Savitribai Phule Pune University, Pune

Faculty of Commerce and Management

Master of Computer Application (MCA)

Programme Curriculum

(Pattern 2024)

(With Effect from Academic Year 2024-25)

Preamble:

1. The name of the programme shall be Master of Computer Application (M.C.A)

2. The revised MCA Curriculum 2024 builds on the implementation of the Choice Based Credit System (CBCS). The curriculum takes the MCA programme to the next level in terms of implementing National Education Policy (NEP) and Outcome Based Education (OBE) along with the CBCS and Grading System.

3. The Institutes should assist in placements for M.C.A. students by interacting with Industries. Institute's placement cell should focus on identifying industrial expectations and institutional preparation for meeting industrial needs.

4. Industry and academia should identify possible areas of collaboration and work together to cater to the rapidly changing scenario.

5. During each semester students can attempt to complete various certifications for better opportunities in the industry.

Introduction:

1. Definition: Outcome Based Education:

1.1 Outcome Based Education (OBE) Approach: Outcomes are about performance, and this implies:

1.1.1 There must be a performer – the student (learner), not only the teacher

1.1.2 There must be something performable (thus demonstrable or assessable) to perform

1.1.3 The focus is on the performance, not the activity or task to be performed

1.2 Programme Educational Objectives (PEOs): Programme educational objectives are broad statements that describe the career and professional accomplishments that the programme is preparing graduates to achieve. Programme Educational Objectives are a set of broad future focused learner's performance outcomes that explicitly identify what learners will be able to do with what they have learned, and what they will be like after they leave institution and are living full and productive lives. Thus, PEOs are what the programme is preparing graduates for in their career and professional life (to attain within a few years after graduation).

1.3 Programme Outcomes (POs): Programme Outcomes are a set of narrow statements that describes what students (learners) of the programme are expected to know and be able to perform or attain by the time of graduation.

1.4 Course Outcomes (COs): Course Outcomes are narrower statements that describe what students are expected to know and be able to do at the end of each course. These relate to the skills, knowledge, and behavior that students acquire in their matriculation through the course.

1.5 Learning Outcomes: A learning outcome is what a student CAN DO because of a learning experience. It describes a specific task that he/she can perform at a given level of competence under a certain situation. The three broad types of learning outcomes are: a) Disciplinary knowledge and skills b) Generic skills c) Attitudes and values

1.6 Teaching and Learning Activities (TLAs): The set of pedagogical tools and techniques or the teaching and learning activities that aim to help students to attain the intended learning outcomes and engage them in these learning activities through the teaching process.

1.7 Assessment and Evaluation: Assessment is one or more processes, carried out by the institution, that identify, collect, and prepare data to evaluate the achievement of programme educational objectives and programme outcomes. Evaluation is one or more processes, done by the evaluation team, for interpreting the data and evidence accumulated through assessment

practices evaluation determines the extent to which programme educational objectives or programme outcomes are being achieved, and results in decisions and actions to improve the programme.

2. MCA Programme Focus:

The basic objective of the Master of Computer Application (MCA) is to provide a steady stream of necessary knowledge, skills and foundation for acquiring a wide range of rewarding careers into rapidly expanding world of Information Technology

2.1 Programme Educational Objectives: PEOs are defined by institution. Following are the guidelines for defining PEOs

2.1.1 PEOs should be assessable and realistic within the context of the committed resources.

2.1.2 The PEOs should be consistent with the mission of the institution.

2.1.3 All the stakeholders should participate in the process of framing PEOs.

2.1.4 The number of PEOs should be manageable.

2.1.5 It should be based on the needs of the stakeholders.

2.1.6 It should be achievable by the programme.

2.1.7 It should be specific to the programme and not too broad.

2.1.8 It should not be too narrow and similar to the POs.

2.2 MCA Programme Outcomes (POs):

Learners are expected to know and be able to		
PO1	**Computing Knowledge**	Apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements.
PO2	**Problem Analysis**	Identify, formulate, research literature, and solve complex Computing problems reaching substantiated conclusions using fundamental principles of Mathematics, Computing sciences, and relevant domain disciplines.
PO3	**Design & Development**	Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PO4	**Research & Development**	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
PO5	**Prompt Tool Usage**	Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations.
PO6	**Ethical Practices**	Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practice.

PO7	Life Long Learning	Recognize the need, and have the ability, to engage in independent learning for continual development as a Computing professional.
PO8	Professional Skills	Demonstrate knowledge and understanding of computing and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO9	Communication Skills	Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.
PO10	Societal Contribution	Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice.
PO11	Teamwork & Leadership	Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary environments.
PO12	Innovation & Sustainability	Identify a timely opportunity and using innovation to pursue that opportunity to create value and wealth for the betterment of the individual and society at large.

3. Admission Details:

3.1 Eligibility for Admission: The eligibility criteria for admission for the MCA course will be as decided by the All India Council of Technical Education (AICTE), New Delhi and Directorate of Technical Education (DTE), Government of Maharashtra. It will publish on their respective websites time to time.

3.2 Reservation of Seat: The percentage of seat reserved for candidates belonging to backward classes only from Maharashtra State in all the Government Aided, Un-aided Institutions/Colleges and University Departments is as per the norms given by Government of Maharashtra, time to time.

3.3 Selection Basis: The selection would be done as per the guidelines given by the Director of Technical Education, Maharashtra State, time to time.

*Bridge course: Bridge course for Non- IT/ CS students shall be conducted by the Institute.

4. Lecture-Practical-Project

A course shall have either or all the three components, i.e. a course may have only lecture component, or only practical/project component or a combination of any two/three components.

The MCA programme is a combination of:

a. Three-Credit Courses (75 Marks each)

b. Two-Credit Courses (50 Marks each)

c. One-Credit Courses (25 Marks each)

d. Six- Credit Courses (100 Marks)

e. Three-Credit MOOC courses (50 marks each)

f. Twelve Credit FP/OJT (Internal 150 marks & External 300 marks).

The curriculum of MCA is providing freedom to choose subjects based on their interests, regardless of their academic stream. This shift encourages disciplinary learning, enabling students to explore diverse fields and broaden their knowledge horizons. The choice based subjects start from the first semester and provide flexible options throughout the semesters.

4.1 Lecture(L): Classroom sessions delivered by faculty in an interactive mode. It should be conducted as per the scheme of lectures indicated in respective course.

4.2 Practical/Project(P): Practical / Project Work consisting of Hands-on experience /Field Studies / Case studies that equip students to acquire the much-required skill component. Besides separate Practical/Project course, three course in each semester include few practical assignment and it will be evaluated under internal evaluation

4.3 A Mini project is an assignment that the student needs to complete at the end of every semester in first year, in order to strengthen the understanding of fundamentals through effective application of the courses learnt.

4.4 The Field Project (FP)/On Job Training(OJT): To be conducted in the FINAL Semester and evaluated at the end of the semester. The detail guidelines have been in the respective course structure.

5. Elective Courses (EC):

Institute has to offer six elective courses with 3 credits from Semester I to Semester III. The motive behind keeping an elective course is to make students aware of current/upcoming trends in Information Technology and other domains.

6. MOOCs Certification:

Each course (Where ever applicable) includes suggested certification which help learners to enrich themselves as per industry demands and requirements.

MOOCs provide opportunities for students to delve deeper into specific topics or explore emerging areas. MOOC platforms offer a wide range of courses across various disciplines within computer applications. Students can access courses on advanced programming languages, artificial intelligence, data science, machine learning, cybersecurity, cloud computing, and many more. This diversity allows students to tailor their learning experience based on their interests and career goals.

7. Research Project

Research project within an MCA course is integral components designed to impart advanced skills and knowledge essential for addressing complex challenges in computing. Research project involve rigorous investigation, experimentation and application of theoretical concepts acquired during the program.

Students are encouraged to explore diverse areas such as software engineering, data science, cybersecurity, and artificial intelligence, fostering expertise that aligns with industry demands. Engaging in research not only enhances academic understanding but also cultivates practical skills in problem-solving, critical analysis, and project management.

Students are encouraged to publish their research work in reputed journals/conferences.

8. Soft Skill Assessment: The soft skill course comprised of one credit with total duration of 15 hours per semester focusing on different skills viz. interpersonal, communication, professional, writing etc.

9. Evaluation and Assessment:

Concurrent Evaluation, a continuous assessment system integral to semester-based courses, spans the duration of each course and is conducted by the course faculty. The assessment aims to provide timely feedback on the teaching-learning process. As part of this system, students undergo continuous evaluation by the institute to ensure progressive student learning.

Faculty promptly share assessment outcomes with students, guiding them toward improvement. Each institute has the autonomy to design evaluation components that offer a balanced assessment across Knowledge, Skills & Attitude (KSA) dimensions, using various assessment tools. The institute determines the type, method, and frequency of concurrent evaluation for each course, maintaining detailed records of all assessments. The curriculum spans two years and four semesters, totaling 95 credits.

Semester	Credit Points	UE	IE
Semester I	26	300	300
Semester II	26	300	300
Semester III	25	250	300
Semester IV	18	300	250
Total	**95**	**1150**	**1150**
			2300

The final total assessment of the candidate is made in terms of an internal (concurrent) evaluation and an external (university) examination for each course.

Examination: Examinations shall be conducted at the end of the semester i.e. during November and in April/May. However supplementary examinations will also be held in November and April/May.

Marks/Grade/Grade Point:

A grade is assigned to each head based on marks obtained by a student in evaluation of the course. These grades, their equivalent grade points are given in the following table.

Marks	Grade	Grade Points
80-100	O: Outstanding	10
70-79	A+: Excellent	9
60-69	A: Very Good	8
55-59	B+: Good	7
50-54	B: Above Average	6
45-49	C: Average	5
40-44	P: Pass	4
0-39	F: Fail	0
-	AB: Absent	0

Suggested components for Concurrent Evaluation (CE) are:

1. Case Study / Situation Analysis – (Group Activity or Individual Activity)

2. Class Test

3. Open Book Test

4. Field Visit / Study tour and report of the same

5. Small Group Project & Internal Viva-Voce

6. Learning Diary

7. Scrap Book

8. Group Discussion

9. Role Play / Story Telling

10. Individual Term Paper / Thematic Presentation

11. Written Home Assignment

12. Industry Analysis – (Group Activity or Individual Activity)

13. Literature Review / Book Review

14. Model Development / Simulation Exercises – (Group Activity or Individual Activity)

15. In-depth Viva

16. Quiz

17. Certification

Institute can decide the type, method and frequency of Concurrent Evaluation for each course and execute accordingly. Detailed record of the Concurrent Evaluation shall be maintained by the Institute. The same shall be made available to the University, on demand.

10. Choice based Credit System (CBCS) and Grading:

The detail document about Choice based Credit System for PG Programme is available on university website. The Grading methodology is also available on university website. University reserves rights to revise CBCS and grading system time to time.

11. Medium of Instruction: The medium of Instruction will be English.

12. Clarification of Syllabus:

It may be necessary to clarify certain points regarding the course. The BOS should meet to study and clarify any difficulties from the Institutes, as and when required.

13. Revision of Syllabus:

As the computer technology is changing very fast, revision of the syllabus should be considered every 2 years.

14. Attendance:

The student must meet the requirement of 75% attendance per semester per course for grant of the term. The Director shall have the right to withhold the student from appearing for examination of a specific course if the above requirement is not fulfilled. Since the emphasis is on continuous learning and concurrent evaluation, it is expected that the students study all-round the semester. Therefore, there shall not be any preparatory leave before the University examinations.

15. ATKT Rules:

The ATKT rules mention in CBCS handbook (available on university website) is application to MCA Programme.

16. Maximum Duration for completion of the Programme:

The candidates shall complete the MCA Programme WITHIN 4 YEARS from the date of admission, by earning the requisite credits. The student will be finally declared as failed if she/he does not pass in all credits within a total period of four years. After that, such students will have to seek fresh admission as per the admission rules prevailing at that time.

17. Exit option:

PG Diploma 44-52 Credits after Three Year UG Degree (with additional 4 credits of OJT) *As per NEP guidelines.

18. Structure of the Programme and detail syllabus of each course:

Sr. No.	Course Title	Course Code	CP	EXT	INT
Semester I					
1	Python Programming	IT11	3	50	25
2	Data Structure and Algorithms	IT12	3	50	25
3	Advanced DBMS	IT13	3	50	25
4	Business Statistics	MT11	3	50	25
5	Software Engineering and Project Management	IT14	3	50	25
6	**Elective- I (Select any one from following)**	EC11			
	Fundamentals of Cloud Computing	EC11-1			
	Web Development	EC11-2	3	50	25
	Fundamental of Data Science	EC11-3			
	Introduction to Cyber Security	EC11-4			
	***Practical**				
7	Practical based on Python and DS	IT11L	3		50
8	Mini Project	ITC11	3		50
	Soft Skills and IKS				
9	Soft Skills – I	SS11	1		25
10	IKS	IK11	1		25
			26	**300**	**300**
Semester II					
Sr. No.	Course Title	Course Code	CP	EXT	INT
1	Java Programming	IT21	3	50	25
2	Optimization Techniques	MT21	3	50	25
3	Software Testing and Quality Assurance	IT22	3	50	25
4	Research Methodology	RM21	3	50	25
5	**Elective- II (Select any one from following)**	EC21			
	Cloud Computing Management and Security	EC21-1			
	JavaScript	EC21-2	3	50	25
	Machine Learning Techniques	EC21-3			
	Essentials of Cyber Security	EC21-4			
6	**Elective- III (Select any one from following)**	EC22			
	Essentials of Cloud Computing and Security	EC22-1			
	Advance Web Development	EC22-2	3	50	25
	Power BI	EC22-3			
	Essentials of Information Security	EC22-4			
	***Practical**				
7	Practical based on Java	IT21L	3		50
8	Mini Project	ITC21	3		50
	Soft Skills and IKS				
9	Soft Skills – II	SS21	1		25
10	IKS	IK21	1		25
			26	**300**	**300**

Semester III					

Sr. No.	Course Title	Course Code	CP	EXT	INT
1	Organizational Behaviour	IT31	3	50	25
2	Design and Analysis of Algorithm	IT32	3	50	25
3	**Elective- IV (Select any one from following)**	EC31			
	Cloud API's and Services	EC31-1			
	Mobile Application Development	EC31-2	3	50	25
	Tableau	EC31-3			
	End -Point Security	EC31-4			
4	**Elective- V (Select any one from following)**	EC32			
	Cloud Migration and Management	EC32-1			
	MERN Stack Development	EC32-2	3	50	25
	Deep Learning	EC32-3			
	Ethical Hacking	EC32-4			
5	**Elective- VI (Select any one from following)**	EC33			
	Enterprise Resource Planning (ERP)	EC33-1			
	E-Commerce	EC33-2	3	50	25
	Social media Marketing	EC33-3			
	Innovation and Entrepreneurship Development	EC33-4			
*Practical					
6	Practical based on Electives IV and V	IT31L	3		50
7	Research Project	RP31	6		100
Soft Skills					
8	Soft Skills- III	SS31	1		25
			25	**250**	**300**

Semester IV					

Sr. No.	Course Title	Course Code	CP	EXT	INT
1	Internship/Project Work (FP/OJT)	IT41	12	300	150
2	MOOC- I	MC41	3		50
3	MOOC- II	MC42	3		50
			18	**300**	**250**

Semester	Credit Points	UE	IE
Semester I	26	300	300
Semester II	26	300	300
Semester III	25	250	300
Semester IV	18	300	250
Total	**95**	**1150**	**1150**
		Total Marks	**2300**