An Autonomous Institute Approved by **AICTE** and affiliated to **MAKAUT**, West Bengal

Curriculum Structure and Syllabus

Masters of Computer Applications (2024-2025)

Department of Computer Applications

Objective:

To conduct software industry, corporate sector, academia, research-oriented MCA program following the AICTE model for MCA.

Eligibility:

Candidates with the following eligibility can take admission in the 2-year MCA program approved by AICTE:

A. Students who have passed Bachelor of Computer Application or Bachelor's degree in Computer Science Engineering or equivalent degree.

B. Students who have passed Bachelor of Science, Bachelor of Commerce or Bachelor of Arts with mathematics at 10+2 or at the graduation level with additional bridge courses as per the norms of the concerned university.

C. Candidates must have obtained at least 50 percent marks, or 45 percent marks in the case of candidates belonging to reserved categories, in the qualifying examination.

Duration:

2 Years (4 Semesters)

Program Educational Objectives (PEOs)

PEO 01: **Technical Expertise:** Develop the ability to plan, analyze, design, code, implement, test and maintain the software product for real time systems that are technically sound, economically feasible and socially acceptable.

PEO 02: **Successful Career:** Exhibit professionalism, ethical attitude with updated technologies in Computer Application based career and capability to set up their own enterprise in various sectors of Computer Applications.

PEO 03: **Soft Skills:** Develop communication skills, team work and leadership quality in their professional multidisciplinary projects and adapt to current trends by engaging in Life Long learning.

PEO 04: **Life Long Learning:** Prepare the students to pursue higher studies by acquiring knowledge in mathematical, computing and engineering principles in the field of computing and related fields and to work in the fields of teaching and research.

Program Specific Outcomes (PSOs)

The post-graduates of Master of Computer Application Program will demonstrate:

PSO 01: Software System Design and Development: The ability to apply software development life cycle principles to design and develop the application software that meets the automation needs of society and industry.

PSO 02: Computing and Research ability: The ability to employ modern computer languages, environments and platforms in creating innovative career paths in SMAC (Social, Mobile, Analytics and Cloud) technologies.

PSO 03: Professionalism and Ethics: Efficient team leaders, effective communicators and capable of working in multi-disciplinary environment following ethical values.

Program Outcomes (POs)	
On Completion of MCA program, the post-graduates are expected to	
PO-01:	**Engineering Knowledge:** Ability to apply knowledge of computing, science, mathematics and engineering fundamentals appropriate to the discipline.
PO-02:	**Problem Analysis:** Ability to identify, critically analyze, formulate the computing requirements appropriate to its solution and develop computer applications.
PO-03:	**Design/Development of Solutions:** Ability to design, implement and evaluate a computer-based complex system, process, component, or program to meet desired needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.
PO-04:	**Conduct Investigations of Complex Problems:** Use of research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions and develop Software with complete satisfaction to the Customer.
PO-05:	**Modern Tool Usage:** Ability to apply current technologies, skills, and modern IT tools necessary for computing practice with an understanding of the limitations.
PO-06:	**The Engineer and Society:** Ability to understand the impact of system solutions in a contemporary, global, economical, environmental and societal context for sustainable development.
PO-07:	**Environment and Sustainability:** Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO-08:	**Ethics:** Ability to discharge their duties with professional and ethical responsibilities as an individual as well as in multi-disciplinary teams with positive attitude.
PO-09:	**Individual and Team Work:** Ability to function individually in effective manner and on teams, including diverse and multi-disciplinary, to accomplish a common goal.
PO-10:	**Communication:** Ability to communicate effectively with a range of audiences and be customer friendly.
PO-11:	**Project Management and Finance:** Demonstrate knowledge and understanding of the engineering 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 and should be economically feasible.
PO-12:	**Life-Long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological changes.

CURRICULUM FRAMEWORK

The MCA Program is the based on the following type of course:

SL. No.	Type of Course	Abbreviation
1	Professional Core Course	PCC
2	Professional Elective Course	PEC
3	Basic Science Mathematics	BSM
4	Professional Core Course Lab	PCL
5	Professional Elective Course Lab	PEL
6	Skill Development Course	SDC
7	Audit Elective Course	AEC
8	Project	PRJ
9	Seminar	SEM
10	Value Added Course	VAC
11	Grand Viva	GV

The Course and Credit Distribution is as under:

SL. No.	Type of Course	No. of Courses	Total Credit	Credit Percentage
1	Professional Core Course	10	40	40
2	Professional Elective Course	3	9	9
3	Basic Science Mathematics	2	8	8
4	Professional Core Course Lab	5	10	10
5	Professional Elective Course Lab	1	2	2
6	Skill Development Course	1	2	2
7	Audit Elective Course	1	3	3
8	Project	2	19	19
9	Seminar	1	1	1
10	Value Added Course	1	2	2
11	Grand Viva	1	4	4
TOTAL		**28**	**100**	**100**

Course Distribution: Semester wise:

SL. No.	Type of Course	No. of Courses per Semester				Total
		I	II	III	IV	
1	Professional Core Course	3	3	4	0	10
2	Professional Elective Course	0	1	1	1	3
3	Basic Science Mathematics	1	1	0	0	2
4	Professional Core Course Lab	2	2	1	0	5
5	Professional Elective Course Lab	0	1	0	0	1
6	Skill Development Course	1	0	0	0	1
7	Audit Elective Course	1	0	0	0	1
8	Project	0	0	1	1	2
9	Seminar	0	0	1	0	1
10	Value Added Course	0	0	0	1	1
11	Grand Viva	0	0	0	1	1
TOTAL		**8**	**8**	**8**	**4**	**28**

Credit Distribution: Semester wise:

SL. No.	Type of Course	No. of Credits per Semester				Total
		I	II	III	IV	
1	Professional Core Course	12	12	16	0	40
2	Professional Elective Course	0	3	3	3	9
3	Basic Science Mathematics	4	4	0	0	8
4	Professional Core Course Lab	4	4	2	0	10
5	Professional Elective Course Lab	0	2	0	0	2
6	Skill Development Course	2	0	0	0	2
7	Audit Elective Course	3	0	0	0	3
8	Project	0	0	3	16	19
9	Seminar	0	0	1	0	1
10	Value Added Course	0	0	0	2	2
11	Grand Viva	0	0	0	4	4
TOTAL		**25**	**25**	**25**	**25**	**100**

Semester-wise Credit, Hours/Week and Marks:

Semester	Credits	Hours/Week	Marks
I	25	31	800
II	25	32	800
III	25	32	800
IV	25	23	300
Total	**100**	**118**	**2700**

SEMESTER–I								
THEORY								
Sl. No	Category	PaperCode	PaperName	ContactHours /Week				Credit
				L	T	P	Total	
1	PCC	CA-101	Data Structure	3	1	-	4	4
2	PCC	CA-102	Concepts of Object-Oriented Programming	3	1	-	4	4
3	PCC	CA-103	Computer Organization and Computer Architecture	3	1	-	4	4
4	BSM	CA-104	Discrete Mathematics	3	1	-	4	4
5	**Audit Elective**			3	-	-	3	3
	AEC	CA-E105A (Old)/CA-105	Constitution of India					
		CA-E105B (Old)/CA-106	Health and Life Style Managementthrough Yoga					
		CA-E105C (Old)/CA-107	Ethics in Business Profession					
		CA-E105D (Old)/CA-108	Environmental Science					
PRACTICAL / SESSIONAL								
1	SDC	CA-181	Soft Skill and Interpersonal Communication	-	-	4	4	2
2	PCL	CA-191	Data Structure Lab with C	-	-	4	4	2
3	PCL	CA-192	Object Oriented Programming Lab with JAVA	-	-	4	4	2
Total Weekly Contact Hours and Credit							**31**	**25**
BRIDGE COURSE **[Only for Students under Category "B" stated in the "Eligibility" Section]**								
Fundamentals of Computer Applications								

SEMESTER–II								
THEORY								
Sl. No	Category	PaperCode	PaperName	ContactHours /Week				Credit
				L	T	P	Total	
1	PCC	CA-201	Principles of Operating System	3	1	-	4	4
2	PCC	CA-202	Relational Database Management System	3	1	-	4	4
3	PCC	CA-203	Artificial Intelligence with Machine Learning	3	1	-	4	4
4	BSM	CA-204	Probability and Statistics	3	1	-	4	4
5	**Professional Elective-I**			3	-	-	3	3
	PEC	CA-E205A (Old)/CA-205	Web Development with Java Technologies					
		CA-E205B (Old)/CA-206	Web Technology using PHP					
		CA-E205C (Old)/CA-207	Android Application Development					
		CA-E205D (Old)/CA-208	Web Technology using ReactJS					
PRACTICAL / SESSIONAL								
1	PCL	CA-292	Relational Database Management System Lab	-	-	4	4	2
2	PCL	CA-293	Artificial Intelligence with Machine Learning Lab	-	-	4	4	2
3	**Professional Elective-I LAB**					4	4	2
3	PEL	CA- 295	Web Development with Java Technologies Lab					
		CA-296	Web Technology using PHP Lab					
		CA-297	Android Application Development Lab					
		CA-298	Web Technology using ReactJS Lab					
Total Weekly Contact Hours and Credit							**31**	**25**
BRIDGE COURSE **[Only for Students under Category "B" stated in the "Eligibility" Section]**								
Fundamental Mathematics								

SEMESTER–III								
THEORY								
Sl. No	Category	PaperCode	PaperName	ContactHours /Week				Credit
				L	T	P	Total	
1	PCC	CA-301	Introduction to Data Science	3	1	-	4	4
2	PCC	CA-302	Computer Networks	3	1	-	4	4
3	PCC	CA-303	Design and Analysis of Algorithm	3	1	-	4	4
4	PCC	CA-304	Software Engineering	3	1	-	4	4
5	**Professional Elective-II**			3	-	-	3	3
	PEC	CA-305	Introduction to Cyber Security					
		CA-306	Introduction to IoT					
		CA-307	Automata Theory and Formal Languages					
		CA-308	Fundamentals of Cryptography					
PRACTICAL / SESSIONAL								
1	PRJ	CA-381	Mini Project	-	-	4	4	3
2	SEM	CA-382	Seminar on Internship/ Summer Training	-	-	-	-	1
3	PCL	CA-391	Data Science Lab with Python	-	-	4	4	2
Total Weekly Contact Hours and Credit							**31**	**25**
Student may opt the PEC from MOOCs Platform (NPTEL/ Swayam Platform)								

SEMESTER–IV								
THEORY								
Sl. No	Category	PaperCode	PaperName	ContactHours /Week				Credit
				L	T	P	Total	
1	VAC	CA-401	Research Methodology and IPR	3	-	-	3	2
2	**Professional Elective-III**			3	-	-	3	3
	PEC	CA-402	Deep Learning and Neural Network					
		CA-403	Compiler Design					
		CA-404	Cloud Computing					
		CA-405	Data Warehousing and Data Mining					
		CA-406	Advanced DBMS					
		CA-407	Image Processing					
		CA-408	Block Chain Technology and Its Applications					
		CA-409	Distributed Systems					
		CA-410	Remote Sensing and GIS					
SESSIONAL								
1	PRJ	CA-481	Major Project and Presentation	-	-	16	16	16
2	GV	CA-482	Grand Viva	-	-	-	-	4
Total Weekly Contact Hours and Credit							**22**	**25**
Student may opt the VAC &PEC from MOOCs Platform (NPTEL/Swayam Platform)								