



# **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 2024-2025 onwards)

628

### **PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)**

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

|              |                                                                                                                                                                                                                                                         |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PEO 1</b> | 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.                           |
| <b>PEO 2</b> | enhance the capacity to strategize, analyze, design, code, test, implement, and maintain software products proficiently.                                                                                                                                |
| <b>PEO 3</b> | cultivate excellence in professionalism, ethical conduct, effective communication, teamwork, and the adoption of cutting– edge ICT tools and techniques.                                                                                                |
| <b>PEO 4</b> | 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. |
| <b>PEO 5</b> | 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.                                                 |
| <b>PEO 6</b> | get strengthened with the abilities needed to initiate entrepreneurial ventures and startup initiatives within various domains of computer science and information technology.                                                                          |



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### **POSTGRADUATE (PG) PROGRAMME OUTCOMES (POs)**

Postgraduate **M.C.A.** is a 2 – year degree Programme with 4 semesters consisting of the following Programme Outcomes (POs) under various criteria including critical thinking, problem solving, effective communication, societal/ citizenship/ ethical credibility, sustainable growth and employable abilities.

|             |                                                                                                                                                                                                                                                                                                                  |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PO 1</b> | <b>Computational Proficiency:</b> Apply foundational knowledge in computing, specialized computing areas, mathematics, and relevant domain expertise to conceptualize and model computing solutions for defined problems and requirements.                                                                       |
| <b>PO 2</b> | <b>Problem Solving Skill:</b> 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.                                               |
| <b>PO 3</b> | <b>Solution Design and Development:</b> 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. |
| <b>PO 4</b> | <b>Investigation of Complex Computing Issues:</b> Employ research– based knowledge and methodologies, including experimental design, data analysis, and information synthesis, to arrive at valid conclusions when investigating intricate computing problems.                                                   |
| <b>PO 5</b> | <b>Modern Tool usage:</b> Utilize, choose, adapt, and apply suitable techniques, resources, and contemporary computing tools proficiently in intricate computing tasks, while recognizing their limitations.                                                                                                     |
| <b>PO 6</b> | <b>Professional Ethics:</b> 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.                                                                                         |



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### **PROGRAMME SPECIFIC OUTCOMES (PSOs)**

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

|              |                                                                                                                                                                                                                                                                                                            |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PSO 1</b> | demonstrate a strong grasp of fundamental concepts in related subjects, encompassing Computer Fundamentals, Computer Programming, and various Network Techniques.                                                                                                                                          |
| <b>PSO 2</b> | 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. |
| <b>PSO 3</b> | apply acquired knowledge from Data Analysis, Software Development, and other relevant areas to effectively design and address interdisciplinary problems.                                                                                                                                                  |
| <b>PSO 4</b> | 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.                                                                 |
| <b>PSO 5</b> | 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.                                                               |
| <b>PSO 6</b> | recognize the importance of and possess the capability for self– directed learning, ensuring continuous development as a computing professional.                                                                                                                                                           |

### **DISTRIBUTION OF CREDITS**

| SEMESTER | COURSES                   | NUMBER OF COURSES | HOURS | CREDITS | TOTAL CREDITS |
|----------|---------------------------|-------------------|-------|---------|---------------|
| I– IV    | CORE                      | 15                | 4     | 2– 4    | 49            |
| IV       | CORE PROJECT              | 1                 | 20    | 10      | 10            |
| I– IV    | ELECTIVE                  | 8                 | 2 – 4 | 2 – 4   | 22            |
| I– II    | SEC                       | 2                 | 2     | 2       | 4             |
| III      | NON– MAJOR ELECTIVE (NME) | 1                 | 4     | 3       | 3             |
| III      | EXTENSION ACTIVITIES      | 1                 | –     | 1       | 1             |
| II       | MINI PROJECT              | 1                 | 2     | 2       | 2             |
| IV       | SELF – STUDY (OPTIONAL)   | 2                 | –     | 1       | (2)           |
|          | <b>TOTAL</b>              |                   |       |         | <b>91 (2)</b> |

Extra credits may be earned through SWAYAM Courses/other online courses

Passed in the BoS Meeting held on 27/02/2025

Signature of the Chairman



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## MASTER OF COMPUTER APPLICATIONS

### COURSE STRUCTURE – I SEMESTER

| S. No. | Course Code                | Course Title                                                            | Hrs./ Week | Exam (Hrs.) | CA | SE | Total Marks | Credits   |
|--------|----------------------------|-------------------------------------------------------------------------|------------|-------------|----|----|-------------|-----------|
| 1.     | 24MCAC11                   | <b>Core – 1: PCC</b><br>Discrete Mathematics                            | 4          | 3           | 25 | 75 | 100         | 4         |
| 2.     | 24MCAC12                   | <b>Core – 2: PCC</b><br>Data Structures and Algorithms                  | 4          | 3           | 25 | 75 | 100         | 4         |
| 3.     | 24MCAC13                   | <b>Core – 3: PCC</b><br>Relational Data Base Management System          | 4          | 3           | 25 | 75 | 100         | 4         |
| 4.     | 24MCACP1                   | <b>Core – 4: PCC</b><br>Data Structures and Algorithms using Python Lab | 4          | 3           | 40 | 60 | 100         | 2         |
| 5.     | 24MCACP2                   | <b>Core – 5: PCC</b><br>Relational Data Base Management System Lab      | 4          | 3           | 40 | 60 | 100         | 2         |
| 6.     | 24MCASP1                   | <b>SEC – 1:</b><br>Soft Skill Development Lab                           | 2          | 3           | 40 | 60 | 100         | 2         |
| 7.     | <b>Elective – I*: PEC</b>  |                                                                         | 4          | 3           | 25 | 75 | 100         | 4         |
|        | 24MCAE11                   | Internet of Things                                                      |            |             |    |    |             |           |
|        | 24MCAE12                   | Digital Marketing                                                       |            |             |    |    |             |           |
|        | 24MCAE13                   | Cyber Security                                                          |            |             |    |    |             |           |
| 8.     | <b>Elective – II*: PEC</b> |                                                                         | 4          | 3           | 40 | 60 | 100         | 2         |
|        | 24MCAEP1                   | Internet of Things Lab                                                  |            |             |    |    |             |           |
|        | 24MCAEP2                   | Digital Marketing Lab                                                   |            |             |    |    |             |           |
|        | 24MCAEP3                   | Cyber Forensics Lab                                                     |            |             |    |    |             |           |
|        |                            | <b>Total</b>                                                            | <b>30</b>  |             |    |    | <b>800</b>  | <b>24</b> |

\*One elective course to be chosen from THREE courses



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### II – SEMESTER

| S. No. | Course Code                  | Course Title                                             | Hrs. / Week | Exam (Hrs.) | CA | SE  | Total Marks | Credits   |
|--------|------------------------------|----------------------------------------------------------|-------------|-------------|----|-----|-------------|-----------|
| 1.     | 24MCAC21                     | <b>Core – 6: PCC</b><br>Advanced Java Programming        | 4           | 3           | 25 | 75  | 100         | 4         |
| 2.     | 24MCAC22                     | <b>Core – 7: PCC</b><br>Linux and Shell Programming      | 4           | 3           | 25 | 75  | 100         | 4         |
| 3.     | 24MCAC23                     | <b>Core – 8: PCC</b><br>Big Data Analytics               | 4           | 3           | 25 | 75  | 100         | 4         |
| 4.     | 24MCACP3                     | <b>Core – 9: PCC</b><br>Advanced Java Programming Lab    | 4           | 3           | 40 | 60  | 100         | 2         |
| 5.     | 24MCACP4                     | <b>Core – 10: PCC</b><br>Linux and Shell Programming Lab | 4           | 3           | 40 | 60  | 100         | 2         |
| 6.     | <b>Elective – III**: PEC</b> |                                                          | 4           | 3           | 25 | 75  | 100         | 4         |
|        | 24MCAE21                     | Soft Computing                                           |             |             |    |     |             |           |
|        | 24MCAE22                     | Social Networks                                          |             |             |    |     |             |           |
|        | 24MCAE23                     | Cryptography                                             |             |             |    |     |             |           |
| 7.     | <b>Elective – IV**: PEC</b>  |                                                          | 4           | 3           | 40 | 60  | 100         | 2         |
|        | 24MCAEP4                     | Soft Computing Lab                                       |             |             |    |     |             |           |
|        | 24MCAEP5                     | Social Networks Lab                                      |             |             |    |     |             |           |
|        | 24MCAEP6                     | Cryptography Lab                                         |             |             |    |     |             |           |
| 8.     | 24MCACV1                     | Mini– Project                                            | 2           | 3           | 40 | 60  | 100         | 2         |
| 9.     |                              | <b>*SWAYAM/NPTEL</b>                                     | –           | –           | –  | 100 | 100         | 1         |
|        |                              | <b>Total</b>                                             | <b>30</b>   |             |    |     | <b>800</b>  | <b>24</b> |

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**\*Extra– Credit Course**



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### III – SEMESTER

| S. No. | Course Code | Course Title                                                      | Hrs. / Week | Exam (Hrs.) | CA | SE  | Total Marks | Credits |
|--------|-------------|-------------------------------------------------------------------|-------------|-------------|----|-----|-------------|---------|
| 1.     | 24MCAC31    | <b>Core – 11: PCC</b><br>Advanced Machine Learning (AML)          | 4           | 3           | 25 | 75  | 100         | 4       |
| 2.     | 24MCAC32    | <b>Core – 12: PCC</b><br>Data Communication and Computer Networks | 4           | 3           | 25 | 75  | 100         | 4       |
| 3.     | 24MCAC33    | <b>Core – 13: PCC</b><br>Web Technology                           | 4           | 3           | 25 | 75  | 100         | 4       |
| 4.     | 24MCACP5    | <b>Core – 14: PCC</b><br>Advanced Machine Learning Lab            | 4           | 3           | 40 | 60  | 100         | 2       |
| 5.     |             | <b>Elective – V*: PEC</b>                                         | 4           | 3           | 25 | 75  | 100         | 3       |
|        | 24MCAE31    | Software Project Management                                       |             |             |    |     |             |         |
|        | 24MCAE32    | Block chain Technologies                                          |             |             |    |     |             |         |
|        | 24MCAE33    | Data Engineering and Management                                   |             |             |    |     |             |         |
| 6.     |             | <b>Elective – VI*: PEC</b>                                        | 4           | 3           | 40 | 60  | 100         | 2       |
|        | 24MCAEP7    | Web Technology Lab                                                |             |             |    |     |             |         |
|        | 24MCAEP8    | Block chain Technologies Lab                                      |             |             |    |     |             |         |
|        | 24MCAEP9    | Data Engineering and Management Lab                               |             |             |    |     |             |         |
| 7.     | 24MCAN31    | <b>NME</b><br>Content Management System                           | 4           | 3           | 25 | 75  | 100         | 3       |
| 8.     | 24MCAS31    | <b>SEC– 2:</b><br>Research Methodology and IPR                    | 2           | 3           | 25 | 75  | 100         | 2       |
| 9.     | 24MCAZ31    | <i>Fundamentals of Human Rights Self – Study (Optional)</i>       | –           | –           | –  | 100 | 100         | 1       |
| 10.    | 24MCAEA1    | <b>Extension Activities</b>                                       | –           | –           | –  | 100 | 100         | 1       |
|        |             | <b>Total</b>                                                      | 30          |             |    |     | 800         | 25 (26) |

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#### IV – SEMESTER

| S. No. | Course Code | Course Title                                                                     | Hrs. / Week | Exam (Hrs.) | CA | SE  | Total Marks | Credits        |
|--------|-------------|----------------------------------------------------------------------------------|-------------|-------------|----|-----|-------------|----------------|
| 1.     | 24MCAC41    | <b>Core – 15: PCC</b><br>Industry Dynamics<br>Technology – Data<br>Visualisation | 4           | 3           | 25 | 75  | 100         | 3              |
| 2.     |             | <b>Elective VII: PEC</b>                                                         | 4           | 3           | 25 | 75  | 100         | 3              |
|        | 24MCAE41    | Computer Vision                                                                  |             |             |    |     |             |                |
|        | 24MCAE42    | Software<br>Development<br>Technologies                                          |             |             |    |     |             |                |
|        | 24MCAE43    | High Performance<br>Computing                                                    |             |             |    |     |             |                |
| 3.     |             | <b>Elective VIII**:<br/>PEC</b>                                                  | 2           | 3           | 40 | 60  | 100         | 2              |
|        | 24MCAEP10   | Computer Vision<br>Lab                                                           |             |             |    |     |             |                |
|        | 24MCAEP11   | Software<br>Development<br>Technologies Lab                                      |             |             |    |     |             |                |
|        | 24MCAEP12   | High Performance<br>Computing Lab                                                |             |             |    |     |             |                |
| 4.     | 24MCACV2    | <b>Core – 16: PCC</b><br>Project                                                 | 20          | 3           | 40 | 60  | 100         | 10             |
| 5.     | 24MCAZ41    | <i>*Women<br/>Empowerment<br/>Self – Study<br/>(Optional)</i>                    | –           | –           | –  | 100 | 100         | 1              |
|        |             | <b>Total</b>                                                                     | <b>30</b>   |             |    |     | <b>400</b>  | <b>18 (19)</b> |

- Extra– Credit Course (Self – Study Course)

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### COURSE STRUCTURE – III SEMESTER

| S. No. | Course Code | Course Title                                                      | Hrs. / Week | Exam (Hrs.) | CA | SE  | Total Marks | Credits |
|--------|-------------|-------------------------------------------------------------------|-------------|-------------|----|-----|-------------|---------|
| 1.     | 24MCAC31    | <b>Core – 11: PCC</b><br>Advanced Machine Learning (AML)          | 4           | 3           | 25 | 75  | 100         | 4       |
| 2.     | 24MCAC32    | <b>Core – 12: PCC</b><br>Data Communication and Computer Networks | 4           | 3           | 25 | 75  | 100         | 4       |
| 3.     | 24MCAC33    | <b>Core – 13: PCC</b><br>Web Technology                           | 4           | 3           | 25 | 75  | 100         | 4       |
| 4.     | 24MCACP5    | <b>Core – 14: PCC</b><br>Advanced Machine Learning Lab            | 4           | 3           | 40 | 60  | 100         | 2       |
| 5.     |             | <b>Elective – V*: PEC</b>                                         | 4           | 3           | 25 | 75  | 100         | 3       |
|        | 24MCAE31    | Software Project Management                                       |             |             |    |     |             |         |
|        | 24MCAE32    | Block chain Technologies                                          |             |             |    |     |             |         |
|        | 24MCAE33    | Data Engineering and Management                                   |             |             |    |     |             |         |
| 6.     |             | <b>Elective – VI*: PEC</b>                                        | 4           | 3           | 40 | 60  | 100         | 2       |
|        | 24MCAEP7    | Web Technology Lab                                                |             |             |    |     |             |         |
|        | 24MCAEP8    | Block chain Technologies Lab                                      |             |             |    |     |             |         |
|        | 24MCAEP9    | Data Engineering and Management Lab                               |             |             |    |     |             |         |
| 7.     | 24MCAN31    | <b>NME</b><br>Content Management System                           | 4           | 3           | 25 | 75  | 100         | 3       |
| 8.     | 24MCAS31    | <b>SEC– 2:</b><br>Research Methodology and IPR                    | 2           | 3           | 25 | 75  | 100         | 2       |
| 9.     | 24MCAZ31    | <i>Fundamentals of Human Rights Self– Study (Optional)</i>        | –           | –           | –  | 100 | 100         | 1       |
| 10.    | 24MCAEA1    | <b>Extension Activities</b>                                       | –           | –           | –  | 100 | 100         | 1       |
|        |             | <b>Total</b>                                                      | 30          |             |    |     | 800         | 25 (26) |

\*One elective course to be chosen from THREE 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

Passed in the BoS Meeting held on 27/02/2025

Signature of the Chairman





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| COURSE CODE | COURSE TITLE                    | CATEGORY         | T | P | CREDITS |
|-------------|---------------------------------|------------------|---|---|---------|
| 24MCAC31    | ADVANCED MACHINE LEARNING (AML) | CORE – 11<br>PCC | 4 | – | 4       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | III      | 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 recent advances in machine learning and covers a range of topics, including theoretical foundations, and practical applications. It is designed to help the students' master cutting-edge machine learning algorithms, deep learning frameworks, and AI applications.

#### COURSE OBJECTIVES:

- To teach the concepts of Machine Learning
- To teach the theoretical and practical aspects of types of machine learning
- To teach supervised learning and their applications
- To teach the concepts and algorithms of unsupervised learning.
- To appreciate the concepts and algorithms of deep learning

#### COURSE OUTCOMES (COs):

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

| No.  | Course Outcomes                                                                                    | Knowledge Level<br>(According to Bloom's Taxonomy) |
|------|----------------------------------------------------------------------------------------------------|----------------------------------------------------|
| CO 1 | understand, impart and analyze the concepts and of Machine Learning Techniques and types of data   | Upto K5                                            |
| CO 2 | comprehend, apply and evaluate the classification techniques for real-world applications           | Upto K5                                            |
| CO 3 | understand, use and perform evaluation of Regression methods                                       | Upto K5                                            |
| CO 4 | recognize, implement and analyse the unsupervised techniques for real-world applications           | Upto K5                                            |
| CO 5 | understand, identify, implement and review the deep learning techniques for real-time applications | Upto K5                                            |

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



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#### ADVANCED MACHINE LEARNING (AML)

##### UNIT – I:

**Introducing Machine Learning:** The Origins of Machine Learning, Uses and Abuses of Machine Learning \_ Basics of Machine Learning Algorithm Model Works – Steps to apply Machine Learning – Choosing a Machine Learning Algorithm – Using Machine Learning concepts. **Managing and Understanding Data:** Data Structures, Vectors And Factors: Lists, Data frames, Matrixes and arrays – Managing Data – Exploring and Understanding Data: Exploring the Structure of Data, Exploring Numeric variables – Exploring Categorical Variables– Exploring Relationships between Variables.

##### UNIT – II:

Lazy Learning – **Classification Using Nearest Neighbors:** The kNN Algorithm– Diagnosing Breast Cancer with the kNN Algorithm– Probabilistic Learning – Classification Using Naive Bayes: Basic concepts of Bayesian Methods– The Naïve Bayes Algorithm– Example – filtering Mobile Phone Spam with the Naive Bayes Algorithm. Divide and Conquer – **Classification Using Decision Trees and Rules:** Understanding Decision Trees– Example – Identifying Risky Bank Loans using C5.0 Decision Trees– Understanding Classification Rules– Example – Identifying Poisonous Mushrooms with Rule Learners.

##### UNIT – III:

Forecasting Numeric Data – **Regression Methods:** Understanding Regression– Example – Predicting Medical Expenses using Linear Regression– Understanding Regression Trees and Model Trees– Example – Estimating the Quality of Wines with Regression Trees and Model Trees. Black Box Methods Neural Networks and Support Vector Machines: Understanding Neural Networks, from Biological to Artificial Neurons, Activation Functions, Network Topology, Training Neural Networks with Backpropagation – Modeling the Strength of Concrete with ANNs– Understanding Support Vector Machines– Performing OCR with SVMs– Finding Patterns – Market Basket Analysis Using Association Rules: Understanding Association Rules– Example – Identifying Frequently Purchased Groceries with Association Rules.

##### UNIT – IV:

Finding Groups of Data – **Clustering with K-Means:** Understanding Clustering– The k-means Algorithm for clustering– Finding teen market segments using k-means Clustering– Evaluating Model Performance: Measuring Performance for Classification– Beyond Accuracy – other Measures of Performance, Visualizing Performance Tradeoffs. **Improving Model Performance:** Tuning Stock Models for Better Performance–Using Caret for Automated Parameter Tuning– Creating a simple Tuned Model– Customizing the Tuning Process– Improving Model Performance with meta-learning– Understanding Ensembles– Bagging– Boosting– Random forests.

##### UNIT – V:

**Introduction to Deep Learning:** Introduction to Deep Learning, Single Layer Perceptron Model (SLP), Multilayer Perceptron Model (MLP), Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), Restricted Boltzmann Machines (RBMs).

**Convolutional Neural Networks (CNNs):** Structure and Properties of CNNs – Components of CNN Architectures– Convolutional Layer, Pooling Layer, Rectified Linear Units (ReLU) Layer, Fully Connected (FC) Layer, Loss Layer – Tuning Parameters, Notable CNN Architectures, Regularization– Recurrent Neural Networks (RNNs): Fully Recurrent Networks, Training RNNs with Back-Propagation Through Time (BPPT)– Elman Neural Networks, Neural History Compressor, Long Short-Term Memory (LSTM), Traditional and Training LSTMs – Structural Damping Within RNNs, Tuning Parameter Update Algorithm.



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#### TEXT BOOKS:

1. Brett Lantz, *Machine Learning with R*, Addison–Wesley Packt Publishing, 2013.
2. Taweh Beysolow, *Introduction to Deep Learning Using R: A Step-by-Step Guide to Learning and Implementing Deep Learning Models Using R*, San Francisco, California, USA, 2017.

#### REFERENCE BOOKS:

1. Daniel T. Larose, Chantal D. Larose, *Data Mining and Predictive Analytics*, Second Ed., Wiley Publication, 2015.
2. Bertt Lantz, *Machine Learning With R: Expert Techniques for Predictive Modeling*, 3<sup>rd</sup> Edition, April 15, 2019,
3. Jason Bell, *Machine Learning: Hands–On for Developers and Technical Professionals*, Wiley Publication, 2015.

#### DIGITAL TOOLS:

Web links and Video Lectures (e– Resources):

- <https://www.analyticsvidhya.com/blog/2024/05/machine-learning-resources-for-self-study/>
- <https://www.tensorflow.org/resources/learn-ml/theoretical-and-advanced-machine-learning>
- <https://www.cs.cornell.edu/courses/cs6780/2010fa/lectures.html>
- [https://mrcet.com/downloads/digital\\_notes/CSE/IV%20Year/MACHINE%20LEARNING\(R17A0534\).pdf](https://mrcet.com/downloads/digital_notes/CSE/IV%20Year/MACHINE%20LEARNING(R17A0534).pdf)

#### Mapping of CO with PSO

|     | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 |
|-----|------|------|------|------|------|------|
| CO1 | 3    | 3    | –    | –    | 3    | 1    |
| CO2 | 3    | 3    | 2    | –    | 3    | 1    |
| CO3 | 3    | 3    | 3    | –    | 3    | 1    |
| CO4 | 3    | 3    | 2    | –    | 3    | 1    |
| CO5 | 3    | 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 2024-2025 onwards)

639

| COURSE CODE | COURSE TITLE                             | CATEGORY      | T | P | CREDITS |
|-------------|------------------------------------------|---------------|---|---|---------|
| 24MCAC32    | DATA COMMUNICATION AND COMPUTER NETWORKS | CORE – 12 PCC | 4 | – | 4       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | III      | 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:

Students will learn about different network architectures, protocols, and technologies that enable communication and data exchange between computers and devices in a network.

#### COURSE OBJECTIVES:

##### To make the students

- understand the properties of digital and analog signals, functionality of different layers in OSI and TCP/IP network models and the factors which impact performance of data communication systems
- understand the analog and digital transmission, properties of communication medias, and the concept of multiplexing of data on common communication channel
- understand different switching circuits, link layer addressing and exemplify the different coding methods and error detection and correction methods for digital data.
- understand data link protocols and different media access control.
- understand the architecture of wired and wireless Local Area Networks (LANs).

#### 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 components of a data communications system                         | Upto K5                                         |
| CO 2 | identify key considerations in selecting various transmission media in networks   | Upto K5                                         |
| CO 3 | learn the role of digital communications devices in a data communications network | Upto K5                                         |
| CO 4 | describe the various types of signals and their features                          | Upto K5                                         |
| CO 5 | use the various error detection and correction schemes                            | Upto K5                                         |

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



# **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 2024-2025 onwards)

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#### **DATA COMMUNICATION AND COMPUTER NETWORKS**

##### **UNIT – I: INTRODUCTION**

Data Communication – Networks – Distributed Processing, Network criteria, Applications – Protocols and Standards, – Standards Organizations – Standards Creation committees, Forums, Regulatory Agencies. Basic Concepts: Line Configuration – Point-to-Point, Multipoint – Topology – Mesh, Star, Tree, Bus, Ring, Hybrid Topologies – Transmission Mode – Simplex, Half-Duplex – Full Duplex – Categories of Networks – LAN, WAN, MAN – Internetworks. The OSI Model: The Model – Functions of the Layers.

##### **UNIT – II: TRANSMISSION OF DIGITAL DATA**

Interfaces and Modems: Digital Data Transmission – Parallel Transmission, Serial Transmission – Transmission Media: Guided Media – Twisted-Pair Cable, Coaxial Cable, Optical Fiber – Unguided Media – Radio Frequency Allocation, Propagation of Radio Waves, Terrestrial Microwave, Satellite Communication, Cellular Telephony. Error Detection and Correction: Types of Errors, Detection, Vertical Redundancy Check, Longitudinal Redundancy Check, Cyclic Redundancy Check, Checksum, Error Correction.

##### **UNIT – III: DATA LINK CONTROL**

Line Discipline – ENQ/ACKJ, Poll/Select – Flow Control – Stop-and-Wait, Sliding Window – Error Control – Automatic Repeat Request, Stop-and-Wait ARQ, Sliding Window ARQ. Switching: Circuit Switching – Space-Division Switches, Time-Division Switches, TDM Bus, Space-and Time division switching combinations, Public switched telephone network – Packet Switching – Datagram Approach, Virtual circuit approach, Circuit-switched connection versus virtual-circuit connection – Message Switching.

##### **UNIT – IV: LOCAL AREA NETWORKS**

Project 802 – IEEE 802, LLC, MAC, PDU – Ethernet – Access method: CSMA/CD, Addressing, Electrical specifications, Frame format, Implementation – Other Ethernet Networks – Switched Ethernet, Fast Ethernet, Gigabit Ethernet – Token Bus – Token Ring – Access method: Token passing, Addressing, Electrical specifications, Frame format, Implementation – FDDI – Access method: Token passing, Addressing, Electrical specifications, Frame format, Implementation – Comparison.

Metropolitan Area Networks: IEEE 802.6 (DQDB) – Access method: Dual Bus, Distributed Queues – Ring Configuration – Operation, and Implementation. Networking and Internetworking Devices: Repeaters – Bridges – Routers – Gateways – Other Devices – Multiprotocol Routers, Brouters, Switches, Routing Switches.

##### **UNIT – V: NETWORK SECURITY**

Security Attacks – Security Services – A model for network security Symmetric encryption principles – Symmetric block encryption algorithms – Public-Key cryptography Principles – Public-Key cryptography algorithms – X.509 certificates.



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### SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2024-2025 onwards)

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#### TEXT BOOKS:

1. *Data Communications and Networking*, Behrouz A. Forouzan, Tata McGraw Hill Publishing Company Limited, New Delhi, 2<sup>nd</sup> Edition, Third Reprint 2001.
2. *Network Security Essentials: Applications and Standards*, William Stallings, Pearson Education Publications, 4<sup>th</sup> Edition, Second Impression 2012.

#### REFERENCE BOOKS:

1. *Computer Networks*, Andrew S. Tanenbaum, Prentice Hall of India, 4<sup>th</sup> Edition, 2006.
2. *Communication Networks–Fundamental Concepts and key architectures*, Alberto Leon Garcia and Indra Widjaja, Tata Mc–Graw–Hill 2<sup>nd</sup> Edition, Pearson Edition, 2014.

#### DIGITAL TOOLS:

Web links and Video Lectures (e– Resources):

- [https://www.tutorialspoint.com/data\\_communication\\_computer\\_network/computer\\_network\\_types.html](https://www.tutorialspoint.com/data_communication_computer_network/computer_network_types.html)
- <https://www.geeksforgeeks.org/network-and-communication/>
- [https://igitsarang.ac.in/assets/documents/coursematerial/4th\\_etc\\_dccn\\_1702714591.pdf](https://igitsarang.ac.in/assets/documents/coursematerial/4th_etc_dccn_1702714591.pdf)
- [https://www.cet.edu.in/noticefiles/265\\_DCCN%20Lecture%20Notes.pdf](https://www.cet.edu.in/noticefiles/265_DCCN%20Lecture%20Notes.pdf)

#### Mapping of CO with PSO

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

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 2024-2025 onwards)

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| COURSE CODE | COURSE TITLE   | CATEGORY         | T | P | CREDITS |
|-------------|----------------|------------------|---|---|---------|
| 24MCAC33    | WEB TECHNOLOGY | CORE – 13<br>PCC | 4 | – | 4       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | III      | 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 helps to understand the basics in internet technology. It enables students to create, design and develop dynamic web sites using HTML, Jav Script, CSS, XHTML, XML, PHP, Angular JS and jQuery.

#### COURSE OBJECTIVES:

To

- make the students understand the fundamentals of the web and thereby develop web applications using various development languages and tools.
- enrich knowledge about XHTML control and Cascading Style Sheets.
- provide in– depth knowledge about Java script.
- enhance knowledge in XML documents with presentations using CSS and XSLT.
- deliver deep knowledge about PHP, Angular JS, jQuery.

#### 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 | design dynamic web pages using Javascript, JQuery and Angular Java script | Upto K5                                         |
| CO 2 | develop Web pages using HTML, CSS and XML                                 | Upto K5                                         |
| CO 3 | create web application using PHP and MySQL                                | Upto K5                                         |
| CO 4 | design dynamic web pages using Angular javascript                         | Upto K5                                         |
| CO 5 | develop interactive web pages using JQuery                                | Upto K5                                         |

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



# **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 2024-2025 onwards)

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#### **WEB TECHNOLOGY**

##### **UNIT – I: WEB FUNDAMENTALS AND HTML**

A Brief Introduction to the Internet – The World Wide Web – Web Browsers – Web Servers –URLs, MIME, HTTP, Security– Introduction to HTML– Origins and Evolution of HTML and HTML – Basic Syntax – Standard HTML Document Structure – Basic Text Markup – Images– Hypertext Links – Lists, Tables, Forms, The Audio Element, The Video Element – Organization Elements, The Time Element

##### **UNIT – II: INTRODUCTION TO XHTML AND CSS**

Basic syntax, Standard structure, Basic text–markup, Images, Hypertext Links. Lists, Tables, Forms, Frames, syntactic differences between HTML and XHTML–Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The box model, Background images, The<span> and <div>tags, Conflict resolution.

##### **UNIT – III: THE BASICS OF JAVASCRIPT**

Overview of JavaScript, Object orientation and JavaScript, general Syntactic characteristics, Primitives, operations, and expressions, Screen output and keyboard input, Control statements, Object creation and modification, Arrays, Functions, Constructors, Pattern matching using regular expressions, Errors in scripts.

**JAVASCRIPT AND XHTML DOCUMENTS:** The JavaScript Execution Environment, The Document Object Model, Elements Access in Java Script, Events and Event Handling, Handling Events from Body Elements, Handling Events from Text Box and password Elements, The DOM2 Model

##### **UNIT – IV: DYNAMIC DOCUMENTS WITH JAVASCRIPT AND XML**

Introduction, Positioning Elements, Moving Elements, Element Visibility, Changing Color and Fonts, Dynamic Content, Stacking Elements, Locating the Mouse Cursor, Reacting to a Mouse Click, Slow Movement of Elements, Dragging and Dropping Elements. Introduction to XML, Syntax of XML, XML Document Structure, Document type definitions, Namespaces, XML schemas, displaying raw XML documents, Displaying XML documents with CSS, XSLT Style Sheets, Web services.

##### **UNIT – V: PHP, ANGULAR JS AND JQUERY**

Introduction to PHP: Overview of PHP –General Syntactic Characteristics – Primitives, Operations, and Expressions – Output – Control Statements – Arrays – Functions – Pattern Matching – Form Handling – Cookies – Session Tracking – Introduction to JQuery, Syntax, selectors, events, JQuery HTML, JQuery Effects, JQuery CSS. Introduction to Angular JS, Directives, Expressions, Controllers, Filters, Services, Events, Forms, Validations, Examples.





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### SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2024-2025 onwards)

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#### TEXT BOOKS:

1. Robert W. Sebesta: *Programming the World Wide Web*, 8<sup>th</sup> Edition, Pearson education, 2015. **UNITS:** 1,2,3,4
2. Dayley Brad, Dayley Brendan, *AngularJS, JavaScript, and jQuery All in One*, Sams Teach Yourself 1<sup>st</sup> Edition, Kindle Edition, 2015. **UNIT:** 5

#### REFERENCE BOOKS:

1. M. Srinivasan: *Web Programming Building Internet Applications*, 3<sup>rd</sup> Edition, Wiley India, 2009.
2. Jeffrey C. Jackson: *Web Technologies—A Computer Science Perspective*, Pearson Education, 7<sup>th</sup> Impression, 2012.
3. Chris Bates: *Web Technology Theory and Practice*, Pearson Education, 2012.
4. Raj Kamal: *Internet and Web Technologies*, McGraw Hill Education.

#### DIGITAL TOOLS:

Web links and Video Lectures (e– Resources):

- <https://www.geeksforgeeks.org/web-technology>
- <https://www.w3schools.com>
- <https://www.rgmcet.edu.in/assets/img/departments/CSE/materials/R15/3-2/Web%20Technologies.pdf>
- <https://www.recw.ac.in/v1.8/wp-content/uploads/2021/04/WIT-Unit-1.pdf>

#### Mapping of CO with PSO

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

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 2024-2025 onwards)

645

| COURSE CODE | COURSE TITLE                  | CATEGORY               | T | P | CREDITS |
|-------------|-------------------------------|------------------------|---|---|---------|
| 24MCACP5    | ADVANCED MACHINE LEARNING LAB | CORE – 14<br>PCC – LAB | – | 4 | 2       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | III      | 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 cover regression, classification, and convolutional neural networks (CNNs), building and fine-tuning models, understanding loss functions, and using optimizers for accuracy through hands-on-coding.

#### COURSE OBJECTIVES:

- To formulate machine learning problems corresponding to different applications.
- To make the students understand a range of machine learning algorithms along with their strengths and weaknesses.
- To apply machine learning algorithms to solve problems of moderate complexity.
- To apply CNN to solve problems of moderate complexity.
- To apply LSTM and RNN to solve problems.

#### 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 implement the mathematical and statistical prospective of machine learning algorithms through python programming | Upto K5                                         |
| CO 2 | recognize and develop the machine learning models through python in built functions                                             | Upto K5                                         |
| CO 3 | understand, impart and develop the machine learning models for real-time dataset                                                | Upto K5                                         |
| CO 4 | comprehend , impart and implement the deep learning models for real-time applications                                           | Upto K5                                         |
| CO 5 | identify and evaluate the performance machine learning models for real-time dataset                                             | Upto K5                                         |

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



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### **SYLLABUS (Under CBCS based on OBE)**

(For the students admitted from the academic year 2024-2025 onwards)

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#### **ADVANCED MACHINE LEARNING LAB**

##### **LIST OF PROGRAMS:**

1. Write a python program to compute the Central Tendency Measures: Mean, Median, Mode, Measure of Dispersion: Variance, Standard Deviation
2. Implement a Linear Regression and Multiple Linear Regression with a Real Dataset
3. Implementation of Logistic Regression using sklearn
4. Implement a binary classification model.
5. Classification with Nearest Neighbours and NavieBaye Algorithm
6. Implementation Decision tree for classification using sklearn and its parameter tuning
7. Implement the k-means algorithm.
8. Implement an Image Classifier using CNN in TensorFlow/ Keras.
9. Implement an Auto encoder in TensorFlow/Keras.
10. Implement a Simple LSTM using TensorFlow/Keras.

##### **DIGITAL TOOLS:**

- [https://www.w3schools.com/python/python\\_ml\\_mean\\_median\\_mode.asp](https://www.w3schools.com/python/python_ml_mean_median_mode.asp)
- [https://mlritm.ac.in/assets/cse/cse\\_lab\\_manuals/R20\\_cse\\_manuals/MACHINE%20LEARNING%20LAB%20MANUAL.pdf](https://mlritm.ac.in/assets/cse/cse_lab_manuals/R20_cse_manuals/MACHINE%20LEARNING%20LAB%20MANUAL.pdf)
- <https://www.coursehero.com/file/225633340/ML-autonomous-manualpdf/>

#### **Mapping of CO with PSO**

| COs | 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



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### SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2024-2025 onwards)

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| COURSE CODE | COURSE TITLE                | CATEGORY            | T | P | CREDITS |
|-------------|-----------------------------|---------------------|---|---|---------|
| 24MCAE31    | SOFTWARE PROJECT MANAGEMENT | ELECTIVE – V<br>PEC | 4 | – | 3       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | III      | 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 the primary important concepts of project management related to managing software development projects. Students will also get familiar with the different activities involved in Software Project Management. It highlights Software Project planning, quality, cost estimation, metrics, evaluation and management.

#### COURSE OBJECTIVES:

- To provide in depth knowledge about the basic concepts of software project management, project planning and Step Wise framework in project planning.
- To discuss the Project planning, cost benefit.
- To inculcate continual training and learning to improve group working.

#### COURSE OUTCOMES:

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

| No.  | Course Outcomes                                                                         | Knowledge Level<br>(According to Bloom's Taxonomy) |
|------|-----------------------------------------------------------------------------------------|----------------------------------------------------|
| CO 1 | understand the fundamentals of Software Project Management                              | Upto K5                                            |
| CO 2 | understand the Project Evaluation by Strategic, Technical and Cost analysis             | Upto K5                                            |
| CO 3 | understand the fundamentals of Software effort estimations                              | Upto K5                                            |
| CO 4 | understand the Risk Management, risk analysis and monitoring                            | Upto K5                                            |
| CO 5 | understanding the various types of contracts and the Organizational Behavior Background | Upto K5                                            |

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



# **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 2024-2025 onwards)

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#### **SOFTWARE PROJECT MANAGEMENT**

##### **UNIT – I:**

Introduction: Software Project Management – Software Project Versus Other Project – Requirement Specification – Information and Control in Organization –Introduction to step wise Project Planning –Select – Identify Scope and Objectives –Identify Project Infrastructure – Analyse Project Characteristics – Products and Activities – Estimate Effort for each Activity – Identify Activity Risks – Allocate Resources – Review / Publicize Plan – Execute Plan and Lower Levels of Planning.

##### **UNIT – II:**

Project Evaluation: Introduction –Strategic Assessment – Technical Assessment – Cost Benefit Analysis –Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation –Selection of an Appropriate Project Approach – Choosing Technologies – Choice of Process Models –Structured Methods – Rapid Application Development – Waterfall Model –V-Process Model –Spiral Model – Software Prototyping –Ways of Categorizing Prototypes –Tools –Incremental Delivery –Selection Process Model.

##### **UNIT – III:**

Software Effort Estimation: Introduction – Problems with Over and Under Estimates – Basis for Software Estimating – Software Effort Estimation Technique –Albrecht Function Point Analysis –Function Points –Object Points –Procedural Code Oriented Approach –COCOMO –Activity Planning –Project Schedules –Projects and activities –Sequencing and Scheduling Activities –Network Planning Models –Formulating a Network Planning – Adding Time Dimension –Forward Pass – Backward Pass –Identifying the Critical Path – Activity Float –Shortening Project Duration –Identifying Critical Activities –Precedence Networks

##### **UNIT – IV:**

Risk Management: Introduction –Nature of Risk Management Identification –Analysis – Reducing –Evaluating –Z values –Resource Allocation –Nature of Resources – Requirements –Scheduling –Critical Paths – Counting the Cost –Resource Schedule –Cost Schedule –Scheduling Sequence –Monitoring and Control –Creating the Framework – Collecting the Data –Visualizing the Progress –Cost Monitoring –Prioritizing Monitoring –Change Control

##### **UNIT – V:**

Managing Contracts: Introduction –Types of Contract –Stages in Contract Placement – Terms of Contract –Contract Management – Acceptance –Managing People and Organizing Teams –Organizational Behavior Background –Selecting the Right Person for the Job –Instruction in the Best Methods – Motivation –Decision Making –Leadership – Organizational Structures –Software Quality –Importance –Practical Measures –Product.



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### SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2024-2025 onwards)

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#### TEXT BOOKS:

1. Bob Hughes, Mike Cotterell, *Software Project Management*, The McGraw-Hill Companies, 2017.
2. Richard Thayers, *Software Engineering Project Management*, Wiley, 2<sup>nd</sup> Edition 2014.
3. Robert K. Wysocki, *Effective Software Project Management*, Wiley, 2010

#### REFERENCE BOOKS:

1. Walker Royce, *Software Project Management*, Addison Wesley, 2000.
2. DerrellInce, H. Sharp and M. Woodman, *Introduction to Software Project Management and Quality Assurance*, Tata McGraw Hill, 1995.

#### DIGITAL TOOLS:

- <https://nptel.ac.in/courses/106/105/106105218/>
- [https://swayam.gov.in/nd1\\_noc19\\_cs70/preview](https://swayam.gov.in/nd1_noc19_cs70/preview)
- <https://freevideolectures.com/course/4071/nptel-software-project-management>
- <https://www.nptelvideos.com/video.php?id=918>
- <https://www.classcentral.com/course/swayam-software-project-management-14294>
- <https://www.w3schools.in/sdlc-tutorial/software-development-life-cycle-sdlc/>

#### Mapping of CO with PSO

|     | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 |
|-----|------|------|------|------|------|------|
| CO1 | 3    | 2    | 2    | 2    | 2    | 1    |
| CO2 | 3    | 3    | 2    | 3    | 3    | 1    |
| CO3 | 3    | 2    | 1    | 3    | 1    | 2    |
| CO4 | 3    | 3    | 1    | 1    | 2    | 2    |
| CO5 | 3    | 2    | 1    | 3    | 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 2024-2025 onwards)

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| COURSE CODE | COURSE TITLE            | CATEGORY            | T | P | CREDITS |
|-------------|-------------------------|---------------------|---|---|---------|
| 24MCAE32    | BLOCKCHAIN TECHNOLOGIES | ELECTIVE – V<br>PEC | 4 | – | 3       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | III      | 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 make the students

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

#### 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 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





# 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 2024-2025 onwards)

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#### BLOCK CHAIN 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 BOOK:

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



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#### **REFERENCE BOOK:**

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://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://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)

(For the students admitted from the academic year 2024-2025 onwards)

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| COURSE CODE | COURSE TITLE                    | CATEGORY            | T | P | CREDITS |
|-------------|---------------------------------|---------------------|---|---|---------|
| 24MCAE33    | DATA ENGINEERING AND MANAGEMENT | ELECTIVE – V<br>PEC | 4 | – | 3       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | III      | 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 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<br>(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



# SOURASHTRA COLLEGE, MADURAI – 625004

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(For the students admitted from the academic year 2024-2025 onwards)

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#### 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.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



# 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 2024-2025 onwards)

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| COURSE CODE | COURSE TITLE         | CATEGORY                   | T | P | CREDITS |
|-------------|----------------------|----------------------------|---|---|---------|
| 24MCAEP7    | WEB TECHNOLOGIES LAB | ELECTIVE – VI<br>PEC – LAB | – | 4 | 2       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | III      | 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 provides information about two powerful technologies PHP and MySQL. Together, these two technologies provide a powerful platform for building database-driven Web applications.

#### COURSE OBJECTIVES:

To make the students

- learn how to create web pages using HTML, CSS and Javascript.
- implement dynamic web pages using Javascript, JQuery and Angular Java script
- create web applications using PHP and MySQL
- create web pages using XML and Cascading Style Sheets
- create XML documents and Schemas.

#### COURSE OUTCOMES (COs):

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

| No.  | Course Outcomes                                                            | Knowledge Level<br>(According to Bloom's Taxonomy) |
|------|----------------------------------------------------------------------------|----------------------------------------------------|
| CO 1 | develop Web pages using HTML, CSS and Javascript.                          | Upto K5                                            |
| CO 2 | design dynamic web pages using JavaScript, JQuery and Angular Java script. | Upto K5                                            |
| CO 3 | create web application using PHP and MySQL.                                | Upto K5                                            |
| CO 4 | develop interactive web pages using XML.                                   | Upto K5                                            |
| CO 5 | design dynamic web pages using XML.                                        | Upto K5                                            |

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



# **SOURASHTRA COLLEGE, MADURAI – 625004**

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### **SYLLABUS (Under CBCS based on OBE)**

(For the students admitted from the academic year 2024-2025 onwards)

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#### **WEB TECHNOLOGIES LAB**

##### **PROGRAM LIST:**

1. Develop a web page to display your education details in a tabular format.
2. Develop a web page to display your CV on a web page.
3. Design a Homepage having three links: About Us, Our Services and
4. Contact Us. Create separate web pages for the three links.
5. Design a web page to demonstrate the usage of inline CSS, internal CSS and external CSS.
6. Design an XML document and create a style sheet in CSS & display the document in the browser.
7. Develop a web page to Create image maps.
8. Design a web page to perform input validation using Angular Javascript.
9. Develop a web page in PHP to fetch details from the database.
10. Design a web page to hide paragraph using JQuery
11. Create a web page and add Javascript to handle mouse events and form events

##### **DIGITAL TOOLS:**

- <https://www.halvorsen.blog/documents/programming/web/web.php>
- <https://www.makeuseof.com/tag/simple-html-code-learn-minutes/>
- <https://www.geeksforgeeks.org/programming-for-beginners-10-best-html-coding-practices-you-must-know/>
- <https://www.phptpoint.com/php-tutorial/>
- <https://www.guru99.com/php-tutorials.html>
- <https://alexwebdevelop.com/how-to-learn-php/>

##### **Mapping of CO with PSO**

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

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 2024-2025 onwards)

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| COURSE CODE | COURSE TITLE                | CATEGORY                   | T | P | CREDITS |
|-------------|-----------------------------|----------------------------|---|---|---------|
| 24MCAEP8    | BLOCKCHAIN TECHNOLOGIES LAB | ELECTIVE – VI<br>PEC – LAB | – | 4 | 2       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | III      | 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 | set up 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





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#### **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    | 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



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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 2024-2025 onwards)

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| COURSE CODE | COURSE TITLE                        | CATEGORY                   | T | P | CREDITS |
|-------------|-------------------------------------|----------------------------|---|---|---------|
| 24MCAEP9    | DATA ENGINEERING AND MANAGEMENT LAB | ELECTIVE – VI<br>PEC – LAB | – | 4 | 2       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | III      | 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 make 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<br>(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



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### 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=eMl_hkBIWk&ab_channel=Clientric)
- [https://www.youtube.com/watch?v=xYaTRA8XOOc&ab\\_channel=BluRoot](https://www.youtube.com/watch?v=xYaTRA8XOOc&ab_channel=BluRoot)

#### Mapping of CO with PSO

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

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 2024-2025 onwards)

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| COURSE CODE | COURSE TITLE              | CATEGORY | T | P | CREDITS |
|-------------|---------------------------|----------|---|---|---------|
| 24MCAN31    | CONTENT MANAGEMENT SYSTEM | NME      | 4 | – | 3       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | III      | 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 an in-depth exploration of Content Management Systems, covering content creation, management, design, and implementation. Students will gain essential skills in structuring digital content, understanding CMS frameworks, and applying best practices in content organization and publishing.

### COURSE OBJECTIVES:

- To acquire basic knowledge about CMS.
- To gather extensive knowledge in designing skills in CMS.
- To learn about various types of CMS.

### COURSE OUTCOMES (COs):

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

| No.  | Course Outcomes                                                                                                                                         | Knowledge Level (According to Bloom's Taxonomy) |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| CO 1 | Gain a deep understanding of data, information, and content, including their formats, structures, and functionalities.                                  | Upto K5                                         |
| CO 2 | Learn the major components of a CMS, its branches, and foundational principles.                                                                         | Upto K5                                         |
| CO 3 | Develop skills in planning, staffing, and implementing CMS projects, including requirements gathering, logical design, and hardware/software selection. | Upto K5                                         |
| CO 4 | Learn to design a CMS effectively, including metadata management, cataloging, publication design, workflow structuring, and staffing models.            | Upto K5                                         |
| CO 5 | Acquire hands-on experience in building collection and publishing systems, with practical exposure to tools like Joomla.                                | 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



# 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 2024-2025 onwards)

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#### CONTENT MANAGEMENT SYSTEM

##### UNIT – I: CONTENT

Defining Data – Information, and Content – Content Format – Content Structure – Content Functionality – What Is Content Really?

##### UNIT – II: CONTENT MANAGEMENT

Understanding Content Management – Major Parts of a CMS – The Branches of Content Management – The Roots of Content Management.

##### UNIT – III: DOING CONTENT MANAGEMENT PROJECTS

Doing CM Projects Simply – Staffing a CMS – Getting Ready for a CMS – Doing Requirements Gathering – Doing Logical Design – Selecting Hardware and Software – Implementing the System.

##### UNIT – IV: DESIGNING A CMS

Designing a CMS Simply – The Wheel of Content Management – Working with Metadata – Cataloguing – Designing Publications – Designing Content Types – Designing Content Access – Designing Workflow and Staffing Models.

##### UNIT – V: BUILDING A CMS & CASE STUDY

Building a CMS Simply – Building Collection Systems – Building Publishing Systems. Case Tools – Joomla.

##### TEXT BOOK

Bob Boiko – Content Management Bible, 2<sup>nd</sup> Edition – Wiley Publishing, Inc.– 2005.

##### REFERENCE BOOKS

1. Eric Tiggeler – Joomla! 3 Beginner's Guide – PACKT Publishing – 2013.
2. Sofia Hauschildt – CMS Made Simple 1.6 Beginners Guide – PACKT Publishing – 2010.
3. Ishai Sagi – SharePoint 2010 How To – Pearson Education – SAMS 2011.

##### DIGITAL TOOLS:

- [https://library.iitd.ac.in/arpit\\_2020-2021/Week%209%20-%20Module%2022%20-%20PPT-%20Content%20Management%20System.pdf](https://library.iitd.ac.in/arpit_2020-2021/Week%209%20-%20Module%2022%20-%20PPT-%20Content%20Management%20System.pdf)
- [https://www.tutorialspoint.com/management\\_information\\_system/content\\_management\\_system.htm](https://www.tutorialspoint.com/management_information_system/content_management_system.htm)
- <https://www.w3schools.in/wordpress/introduction-to-content-management-system-cms>
- <https://www.geeksforgeeks.org/content-management-systems-introduction/>
- <https://www.ibm.com/think/topics/content-management-system>

##### Mapping of CO with PSO

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

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



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(For the students admitted from the academic year 2024-2025 onwards)

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| COURSE CODE | COURSE TITLE                       | CATEGORY | T | P | CREDITS |
|-------------|------------------------------------|----------|---|---|---------|
| 24MCAS31    | RESEARCH<br>METHODOLOGY AND<br>IPR | SEC – 2  | 2 | – | 2       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | III      | 25       | 75       | 100   |

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

#### COURSE DESCRIPTION:

To give an overview of the research methodology and explain the technique of defining a research problem and to explain the functions of the literature review in research. Also, it explains various forms of the intellectual property, its relevance and business impact in the changing global business environment.

#### COURSE OBJECTIVES:

- To give an overview of research methodology.
- To explain the technique of defining a research problem and to explain the functions of the literature review in research.
- To describe the art of interpretation and the art of writing research reports.
- To make the students understand various forms of the intellectual property, its relevance and business impact in the changing global business environment.

#### COURSE OUTCOMES (COs):

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

| No.  | Course Outcomes                                                                                                                                                       | Knowledge Level<br>(According to<br>Bloom's Taxonomy) |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| CO 1 | identify the suitable research methods and articulate the research steps in a proper sequence for the given problem.                                                  | Upto K5                                               |
| CO 2 | carry out literature survey, define the problem statement and suggest suitable solution for the given problem and present in the format of the research paper (IEEE). | Upto K5                                               |
| CO 3 | analyse the problem and conduct experimental design with the samplings.                                                                                               | Upto K5                                               |
| CO 4 | perform the data collection from various sources segregate the primary and secondary data                                                                             | Upto K5                                               |
| CO 5 | apply some concepts/section of Copy Right Act /Patent Act /Cyber Law/Trademark to the given case and develop –conclusions                                             | 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



# **SOURASHTRA COLLEGE, MADURAI – 625004**

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### **SYLLABUS (Under CBCS based on OBE)**

(For the students admitted from the academic year 2024-2025 onwards)

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#### **RESEARCH METHODOLOGY AND IPR**

##### **UNIT – I: RESEARCH METHODOLOGY**

Introduction, Meaning of Research, Objectives of Research, Motivation in Research, Types of Research, Research Approaches, Significance of Research, Research Methods versus Methodology, Research and Scientific Method, Importance of Knowing How Research is Done, Research Process, Criteria of Good Research, and Problems encountered by Researchers in India.

##### **UNIT – II: DEFINING THE RESEARCH PROBLEM**

Research Problem, Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem, An Illustration. Reviewing the literature: Place of the literature review in research, Bringing clarity and focus to your research problem, Improving research methodology, Broadening knowledge base in research area, Enabling contextual findings, How to review the literature, searching the existing literature, reviewing the selected literature, Developing a theoretical framework,

Developing a conceptual framework, Writing about the literature reviewed.

##### **UNIT – III: RESEARCH DESIGN**

Meaning of Research Design, Need for Research Design, Features of a Good Design, Important Concepts Relating to Research Design, Different Research Designs, Basic Principles of Experimental Designs, Important Experimental Designs. Design of Sample Surveys: Introduction, Sample Design, Sampling and Non-sampling Errors, Sample Survey versus Census Survey, Types of Sampling Designs

##### **UNIT – IV: DATA COLLECTION**

Experimental and Surveys, Collection of Primary Data, Collection of Secondary Data, Selection of Appropriate Method for Data Collection, Case Study Method.

Interpretation and Report Writing: Meaning of Interpretation, Technique of Interpretation, Precaution in Interpretation, Significance of Report Writing, Different Steps in Writing Report, Layout. Types of Reports, Oral Presentation, Mechanics of Writing a Research Report, Precautions for Writing Research Reports.

##### **UNIT – V: INTELLECTUAL PROPERTY (IP) ACTS**

Introduction to IP: Introduction to Intellectual Property (IP), different types of IPs and its importance in the present scenario, Patent Acts: Indian patent acts 1970. Design Act: Industrial Design act 2000. Copy right acts: Copyright Act 1957. Trade Mark Act, 1999





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#### TEXT BOOKS:

1. *Research Methodology: Methods and Techniques*, C.R. Kothari, Gaurav Garg New Age International 4<sup>th</sup> Edition, 2018.
2. *Research Methodology A Step-by- Step Guide for Beginners*, Ranjit Kumar SAGE Publications Ltd 3rd Edition, 2011.(For the topic Reviewing the literature – Unit 2)
3. *Intellectual property*, Debirag E. Bouchoux, Cengage learning, 2013.

#### REFERENCE BOOKS:

1. *Research Methods: The Concise Knowledge Base*, Trochim, Atomic Dog Publishing, 2005.
2. *Conducting Research Literature Reviews: From the Internet to Paper*, Fink Arlene, Sage Publications, 2009.

#### DIGITAL TOOLS:

- <https://legalthirst.com/intellectual-property-patent-important-questions-must-read/>
- [https://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_1056.pdf](https://www.wipo.int/edocs/pubdocs/en/wipo_pub_1056.pdf)
- [https://mitmecsept.files.wordpress.com/2018/10/deborah\\_e-bouchoux\\_intellectual\\_property\\_the\\_lbookzz-org.pdf](https://mitmecsept.files.wordpress.com/2018/10/deborah_e-bouchoux_intellectual_property_the_lbookzz-org.pdf)

#### 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



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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 2024-2025 onwards)

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| COURSE CODE | COURSE TITLE                | CATEGORY                | T | P | CREDIT |
|-------------|-----------------------------|-------------------------|---|---|--------|
| 24MCAZ31    | FUNDAMENTALS OF HUMAN RIGHT | SELF – STUDY (OPTIONAL) | – | – | 1      |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | III      | –        | 100      | 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 helps students to work in the field of human right. They can protect their own human and fundamental rights as a human being.

#### COURSE OBJECTIVES:

- To introduce students to the foundational concepts, definitions, and evolution of human rights and their importance in the global context.
- To explore the development of human rights in India, focusing on constitutional provisions like Fundamental Rights, Directive Principles of State Policy, and Fundamental Duties.
- To analyze the rights of marginalized and disadvantaged groups, such as women, children, differently-abled individuals, and minority communities.
- To study significant human rights movements in India, including peasant, tribal, and social reform movements.

#### 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 | demonstrate an understanding of the basic concepts, characteristics, and importance of human rights in historical and contemporary contexts.               | Upto K5                                         |
| CO 2 | analyze the provisions and mechanisms in the Indian Constitution that safeguard human rights, including their practical implementation and challenges.     | Upto K5                                         |
| CO 3 | identify the specific rights and issues faced by marginalized and disadvantaged groups and propose solutions for their empowerment.                        | Upto K5                                         |
| CO 4 | examine the historical and social impact of major human rights movements in India and their relevance today.                                               | Upto K5                                         |
| CO 5 | assess the effectiveness of legal frameworks and institutions, such as National and State Human Rights Commissions, in addressing human rights violations. | Upto K5                                         |

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



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#### FUNDAMENTALS OF HUMAN RIGHT

##### UNIT – I: INTRODUCTION

Meaning and Definitions of Human Rights – Characteristics and Importance of Human Rights – Evolution of Human Rights – Formation, Structure and Functions of the UNO – Universal Declaration of Human Rights – International Covenants – Violations of Human Rights in the Contemporary Era.

##### UNIT – II: HUMAN RIGHTS IN INDIA

Development of Human Rights in India – Constituent Assembly and Indian Constitution – Fundamental Rights and its Classification – Directive Principles of State Policy – Fundamental Duties.

##### UNIT – III: RIGHTS OF MARGINALIZED AND OTHER DISADVANTAGED PEOPLE

Rights of Women – Rights of Children – Rights of Differently Abled – Rights of Elderly – Rights of Scheduled Castes – Rights of Scheduled Tribes – Rights of Minorities – Rights of Prisoners – Rights of Persons Living with HIVAIDS – Rights of LGBT.

##### UNIT – IV: HUMAN RIGHTS MOVEMENTS

Peasant Movements (Tebhaga and Telangana) – Scheduled Caste Movements (Mahar and Ad-Dharmi) – Scheduled Tribes Movements (Santhal and Munda) – Environmental Movements (Chipko and Narmada Bachao Andolan) – Social Reform Movements (Vaikom and Self Respect).

##### UNIT – V: REDRESSAL MECHANISMS

Protection of Human Rights Act, 1993 (Amendment 2019) – Structure and Functions of National and State Human Rights Commissions – National Commission for SCs – National Commission for STs – National Commission for Women – National Commission for Minorities – Characteristics and Objectives of Human Rights Education.

##### REFERENCE BOOKS:

1. Sudarshanam Gankidi, *Human Rights in India: Prospective and Retrospective*, Rawat Publications, Jaipur, 2019.
2. Satvinder Juss, *Human Rights in India*, Routledge, New Delhi, 2020.
3. Namita Gupta, *Social Justice and Human Rights in India*, Rawat Publications, Jaipur, 2021.
4. Mark Frezo, *The Sociology of Human Rights*, John Willy & Sons, U.K. 2014.
5. Chiranjivi J. Nirmal, *Human Rights in India: Historical, Social and Political Perspectives*, Oxford University Press, New York, 2000.
6. Dr. S. Mehrtaj Begum, *Human Rights in India: Issues and perspectives*, APH Publishing Corporation, New Delhi, 2010.
7. Asha Kiran, *The History of Human Rights*, Mangalam Publications, Delhi, 2011.
8. Bani Borgohain, *Human Rights*, Kanishka Publishers & Distributors, New Delhi-2, 2007.
9. Jayan Chudhary, *A Textbook of Human Rights*, Wisdom Press, New Delhi, 2011.

##### DIGITAL TOOLS:

- [https://www.ihra.co.in/uploads/pdf/Human\\_rights\\_law\\_in\\_India.pdf](https://www.ihra.co.in/uploads/pdf/Human_rights_law_in_India.pdf)
- <https://www.distanceeducationju.in/pdf/404%20HUMAN%20RIGHTS.pdf>

##### 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



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### COURSE STRUCTURE – IV SEMESTER

| S. No. | Course Code | Course Title                                                                     | Hrs. / Week | Exam (Hrs.) | CA | SE  | Total Marks | Credits |
|--------|-------------|----------------------------------------------------------------------------------|-------------|-------------|----|-----|-------------|---------|
| 1.     | 24MCAC41    | <b>Core – 15: PCC</b><br>Industry Dynamics<br>Technology – Data<br>Visualisation | 4           | 3           | 25 | 75  | 100         | 3       |
| 2.     |             | <b>Elective VII: PEC</b>                                                         | 4           | 3           | 25 | 75  | 100         | 3       |
|        | 24MCAE41    | Computer Vision                                                                  |             |             |    |     |             |         |
|        | 24MCAE42    | Software<br>Development<br>Technologies                                          |             |             |    |     |             |         |
|        | 24MCAE43    | High Performance<br>Computing                                                    |             |             |    |     |             |         |
| 3.     |             | <b>Elective VIII**:<br/>PEC</b>                                                  | 2           | 3           | 40 | 60  | 100         | 2       |
|        | 24MCAEP10   | Computer Vision<br>Lab                                                           |             |             |    |     |             |         |
|        | 24MCAEP11   | Software<br>Development<br>Technologies Lab                                      |             |             |    |     |             |         |
|        | 24MCAEP12   | High Performance<br>Computing Lab                                                |             |             |    |     |             |         |
| 4.     | 24MCACV2    | <b>Core – 16: PCC</b><br>Project                                                 | 20          | 3           | 40 | 60  | 100         | 10      |
| 5.     | 24MCAZ41    | <i>*Women<br/>Empowerment<br/>Self – Study<br/>(Optional)</i>                    | –           | –           | –  | 100 | 100         | 1       |
|        |             | <b>Total</b>                                                                     | 30          |             |    |     | 400         | 18 (19) |

- Extra– Credit Course (Self – Study Course)
- \*\*One elective course to be chosen from THREE 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 |
|-------------|--------------------------------------------------------|------------------|---|---|---------|
| 24MCAC41    | INDUSTRY DYNAMICS<br>TECHNOLOGY–<br>DATA VISUALISATION | CORE – 15<br>PCC | 4 | – | 3       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | IV       | 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 systematically introduce building blocks, including types of data, visual elements and design approaches with many examples; provide a basic introduction to the latest visualization software tools as well as programming technologies, and review several case studies of their application in producing business intelligence.

#### COURSE OBJECTIVES:

- To teach different statistical methods for Data visualization.
- To make the students understand the basics of R and Python.
- To teach usage of Watson studio, the usage of the packages like Numpy, pandas and matplotlib.
- To make the students know the functionalities and usages of Seaborn.

#### COURSE OUTCOMES (COs):

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

| No.  | Course Outcomes                                                      | Knowledge Level<br>(According to<br>Bloom's<br>Taxonomy) |
|------|----------------------------------------------------------------------|----------------------------------------------------------|
| CO 1 | comprehend the importance of the exploratory data analysis paradigm. | Upto K5                                                  |
| CO 2 | understand basic concepts of data manipulation with R.               | Upto K5                                                  |
| CO 3 | select appropriate data visualization technique for given data       | Upto K5                                                  |
| CO 4 | explore the data visualization tools in python.                      | Upto K5                                                  |
| CO 5 | apply the functionalities of seaborn.                                | Upto K5                                                  |

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



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#### INDUSTRY DYNAMICS TECHNOLOGY – DATA VISUALISATION

##### UNIT – I:

Introduction to Statistics: Introduction to Statistics, Difference between inferential statistics and Descriptive statistics, Inferential Statistics– Drawing Inferences from Data, Random Variables, Normal Probability Distribution, Sampling, Sample Statistics and Sampling Distributions. R overview and Installation– Overview and About R, R and R studio Installation, Descriptive Data analysis using R, Description of basic functions used to describe data in R.

##### UNIT – II:

Data manipulation with R: Data manipulation packages– dplyr, data .table, reshape2, tidyr, Lubridate, Data visualization with R. Data visualization in Watson Studio: Adding data to data refinery, Visualization of Data on Watson Studio.

##### UNIT – III:

Python: Introduction to Python, How to Install, Introduction to Jupyter Notebook, Python Scripting basics, Numpy and Pandas–Creating and Accessing Numpy Arrays, Introduction to pandas, read and write csv, Descriptive statistics using pandas, Working with text data and datetime columns, Indexing and selecting data, groupby, Merge / Join datasets

##### UNIT – IV:

Data Visualization Tools in Python– Introduction to Matplotlib, Basic plots using matplotlib, Specialized Visualization Tools using Matplotlib, Advanced Visualization Tools using Matplotlib Waffle Charts, Word Clouds.

##### UNIT – V:

Introduction to Seaborn: Seaborn functionalities and usage, Spatial Visualizations and Analysis in Python with Folium, Case Study.

##### TEXT BOOKS:

1. *Core Python Programming* – Second Edition, R. Nageswara Rao, Dreamtech Press.
2. *Hands on programming with R*, Garrett Grolemond, Shroff, O'Reilly; First edition.
3. *Fundamentals of Mathematical Statistics*, S.C. Gupta, Sultan Chand & Son.

##### REFERENCE BOOKS:

1. *Learn R for Applied Statistics: With Data Visualizations, Regressions, and Statistics*, Eric Goh Ming Hui, Apress.
2. *Python for Data Analysis*, William McKinney, Second Edition, O'Reilly Media Inc.

##### DIGITAL TOOLS:

- [https://mrcet.com/downloads/digital\\_notes/IT/DATA%20VISUALIZATION%20\(R18A0555\).pdf](https://mrcet.com/downloads/digital_notes/IT/DATA%20VISUALIZATION%20(R18A0555).pdf)
- <https://mitu.co.in/wp-content/uploads/2022/12/Data-Visualization-in-Data-Science.pdf>
- [https://wbchse.wb.gov.in/wp-content/uploads/2023/10/DS\\_XI\\_SEC4.pdf](https://wbchse.wb.gov.in/wp-content/uploads/2023/10/DS_XI_SEC4.pdf)

##### Mapping of CO with PSO

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

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



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| COURSE CODE | COURSE TITLE    | CATEGORY               | T | P | CREDITS |
|-------------|-----------------|------------------------|---|---|---------|
| 24MCAE41    | COMPUTER VISION | ELECTIVE – VII:<br>PEC | 4 | – | 3       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | IV       | 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 give understanding about Computer vision techniques behind a wide variety of real– world applications.
- To make them familiar with various Computer Vision fundamental algorithms and how to implement and apply.
- To give an idea of how to build a computer vision application with Python language.
- To teach various machine learning techniques that are used in computer vision tasks and machine learning techniques with computer vision systems.

#### 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 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





# 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 2024-2025 onwards)

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#### 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](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](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 2024-2025 onwards)

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| COURSE CODE | COURSE TITLE                      | CATEGORY              | T | P | CREDITS |
|-------------|-----------------------------------|-----------------------|---|---|---------|
| 24MCAE42    | SOFTWARE DEVELOPMENT TECHNOLOGIES | ELECTIVE – VII<br>PEC | 4 | – | 3       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | IV       | 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 software development course helps to learn how to create, design, deploy, and support computer software. It should cover system software, the latest programming languages, and help you learn how to build apps for any platform.

#### COURSE OBJECTIVES:

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

#### 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 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



# **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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#### **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, Implementing security using API gateway pattern, Creating application using Ocrlo 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.



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#### 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, IngoWeber, LimingZhu, *DevOps, A Software Architects Perspective*, AddisonWesley–Pearson Publication, First Edition 2015.
3. John Ferguson Smart, Jenkins, *The Definitive Guide*, O'Reilly Publication, First Edition 2011.

#### DIGITAL TOOLS:

- <https://www.geeksforgeeks.org/devops-roadmap/>
- <https://www.scholarhat.com/tutorial/devops/devops-roadmap>
- <https://dev.to/prodevopsguytech/devops-for-beginners-a-complete-roadmap-to-get-started-2863>

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 2024-2025 onwards)

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| COURSE CODE | COURSE TITLE               | CATEGORY              | T | P | CREDITS |
|-------------|----------------------------|-----------------------|---|---|---------|
| 24MCAE43    | HIGH PERFORMANCE COMPUTING | ELECTIVE – VII<br>PEC | 4 | – | 3       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | IV       | 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 course discusses the various activities that happen during program execution, and how they are managed by the hardware (architectural features) and system software (operating systems, run-time systems).

#### COURSE OBJECTIVES:

- To get a clear idea of High Performance Computing concept.
- To get brief knowledge about how to function the HPC systems.
- To get idea of what techniques used in HPC models.
- To understand a Parallel computing concepts.
- To get familiar with OpenMP technology that is widely used in HPC technology.

#### 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 of the HPC and ccNUMA concepts                                               | Upto K5                                         |
| CO 2 | design and develop a parallel programming with modern C, C++ and new version of FORTRAN | Upto K5                                         |
| CO 3 | apply with parallel computing                                                           | Upto K5                                         |
| CO 4 | develop an efficient OpenMP programming                                                 | Upto K5                                         |
| CO 5 | evaluate an efficient MPI programming                                                   | Upto K5                                         |

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



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#### HIGH PERFORMANCE COMPUTING

##### UNIT – I: MODERN PROCESSORS

Stored-program computer architecture–General purpose cache based microprocessor architecture–Memory hierarchies–Multicore processors–Multithreaded processors–Vector processors. **Basic optimization techniques for serial code:** Scalar profiling–Common sense optimizations–Simple measures, large impact–The role of compilers–C++ optimizations.

##### UNIT – II: DATA ACCESS OPTIMIZATION

Balance analysis and light speed estimates–Storage order–Algorithm classification and access optimizations–The Jacobi algorithm–Algorithm classification and access optimizations–Sparse matrix–vector multiply. **Parallel computers:** Taxonomy of parallel computing paradigms–Shared-memory computers–Distributed memory computers–Hierarchical systems–Networks.

##### UNIT – III: BASICS OF PARALLELIZATION

Introduction to Parallelism –Parallel scalability. **Shared memory parallel programming with OpenMP:** Short introduction to OpenMP–OpenMP–parallel Jacobi algorithm.

##### UNIT – IV: EFFICIENT OPENMP PROGRAMMING

Profiling OpenMP programs–Performance pitfalls–Parallel sparse matrix–vector multiply. **Locality optimizations on ccNUMA architectures:** Locality of access on ccNUMA–ccNUMA optimization of sparse MVM–Placement pitfalls–ccNUMA issues with C++.

##### UNIT – V: DISTRIBUTED-MEMORY PARALLEL PROGRAMMING WITH MPI

Message passing–A short introduction to MPI–MPI parallelization of a Jacobi solver. **Efficient MPI programming:** MPI performance tools–Communication parameters–Synchronization, serialization, contention–Reducing communication overhead–Understanding intranode point-to-point communication.

##### TEXT BOOKS:

Georg Hager, Gerhard Wellein *Introduction to High Performance Computing for Scientists and Engineers*, CRC Press, 2011. **Chapters:** 1 to 10.

##### REFERENCE BOOKS:

1. Michael W. Berry, Kyle A. Gallivan, Efstratios Gallopoulos, Ananth Grama, Bernard Philippe, Yousef Saad, Faisal Saied, *High-performance scientific computing: algorithms and applications*, Springer, 2012.
2. Victor Eijkhout, *Introduction to High Performance Scientific Computing*, MIT Press, 2011.

##### DIGITAL TOOLS:

- <https://archive.nptel.ac.in/courses/106/108/106108055/#>
- <https://www.geeksforgeeks.org/high-performance-computing/>
- <https://www.geeksforgeeks.org/introduction-to-parallel-computing/>

##### 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    | 3    | 1    |
| 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)

### SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2024-2025 onwards)

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| COURSE CODE | COURSE TITLE        | CATEGORY                     | T | P | CREDITS |
|-------------|---------------------|------------------------------|---|---|---------|
| 24MCAEP10   | COMPUTER VISION LAB | ELECTIVE – VIII<br>PEC – LAB | – | 2 | 2       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | IV       | 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<br>(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





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### **SYLLABUS (Under CBCS based on OBE)**

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#### **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.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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## MASTER OF COMPUTER APPLICATIONS (M.C.A)

### SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2024-2025 onwards)

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| COURSE CODE | COURSE TITLE                          | CATEGORY                   | T | P | CREDITS |
|-------------|---------------------------------------|----------------------------|---|---|---------|
| 24MCAEP11   | SOFTWARE DEVELOPMENT TECHNOLOGIES LAB | ELECTIVE – VIII: PEC – LAB | – | 2 | 2       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | IV       | 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:

DevOps courses teach the principles, practices, and tools of DevOps, which is a combination of development and operations. It also covers the latest topics from basics to advanced level topics AWS, Jenkin and Docker.

#### COURSE OBJECTIVES:

##### To make the students

- understand the concept of DevOps with associated technologies and methodologies.
- be familiarized 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:

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



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#### **SOFTWARE DEVELOPMENT TECHNOLOGIES LAB**

##### **LIST OF PROGRAMS**

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 Dockerfile instructions, build an image for a sample web application using Dockerfile.
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://www.geeksforgeeks.org/git-cheat-sheet/>
- <https://www.geeksforgeeks.org/mean-stack/>
- <https://www.studocu.com/in/document/jawaharlal-nehru-technological-university-kakinada/mean-stack-development/full-stack-lab/57313065>

#### **Mapping of CO with PSO**

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

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



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### SYLLABUS (Under CBCS based on OBE)

(For the students admitted from the academic year 2024-2025 onwards)

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| COURSE CODE | COURSE TITLE                   | CATEGORY                     | T | P | CREDITS |
|-------------|--------------------------------|------------------------------|---|---|---------|
| 24MCAEP12   | HIGH PERFORMANCE COMPUTING LAB | ELECTIVE – VIII<br>PEC – LAB | – | 2 | 2       |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | IV       | 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:

HPC course focuses to the practise of pooling computing capacity in a manner that gives far more performance than one might obtain out of a regular desktop computer or workstation.

#### COURSE OBJECTIVES:

To make the students

- understand concepts of High Performance Computing.
- get brief knowledge about PB and Slurm.
- understand techniques of OpenMP and OpenMPI.
- understand Parallel computing concepts.
- get familiar with CUDA.

#### COURSE OUTCOMES (COs):

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

| No.  | Course Outcomes                                                | Knowledge Level<br>(According to Bloom's Taxonomy) |
|------|----------------------------------------------------------------|----------------------------------------------------|
| CO 1 | apply and Evaluate the HPC Programs.                           | Upto K5                                            |
| CO 2 | design and Develop a MPI Programs.                             | Upto K5                                            |
| CO 3 | design and Develop a different programming concepts of OpenMP. | Upto K5                                            |
| CO 4 | develop an efficient PB and Slurm programming.                 | Upto K5                                            |
| CO 5 | evaluate an efficient CUDA programming.                        | Upto K5                                            |

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



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(For the students admitted from the academic year 2024-2025 onwards)

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#### HIGH PERFORMANCE COMPUTING LAB

(Implemented either PB, Slurm, OpenMP, OpenMPI, and CUDA)

1. Demo: – Access and best practices on HPC
2. Matrix multiplication with Job scheduling (PB or Slurm)
3. Vectors add with malloc shared
4. Vector add program with MPI
5. Hello world task for Multithreading with openMP
6. openMP shared memory on Host and Device
7. openMP Matrix Multiplication with parallelism and Barrier
8. openMP with Reduction on operands and aggregate functionality
9. Vector and Matrix multiplication on CUDA
10. Feed forward computing on CUDA

#### DIGITAL TOOLS:

- <https://www.studocu.com/in/document/university-of-mumbai/bachelor-of-engineering/hpc-labmanual-lab-manual/42528423>
- <https://www.scribd.com/document/648600493/HPC-Manual-2022-23-1-1>

#### 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    | 3    | 1    |
| CO5 | 3    | 3    | 3    | 2    | 2    | 1    |

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



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| COURSE CODE | COURSE TITLE | CATEGORY         | T | P  | CREDITS |
|-------------|--------------|------------------|---|----|---------|
| 24MCACV2    | PROJECT      | CORE – 16<br>PCC | – | 20 | 10      |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | IV       | 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 provide hands on training for building applications/software using appropriate known/needed technologies.

#### COURSE OBJECTIVES:

- To solve real-time problems in the following fields Industry/Academic Institutions/Computer science and involves practical work for understanding and solving problems in the field of computing.
- Students will do individually Commercial or Technical Project based on their Industry /Academic Institution needs with the known/needed technologies.

#### COURSE OUTCOMES (COs):

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

| No.  | Course Outcomes                                                                                                                                  | Knowledge Level (According to Bloom's Taxonomy) |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| CO 1 | have hands of experience in analysis of real time case.                                                                                          | Upto K5                                         |
| CO 2 | learn to discover potential research areas in the field of cyberspace.                                                                           | Upto K5                                         |
| CO 3 | learn to conduct a survey of several available literature in the preferred field of study.                                                       | Upto K5                                         |
| CO 4 | learn to compare and contrast the several existing solutions for research challenges.                                                            | Upto K5                                         |
| CO 5 | demonstrate an ability to work in teams and manage the conduct of the research study and to get deep knowledge in the known/needed technologies. | Upto K5                                         |

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

K4 – ANALYSE, K5– EVALUATE

#### Mapping of CO with PO and 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 | 3    | 3    | 3    | 3    | 3    | 3    |
| CO5 | 3    | 3    | 2    | 3    | 2    | 3    |

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



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| COURSE CODE | COURSE TITLE      | CATEGORY              | T | P | CREDIT |
|-------------|-------------------|-----------------------|---|---|--------|
| 24MCAZ41    | WOMEN EMPOWERMENT | SELF-STUDY (OPTIONAL) | – | – | 1      |

| YEAR | SEMESTER | INTERNAL | EXTERNAL | TOTAL |
|------|----------|----------|----------|-------|
| II   | IV       | –        | –        | 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 explores the historical trajectory of women's empowerment in India, constitutional provisions, policies, and challenges faced by women. Through an interdisciplinary approach, students will gain insights into social, economic, and political empowerment and the impact of influential women leaders. The course also examines pressing social issues and strategies to promote gender equality, fostering an informed and proactive perspective on women's rights and development.

#### COURSE OBJECTIVES:

- Understand the historical evolution of women's empowerment in India from ancient to modern times.
- Analyze the constitutional provisions, laws, and policies that support women's empowerment at national and state levels.
- Examine the roles of NGOs, self-help groups, and other institutions in fostering women's empowerment.
- Evaluate key social, economic, and political challenges faced by women and explore potential solutions

#### 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 | Demonstrate a comprehensive understanding of women's empowerment, its dimensions, and historical progress            | Upto K5                                         |
| CO 2 | Apply knowledge of constitutional provisions and policies to analyze real-world scenarios related to gender equality | Upto K5                                         |
| CO 3 | Critically evaluate the effectiveness of various empowerment programs and initiatives.                               | Upto K5                                         |
| CO 4 | Recognize and appreciate the contributions of influential women leaders in India's development.                      | Upto K5                                         |
| CO 5 | Advocate for gender-sensitive approaches in media, education, and governance.                                        | 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





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#### **WOMEN EMPOWERMENT**

##### **UNIT – I: HISTORY OF WOMEN EMPOWERMENT IN INDIA**

Ancient Period, Medieval and Modern Period – Concept of Women Empowerment: Meaning, forms, Need and Importance – Dimensions of Women Empowerment: Social, Religious, Economic, Educational and Political.

##### **UNIT – II: WOMEN EMPOWERMENT**

**CONSTITUTIONAL PROVISIONS AND LAWS** – Women Empowerment Policy and Schemes – Central Level – State Level (With Special Reference to TAMILNADU)

##### **UNIT – III: WOMEN EMPOWERMENT**

**ISSUES AND CHALLENGES** – Supporting Agencies: NGOs, Self Help Groups and Panchayati Raj Institutions. – Powerful Women Leadership of India: Ahilya Bai Holkar, Rani Durgavati, Savitri Bai Phule, Mary Kom, Sindhutai Sakpal, Tessy Thomas, Indira Nooyi, Gaura Devi.

##### **UNIT – IV: SOCIAL EMPOWERMENT**

Women in Higher Education; Gender issues in Health, Environment, Family welfare Measures, Indecent representation of Women in media; Women in Difficult circumstances; Constitutional. **ECONOMIC EMPOWERMENT:** Introduction– organized sector, unorganized sector; Role of Women in Economic Development – Female Poverty and Poverty alleviation programmes; Status of Women farmers and land rights; Women Entrepreneurs; Impact of Globalization on working women; National Policy for the empowerment of women 2001.

##### **UNIT – V: POLITICAL EMPOWERMENT**

Political participation of women – Political Socialization– Women leaders in politics. Women in Local Governance– Barriers– Reservation policies– Women's Political Rights: CEDAW. **SOCIAL ISSUES REGARDING WOMEN:** Issues of Girl child, Female, infanticide and foeticide, Sex Ratio child marriage, Dowry & Property Rights, Violence against Women, Domestic violence, Female Headed Households', Women in the Unorganized sector of Employment, Women's work– Status and problems, problems of Dalit women.



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#### **TEXT BOOK**

Hajira Kumar, Jaimon Varghese, *Women's Empowerment: Issues, Challenges and Strategies*, Regency Publications, New Delhi, 2005.

#### **REFERENCE BOOKS**

1. Maithreyi Krishna Raj. (1986). *Women Studies in India: Some Perspectives*. Popular Prakasham, Bombay.
2. Mala Khullar, (Ed). (2005). *Writing the Women's Movement: A Reader*. Zubaan, Kali for Women, New Delhi.
3. Mies, Maria. (1980). *Indian Women and Patriarchy*. Concept Publishing Company, New Delhi.

#### **DIGITAL TOOLS:**

- <https://www.rccmindore.com/wp-content/uploads/2023/03/WE.pdf>
- <https://egyankosh.ac.in/bitstream/123456789/74154/1/Unit-4.pdf>
- <https://forumias.com/blog/women-empowerment-economic-political-and-social-explained-pointwise/>

#### **Mapping of CO with PSO**

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

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