – 7 PCC	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓
	National		Local		Regional		Global				✓
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓

COURSE DESCRIPTION:

This course gives an overview of Big Data, i.e. storage, retrieval and processing of big data. In addition, it also focuses on the technologies, i.e., the tools/algorithms that are available for storage, processing of Big Data.

COURSE OBJECTIVES:

- To introduce big data tools & Information Standard formats and the basic concepts of big data.
- To teach the importance of NoSQL.
- To teach Hadoop, HDFS and MapReduce concepts.
- To explore the big data tools such as Hive, HBase and Pig.
- To demonstrate Recommendation Systems.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand, illustrate and evaluate the concepts and techniques of Data Science, Big Data Analytics and its tools	Upto K5
CO 2	collaborate, apply and review the computing for big data in Hadoop, and NoSQL environment.	Upto K5
CO 3	comprehend, implement and review the concepts of data science and big data analytics projects using MapReduce, and MongoDB	Upto K5
CO 4	understand, use and analyze the concepts of big data analytics projects using HIVE and PIG database.	Upto K5
CO 5	describe types of Recommendation Systems using Big Data Analytics.	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

BIGDATA ANALYTICS

UNIT – I: BIG DATA AND ANALYTICS

Classification of Digital Data: Structured Data– Semi Structured Data and Unstructured Data. Introduction to Big Data: Characteristics – Evolution – Definition – Challenges with Big Data – Other Characteristics of Data – Big Data – Traditional Business Intelligence versus Big Data – Data Warehouse and Hadoop.

Environment Big Data Analytics: Classification of Analytics – Challenges – Big Data Analytics important – Data Science – Data Scientist – Terminologies used in Big Data Environments – Basically Available Soft State Eventual Consistency – Top Analytics Tools

UNIT – II: TECHNOLOGY LANDSCAPE

NoSQL, Comparison of SQL and NoSQL, Hadoop –RDBMS Versus Hadoop – Distributed Computing Challenges – Hadoop Overview – Hadoop Distributed File System – Processing Data with Hadoop – Managing Resources and Applications with Hadoop YARN – Interacting with Hadoop Ecosystem

UNIT – III: MONGODB AND MAPREDUCE PROGRAMMING

MongoDB: Mongo DB – Terms used in RDBMS and Mongo DB – Data Types – MongoDB Query Language. MapReduce: Mapper – Reducer – Combiner – Partitioner – Searching – Sorting – Compression

UNIT – IV: HIVE

Introduction – Architecture – Data Types – File Formats – Hive Query Language Statements – Partitions – Bucketing – Views – Sub– Query – Joins – Aggregations – Group by and Having – RCFile – Implementation – Hive User Defined Function – Serialization and Deserialization. **Pig:** Introduction – Anatomy – Features – Philosophy – Use Case for Pig – Pig Latin Overview – Pig Primitive Data Types – Running Pig – Execution Modes of Pig – HDFS Commands – Relational Operators – Eval Function – Complex Data Types – Piggy Bank – User–Defined Functions – Parameter Substitution – Diagnostic Operator – Word Count Example using Pig – Pig at Yahoo! – Pig Versus Hive

UNIT – V: RECOMMENDATION ENGINES

Introduction to Recommendation Engines: Recommendation engine definition – Need for Recommender Systems – Big Data Driving the Recommender Systems –Types of Recommender Systems –Evolution of Recommender Systems with Technology. Evolution of Recommendation Engines Explained: Evolution of Recommendation Engines – Nearest Neighborhood– based Recommendation Engines – Content– based Recommender Systems – Hybrid Recommender Systems – Model– based Recommender Systems.

TEXT BOOKS:

1. ***Big Data and Analytics***, Seema Acharya and Subhashini Chellappan, 2nd edition, Wiley India Private Limited, 2017.
2. ***Building Recommendation Engines***. – Suresh Kumar Gorakala, 1st edition, Packt Publishing Limited, United Kingdom, 2016

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 Fundamentals Concepts, Driver & Techniques***, Thomas Erl, Wajid Khattak and Paul Buhler, 3rd Edition, Pearson publication, 2018.

DIGITAL TOOLS:

- https://www.tutorialspoint.com/big_data_analytics/index.html
- https://www.edureka.co/blog/big– data– tutorial
- https://www.tutorialride.com/big– data– analytics/big– data– analytics– tutorial.html
- https://www.guru99.com/bigdata– tutorials.html

Mapping of CO with PSO

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

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

SOURASHTRA COLLEGE, MADURAI– 625004

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

MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2025-2026 onwards)

838

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAC23	SOFT COMPUTING	CORE – 8 PCC	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓
	National		Local		Regional		Global				✓
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓

COURSE DESCRIPTION:

This course will cover fundamental concepts used in soft computing. The main objective of the course is to expose the students to various types of soft computing techniques, and applications of soft computing.

COURSE OBJECTIVES:

- To give a basic understanding of neural network theory and fuzzy logic theory.
- To make the students understand supervised and unsupervised learning algorithms
- To enable the students to gain a basic understanding of neural networks.
- To help them know about fuzzy logic, fuzzy inference systems, and their functions.
- To impart basic knowledge on Genetic algorithms and their applications.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	provide an introduction to the basic principles, techniques, and applications of soft computing	Upto K5
CO 2	get familiar with Neural network architectures and supervised learning algorithms	Upto K5
CO 3	understand the architectures and algorithms of Unsupervised Learning techniques	Upto K5
CO 4	develop the skills to gain a basic understanding of fuzzy logic theory and fuzzy inference systems	Upto K5
CO 5	know traditional optimization and search techniques and genetic programming	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

SOFT COMPUTING

UNIT – I: INTRODUCTION TO SOFT COMPUTING

Artificial Neural Networks– Biological Neurons– Basic Models of Artificial Neural Networks–Connections–Learning–Activation Functions– Important Terminologies of ANNs– Muculloch and Pitts Neuron–Linear Separability– Hebb Network–Flowchart of Training Process– Training Algorithm.

UNIT – II: SUPERVISED LEARNING NETWORK

Perceptron Networks–Perceptron Learning Rule–Architecture–Flowchart for Training Process–Perceptron Training Algorithms for Single Output Classes–Perceptron Training Algorithm for Multiple Output Classes–Perceptron Network Testing Algorithm – Adaptive Linear Neuron–Delta Rule for Single Output Unit–Flowchart for training algorithm–Training Algorithm – Testing Algorithm – Multiple Adaptive Linear Neurons–Architecture–Flowchart of Training Process–Training Algorithm–Back Propagation Network–Architecture–Flowchart for Training Process–Training Algorithm–Learning Factors of Back–Propagation Network–Radial Basis Function Network– Architecture–Flowchart for Training Process–Training Algorithm.

UNIT – III: UNSUPERVISED LEARNING NETWORK

Associative Memory Networks – Auto Associative Memory Network–Architecture–Flowchart for Training Process–Training Algorithm–Testing Algorithm– Bidirectional Associative Memory– Architecture–Discrete Bidirectional Associative Memory–Iterative Auto Associative Memory Networks – Linear Auto Associative Memory–Kohonen Self–Organizing Feature Map– Architecture– Flowchart for Training Process–Training Algorithm.

UNIT – IV: INTRODUCTION TO FUZZY LOGIC

Classical Sets –Operations on Classical Sets–Fuzzy sets – Fuzzy Sets– Properties of Fuzzy Sets– Fuzzy Relations –Membership Functions: Fuzzification– Methods of Membership Value Assignments – Defuzzification – Lambda–Cuts for Fuzzy sets and Fuzzy Relations – Defuzzification Methods–Max–Membership Principle–Centroid Method–Weighted Average Method–Mean Max Membership–Center of Sums–Center of Largest Area–First of Maxima – Fuzzy Set Theory – Fuzzy Arithmetic And Fuzzy Measures: Fuzzy Measures – Belief and Plausibility Measures–Probability Measures– Possibility and Necessity Measures– Formation of Rules –Fuzzy Inference Systems (FIS) – Fuzzy Decision Making – Fuzzy Logic Control Systems.

UNIT – V: GENETIC ALGORITHM

Introduction – Biological Background – Traditional Optimization and Search Techniques –Gradient Based Local Optimization Method–Random Search–Stochastic Hill Climbing–Simulated Annealing–Symbolic Artificial Intelligence–Operators in Genetic Algorithm – Encoding–Selection– Crossover–Mutation – Stopping Conditions for Genetic Algorithm Flow–Genetic Programming–Working of Genetic Programming–Characteristics of Genetic Programming – Data Representation.

TEXT BOOKS:

1. ***Principles of Soft Computing***, S.N. Sivanandam, S.N.Deepa, Wiley, 3rd Edition, 2019.
   UNIT I: Chapter 1: 2.1,2.3,2.4,2.5,2.6,2.7
   UNIT II: Chapter 3: 3.2,3.3,3.4,3.5,3.6
   UNIT III: Chapter 4: 4.3,4.4,4.7,5.3
   UNIT IV: Chapter 7,8,9,10,11,12,14: 7.2,7.3, 8.4, 9.3,9.4, 10,10.2,10.3,10.4, 11.4, 12.8, 14
   UNIT V: Chapter 15: 15.2,15.3,15.4,15.9,15.10

REFERENCE BOOKS:

1. Das, A. (2018). ***Artificial Intelligence and Soft Computing for Beginners***, 3rd Edition, 2018, Shroff Publishers and Distributors, Mumbai.
2. Amit, K. (2018). ***Artificial Intelligence and Soft Computing: Behavioral and Cognitive Modeling of the Human Brain***, 2018, CRC press.
3. Rajasekaran, S., & Pai, G. V. (2011). ***Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications (with cd).*** 2012, PHI Learning Pvt. Ltd.
4. Jang, J. S. R., Sun, C. T., & Mizutani, E. (2004). ***Neuro–Fuzzy and Soft Computing–A Computational Approach to Learning and Machine Intelligence*** [Book Review]. IEEE Transactions on automatic control, 42(10), 1482–1484.
5. Gupta, M. M., ***Soft Computing and Intelligent Systems: Theory and Applications***. Elsevier, 2004.

DIGITAL TOOLS:

- https://archive.nptel.ac.in/courses/106/105/106105173/
- https://www.cet.edu.in/noticefiles/274_soft%20computing%20LECTURE%20NOTES.pdf
- https://mrcet.com/downloads/digital_notes/CSE/III%20Year/AIML/Neural–Networks.pdf
- https://pg.its.edu.in/sites/default/files/MCAKCA032–PRINCIPALES%20OF%20SOFT%20COMPUTING–SN%20SIVNANDAM %20AND%20DEEPA%20SN.pdf

Mapping of CO with PSO

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

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

SOURASHTRA COLLEGE, MADURAI– 625004

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MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2025-2026 onwards)

841

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCACP3	DATA STRUCTURES AND ALGORITHMS LAB	CORE – 9 PCC – LAB	–	4	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	40	60	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓
	National		Local		Regional		Global				✓
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓

COURSE DESCRIPTION:

This course investigates abstract data types (ADTs), recursion, algorithms for searching and sorting, and basic algorithm analysis. ADTs to be covered include lists, stacks, queues, priority queues, trees, and graphs.

COURSE OBJECTIVES:

- To understand Stack, Queue and Doubly Linked ADT structures.
- To implement different ADT structures with real– time scenarios.
- To analyze the recursion concepts.
- To apply different sorting and tree techniques.
- To implement modern data structures with Python language.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	have a strong understanding in various ADT concepts	Upto K5
CO 2	become a familiar with implementation of ADT models	Upto K5
CO 3	apply sort and tree search algorithms	Upto K5
CO 4	evaluate the different data structure models	Upto K5
CO 5	learn how to develop ADT for the various real– time problems	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

DATA STRUCTURES AND ALGORITHMS LAB

Implement the following problems using Python 3.4 and above

1. Recursion concepts.
   Linear recursion
   Binary recursion.
2. Stack ADT.
3. Queue ADT.
4. Doubly Linked List ADT.
5. Heaps using Priority Queues.
6. Merge sort.
7. Quick sort.
8. Binary Search Tree.
9. Minimum Spanning Tree.
10. Depth First Search Tree traversal.

DIGITAL TOOLS:

- https://mrcet.com/pdf/Lab%20Manuals/CSE/DATA%20STRUCTURES%20THROUGH%20PYTHON%20LAB%20MANUAL(R20A0503).pdf
- https://vjit.ac.in/wp– content/uploads/2022/02/Data– Structures– Python– Programming– Lab– Manual.pdf
- https://www.scribd.com/document/490561887/Python– lab– manual– pdf

Mapping of CO with PSO

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

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

SOURASHTRA COLLEGE, MADURAI– 625004

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MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

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843

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCACP4	BIG DATA ANLYTICS LAB	CORE – 10 PCC – LAB	–	4	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	40	60	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓	
	National		Local		Regional		Global				✓	
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values	✓		

COURSE DESCRIPTION:

The primary objective of this course is to optimize business decisions and create a competitive advantage with Big Data analytics. This course will introduce the basics required to develop map reduce programs, derive business benefit from unstructured data.

COURSE OBJECTIVES:

- To teach the fundamental techniques for handling the big data tools.
- To familiarize the tools required to manage big data.
- To analyse big data using Hadoop, MapReduce, Hive, and Pig
- To teach the fundamental principles in achieving big data analytics with scalability and streaming capability
- To enable students to have skills that will help them to solve complex.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand and develop conceptually how Big Data is stored and implement it using different tools	Upto K5
CO 2	comprehend and implement programs for data storage in HDFS and table manipulation using Big Data tools in Hadoop environment	Upto K5
CO 3	understand and Critically analyse existing Big Data datasets and implementations the solutions for it using MongoDB	Upto K5
CO 4	understand and examine existing Big Data datasets and implementations the solutions using HIVE database	Upto K5
CO 5	comprehend and review existing datasets and implementations the solutions to handle it using PIG	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

BIG DATA ANALYTICS LAB

LIST OF PROGRAMS:

1. Implement File System Shell Commands for HDFS in Hadoop Environment
2. Write a Mapreduce program using single reduce function for finding Maximum and Minimum Number
3. Write a Mapreduce program using multiple reduce function for Word Count in an given Text document
4. Implement the following using Pig Latin Input and Output Operations Relational Operations
5. Implement the following using Pig Latin User Defined Functions Advanced Relational Operations
6. Write a Word Count program using Pig Latin Script
7. Write a program to find a maximum temperature using Pig Latin Script
8. Implement the following using Hive commands Handling the Database Creating and Manipulating table
9. Implement Simple Queries for database using Mongo
10. Implement Simple Queries for collections using Mongo

DIGITAL TOOLS:

- https://mrcet.com/pdf/Lab%20Manuals/BIG%20DATA%20ANALYTICS%20Lab%20Manual.pdf
- http://www.hadooplessons.info/2015/01/word– count– in– pig– latin.html
- http://deccancollege.ac.in/MCALABMANUALS/BIGDATALABMANUAL.pdf

Mapping of CO with PSO

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

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

SOURASHTRA COLLEGE, MADURAI– 625004

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MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2025-2026 onwards)

845

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAE21	INTERNET OF THINGS	ELECTIVE – 3 PEC	4	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓
	National		Local		Regional		Global				✓
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓

COURSE DESCRIPTION:

This course aims to provide a basic understanding of Internet of Things. It offers hands on training for building simple applications using appropriate sensors, microcontroller board and other components.

COURSE OBJECTIVES:

- To understand the underlying concepts of Internet of Things (IoT)
- To know the challenges and future directions of IoT.
- To distinguish various applications in IoT.

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 Internet of Things & its characteristics and IoT enabling technologies.	Upto K5
CO 2	describe the differences and similarities between IoT & M2M and managing IoT systems.	Upto K5
CO 3	understand IoT Platform design methodology and developing IoT System using Python.	Upto K5
CO 4	identify the various IoT physical components, server and cloud.	Upto K5
CO 5	demonstrate Data Analytics for IoT.	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

INTERNET OF THINGS

UNIT – I:

Introduction to Internet of Things: Introduction – physical design of IoT – Logical design of IoT – IoT enabling technologies – IoT levels & deployment templates.

Domain Specific IoTs: Introduction – Home automation – Cities – Environment – Energy – Retail – Logistics – Agriculture – Industry – Health & Lifestyle.

UNIT – II:

IoT and M2M: Introduction – M2M – difference between IoT and M2M – SDN and NFV for IoT.

IoT System Management with NETCONF–YANG: Need for IoT management – SNMP – network operator requirements – IoT system management with NETCONF–YANG.

UNIT – III:

IoT Platforms Design Methodology: Introduction – IoT design methodology – case study on IoT system for weather monitoring.

IoT Systems – Logical Design using Python: – Introduction – installing python – data types – data structure – control flow – functions – modules – packages – file handling – data & time operations – classes – packages for IoT.

UNIT – IV:

IoT Physical Devices & Endpoints: IoT device definition – Raspberry Pi – about the board – Linux on raspberry Pi – raspberry Pi interfaces – programming raspberry Pi with python – other IoT devices.

IoT Physical Servers & Cloud Offerings Introduction – WAMP – Xively – Django – designing a REST ful Web API – Amazon web services for IoT.

UNIT – V:

Data Analytics for IoT: Introduction – Apache Hadoop – Using Hadoop MapReduce for batch data analysis – Apache Oozie – Apache Spark – Apache Storm – using Apache Storm for real time data analysis.

Case studies illustrating IoT Design: Introduction – Home Automation.

TEXT BOOK:

Arshdeep Bahga, Vijay Madisetti, ***Internet of Things – A hands on Approach***, University Press, Hyderabad, 2018.

REFERENCE BOOKS:

1. Donald Norris ***—The Internet of Things: Do–It–Yourself at Home Projects for Arduino, Raspberry Pi and BeagleBone Black***, Mc.Graw Hill,2015.
2. CunoPfister ***—Getting Started with the Internet of Things***, O'Reilly Media, Inc.,2011
3. Honbo Zhou ***—The Internet of Things in the Cloud: A Middleware Perspective***, Press,2012
4. Olivier Hersent, David Boswarthick, Omar Elloumi, ***—The Internet of Things, Key applications and Protocols***, Wiley, 2012

DIGITAL TOOLS:

- https://www.javatpoint.com/iot–internet–of–things
- https://www.guru99.com/iot–tutorial.html
- https://azure.microsoft.com/en–us/overview/internet–of–things–iot/what–is–the–internet–of–things/#overview
- http://www.microsoft.com/en–in/server–cloud/internet–of–things.aspx

Mapping of CO with PO

CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	2	3	2	3
CO2	3	3	2	3	2	3
CO3	2	3	2	3	2	3
CO4	3	3	2	3	2	3
CO5	3	3	3	3	2	3

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

SOURASHTRA COLLEGE, MADURAI– 625004

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MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2025-2026 onwards)

848

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAEP5	INTERNET OF THINGS LAB	ELECTIVE – III PEC – LAB	–	4	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	40	60	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓
	National		Local		Regional		Global				✓
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓

COURSE DESCRIPTION:

This course teaches a deep understanding of IoT technologies from the ground up. Students will learn IoT device programming (Arduino and Raspberry Pi), sensing and actuating technologies.

COURSE OBJECTIVES:

- To familiarize the students to the basics of Internet of things and protocols.
- To expose the students to some application areas where Internet of Things can be applied.
- To create web server program for local hosting.

COURSE OUTCOMES (COs):

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the concept of Internet of Things	Upto K5
CO 2	implement interfacing of various sensors with Arduino/Raspberry Pi.	Upto K5
CO 3	demonstrate the ability to transmit data wirelessly between different devices.	Upto K5
CO 4	show an ability to upload/download sensor data on cloud and server.	Upto K5
CO 5	design IoT application for various fields	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4–ANALYSE, K5– EVALUATE

INTERNET OF THINGS LAB

EXERCISES:

1. To develop an IoT program to turn ON/OFF LED light (3.3V)
2. To develop an IoT program using IR sensor (Smart Garbage Monitoring, Detecting Parking Availability, etc.)
3. To develop an IoT program using Humidity and Temperature Monitoring (Forest fire Detection, Weather Monitoring)
4. To develop an IoT web server program for local hosting
5. To develop an IoT program using Soil Moisture Sensor
6. To develop an IoT program using Ultrasonic Sensor (Distance Measurement, etc.)
7. To develop a real–time IoT program using Relay Module (Smart Home Automation with 230V)
8. To develop an IoT program for Fire Detection (Home, Industry, etc.)
9. To develop an IoT program for Gas Leakage detection (Home, Industry, etc.)
10. To develop an IoMT program using Heartbeat Sensor

DIGITAL TOOLS:

- https://vemu.org/uploads/lecture_notes/15_02_2023_57975631.pdf
- https://www.ucpesbam.in/public/images/lab_manuals_pdf/IOT%20Lab%20Manual%20(1)_compressed.pdf
- https://www.nitttrchd.ac.in/imee/Labmanuals/manual%20Internet%20of%20Things%20I.pdf

Mapping of CO with PSO

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

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

SOURASHTRA COLLEGE, MADURAI– 625004

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

MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2025-2026 onwards)

850

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAE22	COMPUTER VISION	ELECTIVE – III PEC	4	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓
	National		Local		Regional		Global				✓
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓

COURSE DESCRIPTION:

This course focuses on enabling computers to identify and understand objects and people in images and videos. It also provides an introduction to computer vision, including fundamentals of image formation, camera imaging geometry, feature detection and matching, stereo, motion estimation and tracking, image classification, scene understanding, and deep learning with neural networks.

COURSE OBJECTIVES:

- To get understanding about Computer vision techniques behind a wide variety of real–world applications.
- To get familiar with various Computer Vision fundamental algorithms and how to implement and apply.
- To get an idea of how to build a computer vision application with Python language.
- To understand various machine learning techniques that are used in computer vision tasks.
- To incorporate machine learning techniques with computer vision systems.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand and recall computer vision and its application areas	Upto K5
CO 2	develop build a computer vision system	Upto K5
CO 3	apply and analyze a design range of algorithms for image processing and computer vision	Upto K5
CO 4	develop incorporate machine learning techniques with computer vision system	Upto K5
CO 5	apply and analyze image segmentation and image registration	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

COMPUTER VISION

UNIT – I:

Basic Image Handling and Processing: PIL – the Python Imaging Library–Matplotlib–NumPy–SciPy–Advanced example: Image de–noising. **Local Image Descriptors:** Harris corner detector–SIFT – Scale–Invariant Feature Transform–Matching Geotagged Images.

UNIT – II:

Image to Image Mappings: Homographic–Warping images–Creating Panoramas. **Camera Models and Augmented Reality:** The Pin–hole Camera Model–Camera Calibration–Pose Estimation from Planes and Markers–Augmented Reality.

UNIT – III:

Multiple View Geometry: Epipolar Geometry–Computing with Cameras and 3D Structure–Multiple View Reconstruction–Stereo Images. **Clustering Images:** K–means Clustering–Hierarchical Clustering–Spectral Clustering.

UNIT – IV:

Searching Images: Content based Image Retrieval–Visual Words–Indexing Images–Searching the Database for Images–Ranking Results using Geometry–Building Demos and Web Applications. **Classifying Image Content:** K–Nearest Neighbors–Bayes Classifier–Support Vector Machines–Optical Character Recognition.

UNIT – V:

Image Segmentation: Graph Cuts–Segmentation using Clustering–Variational Methods. **OpenCV:** Python Interface–OpenCV Basics–Processing Video–Tracking.

TEXT BOOKS:

1. Richard Szeliski, ***Computer Vision: Algorithms and Applications***, Springer– Texts in Computer Science, Second Edition, 2022.
2. ***Computer Vision: A Modern Approach***, D. A. Forsyth, J. Ponce, Pearson Education, Second Edition, 2015

REFERENCE BOOKS:

1. Richard Hartley and Andrew Zisserman, ***Multiple View Geometry in Computer Vision***, Second Edition, Cambridge University Press, March 2004.
2. Christopher M. Bishop; ***Pattern Recognition and Machine Learning***, Springer, 2006
3. E. R. Davies, ***Computer and Machine Vision***, Fourth Edition, Academic Press, 2012

DIGITAL TOOLS:

- https://onlinecourses.nptel.ac.in/noc19_cs58/preview#:~:text=The%20course%20will%20have%20a,techniques%20applied%20in%20this%20area.&text=Category%20%3A,Computer%20Science%20and%20Engineering
- http://pride.periyaruniversity.ac.in/SLM2024/MCA/II_6_COMPUTER%20VISION.pdf

Mapping of CO with PSO

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

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

SOURASHTRA COLLEGE, MADURAI– 625004

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MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2025-2026 onwards)

852

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAEP6	COMPUTER VISION LAB	ELECTIVE – III PEC – LAB	–	4	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	40	60	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓	
	National		Local		Regional		Global				✓	
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓	

COURSE DESCRIPTION:

The course focuses on a practical multi–class image classification problem, the recognition of different image clustering and segmentation.

COURSE OBJECTIVES:

- To get an idea of how to build a computer vision application with Python language.
- To learn the basic image handling and processing
- To get familiar with various Computer Vision fundamental algorithms and how to implement and apply.
- To get an idea of how to implement the image transforms.
- To understand various image segmentation algorithms.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	develop and implement the image loading and exploring.	Upto K5
CO 2	evaluate the image transforms.	Upto K5
CO 3	apply and analyze for image processing denoising algorithms.	Upto K5
CO 4	design and develop the Image Segmentation using Edge detection and Histograms.	Upto K5
CO 5	apply and analyze image clustering and classification algorithms.	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

COMPUTER VISION LAB

Implement the following problems using Python with OpenCV

1. Image Loading, Exploring, and displaying an Image.
2. Access and Manipulate of Image Pixels.
3. Image Transformations.
   i) Resizing
   ii) Rotation
4. Addition operation of Two Images.
5. Image filtering operations
   i) Mean Filtering
   ii) Gaussian Filtering
6. Image Binarization Using Simple Thresholding method.
7. Edge Detection operation using Sobel and Scharr Gradients.
8. Find Grayscale and RGB Histograms of an Image.
9. Segment an Image using K–means Clustering algorithm.
10. Write a program to classify an Image using KNN Classification algorithm.

DIGITAL TOOLS:

- https://www.cs.rug.nl/~michael/teaching/CompVis/cv_prakt.pdf
- https://www.studocu.com/in/document/university–of–mumbai/master–of–information–technology/computer–vision–manual/49630689
- https://gnindia.dronacharya.info/CSE/Downloads/Labmanuals/DIP–Lab–Manual.pdf

Mapping of CO with PSO

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

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

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SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2025-2026 onwards)

854

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAE23	CYBER SECURITY	ELECTIVE – IV PEC	4	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓		
	National		Local		Regional		Global				✓		
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓		

COURSE DESCRIPTION:

From this course, student will gain a comprehensive understanding of best practices for safeguarding data during transmission and ensuring the security of network infrastructures. They will explore legal and regulatory considerations, including privacy laws, copyright issues, and data protection regulations. Additionally, they will learn how to proactively prevent, monitor, and effectively respond to data breaches and cyber attacks.

COURSE OBJECTIVES:

- To make the students understand the difference between threat, risk, attack and vulnerability and able to realize how threats materialize into attacks.
- To make the students analyze typical threats, attacks and exploits and the motivations behind them.
- To focus on the models, tools, and techniques for enforcement of security with some emphasis on the use of cryptography.
- To make the students study about cyber laws in different countries.
- To analyze the cyber security needs of an organization.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand, describe, analyze and examine the basics of Cyber security concepts and its implementation in India	Upto K5
CO 2	comprehend and demonstrate the security tips in browsers, WLAN, social networks, Email security and Smart phone. Apply the investigations in post mortem and Forensics	Upto K5
CO 3	understand, apply and evaluate the various investigation roles and Wi Fi protecting mechanisms.	Upto K5
CO 4	understand, illustrate and evaluate the method of seize the digital information and evidences forensics data and evaluate the forensics reports	Upto K5
CO 5	comprehend, apply and appraise the methods digital forensics with cybercrime prevention techniques	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

CYBER SECURITY

UNIT – I:

Introduction to cybercrime: Classification of cybercrimes – reasons for commission of cybercrime – malware and its type – kinds of cybercrime – authentication – encryption – digital signatures – antivirus – firewall – steganography – computer forensics – why should we report cybercrime – introduction counter cyber security initiatives in India – generating secure password – using password manager–enabling two–step verification – security computer using free antivirus.

UNIT – II:

Tips for buying online: Clearing cache for browsers – wireless LAN–major issues with WLAN– safe browsing guidelines for social networking sites – email security tips – introduction–smart phone security guidelines – purses, wallets, smart phones – platforms, setup and installation– communicating securely with a smart phone.

UNIT – III:

Cyber investigation roles**:** Introduction – role as a cybercrime investigator – the role of law enforcement officers – the role of the prosecuting attorney – incident response: introduction–post mortem versus live forensics – computer analysis for the hacker defender program–network analysis – legal issues of intercepting Wi–Fi transmission – Wi–Fi technology – Wi–Fi RF– scanning RF – eavesdropping on Wi–Fi – fourth amendment expectation of privacy in WLAN.

UNIT – IV:

Seizure of digital information: introduction – defining digital evidence – digital evidence seizure methodology – factors limiting the wholesale seizure of hardware – other options for seizing digital evidence – common threads within digital evidence seizure – determining the most appropriate seizure method– conducting cyber investigations–demystifying computer/cyber crime – IP addresses – the explosion of networking – interpersonal communication.

UNIT – V:

Digital forensics and analyzing data: introduction – the evolution of computer forensics–phases of digital forensics–collection – examination–analysis – reporting – Cyber crime prevention: Introduction – crime targeted at a government agency.

TEXT BOOKS:

1. Dr.JeetendraPande, ***Introduction to Cyber Security,*** Published by Uttarakhand Open University, 2017.(Chapter: 1.2–6.4,9.3–12.2)
2. Anthony reyes, Kevin o'shea, Jim steele, Jon R. Hansen, Captain Benjamin R. Jean Thomas Ralph, ***Cyber–crime investigations – bridging the gaps between security professionals, law enforcement, and prosecutors***, 2007. (Chapter: 4, 5, 6, 7, 8, 9,10)

REFERENCE BOOKS:

1. ***Cyber Security for Dummies***, Joseph Steinberg, Wiley, 2020.
2. ***Computer Forensics and Investigations***, Nelson Phillips and Enfinger Steuart, Cengage Learning, New Delhi, 2009.

DIGITAL TOOLS:

- https://www.w3schools.com/cybersecurity/index.php
- https://intellipaat.com/blog/tutorial/ethical– hacking– cyber– security– tutorial/

Mapping of CO with PSO

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

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

SOURASHTRA COLLEGE, MADURAI– 625004

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MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

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856

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAEP7	CYBER SECURITY LAB	ELECTIVE – IV PEC – LAB	–	4	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	40	60	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓
	National		Local		Regional		Global				✓
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓

COURSE DESCRIPTION:

To make the students vulnerability test and penetration test in the security testing system. To make the students Understand the basics of Computer forensics fundamentals. To make the students analyze various computer forensics technologies. To provide computer forensics systems.

COURSE OBJECTIVES:

- To learn and implement to Change the wireless device mode as monitor mode
- To develop in multiple vulnerabilities web server
- To understand and implement the open ports in the network
- To acquire programming skills in Implement various wireless device modes
- To comprehend related to find the sub domains of webpage

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	comprehend the programming skills in Change the wireless device mode as monitor mode	Upto K5
CO 2	understand and implement multiple vulnerabilities web server	Upto K5
CO 3	evaluate the use of different wireless device modes	Upto K5
CO 4	design to Solve related to find the sub domains of webpage	Upto K5
CO 5	create and apply open ports in the network	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

CYBER SECURITY LAB

Implement the following using any cyber security tools

1. Install virtual box (kali Linux)
2. Generate a secure password using keepass
3. Change the wireless device mode as monitor mode
4. Find the known and open vulnerabilities of system using metaspolit
5. Identify the multiple vulnerabilities webserver using nikto tool
6. Identify the open ports in the network using nmap tools
7. List all the network around us and display the information about the networks
8. Sniff and capture the packet sent over HTTP requests
9. Find the owners of internet resources using Whois Lookup tool
10. Find the sub domains of webpage using knock tool

DIGITAL TOOLS:

- https://github.com/frankwxu/digital– forensics– lab
- https://www.kitploit.com/2021/11/digital– forensics– lab– free– hands– on.html
- https://www.scribd.com/document/680034705/Cyber– Forensics– Lab– Manual

Mapping of CO with PSO

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

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

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MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

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858

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAE24	BLOCKCHAIN TECHNOLOGIES	ELECTIVE – IV PEC	4	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓	
	National		Local		Regional		Global				✓	
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓	

COURSE DESCRIPTION:

This course gives a foundational overview of how blockchain technology works, in order to demystify the technology and to understand its possibilities and limitations.

COURSE OBJECTIVES:

- To understand about Blockchain is an emerging technology platform for developing decentralized applications and data storage.
- To comprehend fundamentals of Public Key Cryptography technology and Consensus Algorithms.
- To familiarize with Bitcoin Network, Bitcoin Clients, APIs and Payments technology of blockchain operations.
- To engage with Components of the Ethereum ecosystem.
- To grasp about Development Tools and Frameworks.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand, apply and examine the characteristics of blockchain, bitcoin and consensus algorithm in centralized and decentralized methods.	Upto K5
CO 2	comprehend and demonstrate the application of hashing and public key cryptography in protecting the blockchain.	Upto K5
CO 3	understand and analyse the elements of trust in a Blockchain: validation, verification, and consensus.	Upto K5
CO 4	comprehend and evaluate the alternate coin, Ethereum and smart contract.	Upto K5
CO 5	grasp and apply the knowledge of Tools and languages for applications	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

Passed in the BoS Meeting held on 27/02/2025 **Signature of the Chairman**

BLOCKCHAIN TECHNOLOGIES

UNIT – I:

Blockchain: The growth of blockchain technology – Distributed systems – The history of blockchain and Bitcoin – Blockchain – Consensus – CAP theorem and blockchain. **Decentralization:** Decentralization using blockchain – Methods of decentralization – Routes to decentralization – Blockchain and full ecosystem decentralization – Pertinent terminology – Platforms for decentralization – Innovative trends.

UNIT – II:

Public Key Cryptography: Asymmetric cryptography – Cryptographic constructs and blockchain technology. **Consensus Algorithms:** Introducing the consensus problem – Analysis and design – Classification – Algorithms – Choosing an algorithm. **Smart Contracts:** History – Definition – Ricardian contracts – Smart contract templates – Oracles – Deploying smart contracts – DAO

UNIT – III:

Bitcoin: Bitcoin—an overview – Cryptographic keys – Transactions – Blockchain – Mining. **Bitcoin Network and Payments:** The Bitcoin network – Wallets – Bitcoin payments –Innovation in Bitcoin – Advanced protocols – Bitcoin investment and buying and selling Bitcoin. **Bitcoin Clients and APIs:** Bitcoin client installation – Experimenting further with bitcoin–cli – Bitcoin programming.

UNIT – IV:

Alternative Coins: Theoretical foundations – Difficulty adjustment and retargeting algorithms – Bitcoin limitations – Extended protocols on top of Bitcoin –Development of altcoins. **Ethereum: Ethereum –** an overview – Ethereum network – Components of the Ethereum ecosystem – Ethereum Virtual Machine (EVM) – Smart contracts. – Blocks and blockchain – Wallets and client – Nodes and miners – APIs, tools, and DApps – Supporting protocols – Programming languages.

UNIT – V:

Development Tools and Frameworks: Languages – Compilers – Tools and libraries – Frameworks – Contract development and deployment – Layout of a Solidity source code file – Solidity language. **Use Cases:** IoT – Government – Health –Finance – Media. **Scalability and Other Challenges:** Scalability – Privacy – Security – Other challenges.

TEXT BOOKS:

Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder. ***Bitcoin and Cryptocurrency Technologies***. Princeton University Press, 2016. ISBN 978–0691171692

REFERENCE BOOKS:

Andreas Antonopoulos, ***Mastering Bitcoin: Programming the open block chain,*** Oreilly Publishers, 2017. ISBN 978–9352135745

DIGITAL TOOLS:

- https://mrcet.com/downloads/digital_notes/CSE/IV%20Year/17062023/BLOCK%20CHAIN%20TECHNOLOGY[R20A0522].pdf
- https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SITA1301.pdf
- https://sjce.ac.in/wp–content/uploads/2021/12/Block–Chain–notes.pdf
- https://www.geeksforgeeks.org/blockchain–technology–introduction/
- https://www.simplilearn.com/tutorials/blockchain–tutorial/blockchain–technology

Mapping of CO with PSO

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

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

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MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

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861

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCAEP8	BLOCKCHAIN TECHNOLOGIES LAB	ELECTIVE – IV PEC – LAB	–	4	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	40	60	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship				✓
	National		Local		Regional		Global				✓
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values		✓

COURSE DESCRIPTION:

This course allows the students to explore the driving force behind the cryptocurrency bitcoin. It will cover blockchain basics like how blockchain works and applications of blockchain.

COURSE OBJECTIVES:

- To teach the basics of Blockchain and apply cryptographic algorithms
- To design, build, and deploy smart contracts and distributed applications,
- To deploy Private Blockchain and smart contracts on Ethereum.
- To understand and deploy cryptocurrencies and their functions in applications
- To implement Blockchain for various use cases.

COURSE OUTCOMES (COs):

On the successful completion of the course, students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	setup your own private Blockchain and deploy smart contracts on Ethereum.	Upto K5
CO 2	gain familiarity and implement with cryptography and Consensus algorithms.	Upto K5
CO 3	create and deploy projects using Web3j.	Upto K5
CO 4	recall and deploy the structure and mechanism of Bitcoin, Ethereum, Hyperledger	Upto K5
CO 5	implement Blockchain for various use cases	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

BLOCKCHAIN TECHNOLOGIES LAB

LIST OF PROGRAMS

1. Create a Public Ledger and Private Ledger with the various attributes like Access, Network Actors, Native token, Security, Speed and examples.
2. Building and Deploying MultiChain private Blockchain
3. Write Hello World smart contract in a higher programming language (Solidity)
4. Construct the Naïve block chain
5. Construct and deploy your contract (Use deploy method)
6. Set up a Regtest environment
7. Build a payment request URI
8. Hashcash implementation
9. Develop a toy application using Blockchain
10. Create simple wallet transaction from one account to another account using Metamask.

DIGITAL TOOLS:

- https://mrcet.com/pdf/Lab%20Manuals/BLOCKCHAIN%20TECHNOLOGY%20Lab%20manual.pdf
- https://www.studocu.com/in/document/university–of–mumbai/blockchain/bc–lab–manual/49769818
- https://metamask.io/
- https://archive.trufflesuite.com/

Mapping of CO with PSO

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

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

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SYLLABUS (Under CBCS based on OBE)

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863

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
25MCACV1	MINI PROJECT	CORE – 11: PCC	–	2	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	40	60	100

Curriculum Design and Development	Employability		✓	Skill Oriented		✓	Entrepreneurship		✓		
	National		Local		Regional		Global			✓	
Curriculum Enrichment	Professional Ethics		Gender		Environment and Sustainability		Human Values		Other Values	✓	

COURSE DESCRIPTION:

This course aims to make the students understand the real time software development environment. The student will gain an in–depth knowledge in the selected problem, and the language/software, which is used by them.

COURSE OBJECTIVES:

- To solve simple real–time problems in the following fields Industry/Academic Institutions/Computer science.
- To help the students do project (Commercial or Technical) individually or combined.

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	have hands of experience on innovation, record keeping, documentation etc. and promote them as entrepreneur.	Upto K5
CO 2	learn to develop solution and apply the technologies learnt during the course in the real–time projects.	Upto K5
CO 3	learn how to plan various work in the project development environments involving deadlines and teamwork.	Upto K5
CO 4	get a chance for preparing for main project.	Upto K5
CO 5	prepare technical report based on the project and deliver seminar on their work.	Upto K5

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3 – APPLY, K4 – ANALYSE, K5– EVALUATE

Mapping of CO with PSO

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

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

Passed in the BoS Meeting held on 27/02/2025 Signature of the Chairman