Learning Outcomes based Curriculum Framework (LOCF)

For

Master of Computer Applications (2 Year) Postgraduate Programme



Department of Computer Science & Engineering Chaudhary Devi Lal University





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1. About the Department

There are two major streams in computer education. One of them is the Engineering stream leading to the B.E. / B. Tech. Degree and the other an Applications stream leading to the MCA degree. The primary emphasis in the MCA programme is on designing information systems for various organizations such as government departments, banks, insurance companies, hotels, hospitals, etc. Development of application software in diverse areas where computers are used will be the main function of MCA graduates. The major thrust in the MCA programme is on giving the graduates a sound background in computing, business functioning, and mathematics relevant to information technology systems. The curriculum has the courses relevant to achieving the programme outcomes. A strong laboratory component is a part of the MCA curriculum, for computer application students learn best by doing. The laboratories, besides supplementing the theory course should also expose the student to the use of the latest software tools. Every MCA student is required to spend 6-8 weeks summer training in a relevant software development house or related industry after taking their second-semester terminal examinations. Further, in their fourth semester, every MCA student shall have to work on a real-life software development project worth 8 credits. For carrying out the project work, MCA students shall be taught and trained in various software development platforms for desktop, web-based, and mobile-based applications.

Further, every MCA student shall have to earn 116 credits in total including. Core Courses credits, discipline elective courses Credits and Open Elective Courses Credits offered by other teaching departments of the University. The students with non-computer background at graduation level are required to earn 12 credits through two Bridge Courses. Moreover, so as to enhance the life skills, the student may opt for up to two Add-On Courses. The postgraduate programme in engineering stream of computer science leading to the M. Tech. CSE degree has its primary emphasis on designing systems in computer hardware and systems software. Designing embedded systems, designing peripherals and interfacing them to a computer and use of computers in signal processing are some other areas of interest to engineering students.

In computing science and engineering, students are provided a practical exposure to tools and technologies required in professional and academic arena. Curriculum of M. Tech. CSE programme comprises of an ample laboratory component, wherein the students get to know of current processes and technologies of this field. The M. Tech. CSE programme regular (Full Time and Part Time) is dedicated to conducting and reporting on a research problem culminating in a dissertation worth 14 credits. Further, every M. Tech. CSE Regular Full Time student shall have to earn 82 credits in total – 44 Core Courses credits, 30 Discipline Specific Elective Courses Credits and 8 Open Elective Courses Credits offered by other teaching departments of the University. Every M. Tech. CSE Regular Part Time student shall have to earn 70 credits in total – 40 Core Courses credits, 30 Discipline Specific Elective Courses Credits. This helps them blend their skills and orientation towards life in general and profession in particular. All in all, M. Tech. CSE graduates shall posses sound theoretical and research background apart from knowing modern principles and practices in computer science and engineering.

2. Learning Outcomes based Curriculum Framework





The CBCS evolved into learning outcomes based curriculum framework and provides an opportunity for the students to choose courses from the prescribed courses comprising core, elective/minor or skill-based courses. The courses can be evaluated following the grading system, which is considered to be better than the conventional marks system. Grading system provides uniformity in the evaluation and computation of the Cumulative Grade Point Average (CGPA) based on student's performance in examinations which enables the student to move across institutions of higher learning. The uniformity in evaluation system also enables the potential employers in assessing the performance of the candidates.

2.1 Objectives of the Programme

After two years of completion of their MCA programme, the graduates are expected to:

- exhibit their expertise in problem-Solving skills through design, analysis, implementation, and evaluation of IT/computer-based systems, tools, and applications locally and globally;
- be effectively adept as individuals and as team members in multidisciplinary software development projects involving technical, managerial, economic, and social constraints;
- demonstrate patronage, leadership, and entrepreneurship skills by helping peers/juniors and by spearheading the projects teams and initiating new software projects;
- engage in lifelong learning, career enhancement and adept to changing professional and societal, and environmental needs;
- develop Technical and Communication Skills necessary to function productively to achieve a successful professional career with integrity and societal commitments.

2.2. **Programme Outcomes (POs)**

At the time of completion, the MCA graduates are expected to possess the following generic graduate attribute:

PO1	Computational 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 of Solutions: 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	Conduct Investigations of Complex Computing Problems: Use research-based knowledge and research methods including design of experiments, analysis, and interpretation of data, and synthesis of the information to provide valid conclusions
PO5	Modern 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	Professional Ethics: 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	Project management and finance: Demonstrate knowledge and understanding of the computing and management principles and apply these to one's work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO9	Communication Efficacy: 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 and Environmental Concern: 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	Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and multidisciplinary environments.
PO12	Innovation and Entrepreneurship: 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.

2.3 Programme Specific Outcomes (PSOs)

The fresh graduates of the MCA programme will have the following disciplinespecific graduate attributes:

PSO1	A sound understanding of the principles of mathematics and computing and their applications in problem-solving;
PSO2	Skills to design, develop, deploy and maintain applications for desktop, web, mobile, cloud, and cross computing platforms using modern computing tools and technologies;
PSO3	Prepared to achieve their career goals in the academia/industry or

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	pursue higher studies and enhance their professional knowledge;
PSO4	Acquire the expertise to adopt/apply skills gained during research, experimentation and develop a flavour for adopting trending technologies to solve computing problems;
PSO5	Practice their respective vocation/profession with ethics, integrity, leadership, and social responsibility.

3. **Programme Structure**

Master of Computer Applications - a four-semester postgraduate programme is 116 credits weightage consisting of Core Courses (CC), Discipline Specific Elective Courses (DSC), Skill Enhancement Courses (SEC), Open Elective Courses (OEC), Bridge Course (BC) and Add-On Course (AOC)

Table 1: MCA Credit Scheme

Semester	Core Courses		Discipline Specific		Skill Enhancement			Open Elective	Grand
	(CC)		Electiv	e Courses	Course	es		Courses	Total
			(DSC)				(OEC)		Credits
I II III IV	No. of Courses 7 4 4	Total Credits 24 24 12 12	No. of Courses 3 2	Total Credits 12 8	No. of Courses - 1(Internship) 1(Project)	Total Credits - 4 8	•	A total of 12 credits are to be earned from other Departments or from MOOCs. Students have to opt open elective course in consultation with Chairperson and Director, University Centre for Outreach Programmes and Extension	
Total	-	72		20	-	12		12	116
%age	-	62.06%		17.2%	-	10.34%		10.34%	-

Bridge Courses			Add-On Courses	s (Optional)	
No. of Courses	Total Credits		No. of Courses	Total Credits	
02(BC1 & BC2)	12		02(AOC1 &AOC2)	04	

Open Elective Courses offered for Students of other Departments

Semester	No. of Papers	Total Credits
Even and Odd	4	16

Note: Please mention L+P+T if practical is a part above.





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Semester	Core Courses	Discipline	Skill	Open Elective Courses	Total
		Elective	Enhancement		Courses
		Specific	Courses		
		Courses			
Ι	CC1			• A total of 12	
	CC2			credits are to be	
	CC3			earned from	7
	CC4			other	
	CC5			Departments or	
	CC6			from MOOCs.	
	CC7			• Students have to	
II	CC8			opt open elective	
	CC9			course in	
	CC10			consultation with	
	CC11			Chairperson and	7
	CC12			Director,	
	CC13			University Centre	
	CC14			for Outreach	
III	CC15	DSC1	SEC1	Programmes and	8
	CC16	DSC2		Extension	
	CC17	DSC3			
	CC18				
	CC19				
IV	CC20	DSC4	SEC2		
	CC21	DSC5			7
	CC22	DSC6			

Table 2: Detailed break-up of Courses' Type (Semester wise)

Table 3: Courses' codes, titles, and credits

Course Code	Course Title	Credit			
	Semester I	Theory	Practical	Total	
MCA/Gen/1/CC1	Computer Architecture and Parallel	4	0	4	
	Processing				
MCA/Gen /1/CC2	Computer Networks	4	0	4	
MCA/Gen /1/CC3	Software Engineering	4	0	4	
MCA/Gen /1/CC4	Operating Systems	4	0	4	
MCA/Gen /1/CC5	Java and C#	4	0	4	
MCA/Gen /1/CC6	Software Lab– Java	0	2	2	
MCA/Gen /1/CC7	Software Lab- C#	0	2	2	
	Semester II				
MCA/Gen /2/CC8	Data Structures	4	0	4	
MCA/Gen /2/CC9	Computer Graphics	4	0	4	
MCA/Gen /2/CC10	Database Systems	4	0	4	
MCA/Gen /2/CC11	Artificial Intelligence	4	0	4	

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MCA/Gen /2/CC12	Web Development using Servlet, JSP and ASP[dot]NET	4	0	4
MCA/Gen /2/CC13	Software Lab- Web Development using Servlet, JSP	0	2	2
MCA/Gen /2/CC14	Software Lab - Web Development using ASP[dot]NET	0	2	2
	Semester III			
MCA/Gen /3/CC15	Web Development	4	0	4
MCA/Gen /3/CC16	IoT and Cloud Computing	4	0	4
MCA/Gen /3/DSC1	(a) Linux and Shell Script(b) Android Software Development	4	0	4
MCA/Gen /3/DSC2	(a) Network Security (b) Wireless Networks	4	0	4
MCA/Gen /3/DSC3	(a) Discrete Mathematics(b) Theory of Computations(c) Compiler Construction	4	0	4
MCA/Gen /3/CC17	Software Lab - Web Development	0	2	2
MCA/Gen /3/CC18	Software Lab - Linux/Android	0	2	2
MCA/Gen /3/SEC1	Presentation/Viva on Internship	4	0	4
	Semester IV			
MCA/Gen /4/CC19	Python Programming	4	0	4
MCA/Gen /4/CC20	R Programming	4	0	4
MCA/Gen /4/DSC4	(a) Soft Computing(b) Machine Learning(c) Genetic Algorithms	4	0	4
MCA/Gen /4/DSC5	(a) Data Warehousing and Data Mining(b) Big Data Analytics(c) Data Science	4	0	4
MCA/Gen /4/SEC2	Project Work	8	0	8
MCA/Gen /4/CC21	Software Lab – Python Lab	0	2	2
MCA/Gen /4/CC22	Software Lab – R Prog. Lab	0	2	2

Table 4: MCA Courses' List

Course Code	Course Title	Credits
	Core Courses	·
MCA/Gen /1/CC1	Computer Architecture and Parallel Processing	4
MCA/Gen /1/CC2	Computer Networks	4
MCA/Gen /1/CC3	Software Engineering	4
MCA/Gen /1/CC4	Operating Systems	4
MCA/Gen /1/CC5	Java and C#	4
MCA/Gen /1/CC6	Software Lab – Java	2
MCA/Gen /1/CC7	Software Lab – C#	2
MCA/Gen /2/CC8	Data Structures	4
MCA/Gen /2/CC9	Computer Graphics	4

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MCA/Gen /2/CC10	Database Systems	4		
MCA/Gen /2/CC11	Artificial Intelligence	4		
MCA/Gen /2/CC12	Web Development using Servlet, JSP and ASP[dot]NET	4		
MCA/Gen /2/CC13	Software Lab- Web Development using Servlet, JSP	2		
MCA/Gen /2/CC14	Software Lab – Web Development using ASP[dot]NET	2		
MCA/Gen /3/CC15	Web Development	4		
MCA/Gen /3/CC16	IoT and Cloud Computing	4		
MCA/Gen /3/CC17	Software Lab - Web Development	2		
MCA/Gen /3/CC18	Software Lab - Linux/Android	2		
MCA/Gen /4/CC19	Python Programming	4		
MCA/Gen /4/CC20	R Programming	4		
MCA/Gen /4/CC21	Software Lab – Python Lab	2		
MCA/Gen /4/CC22	Software Lab – R Programming Lab	2		
	Discipline Specific Elective Courses			
MCA/Gen /3/DSC1	(a) Linux and Shell Script	4		
	(b) Android Software Development			
MCA/Gen /3/DSC2	(a) Network Security	4		
	(b) Wireless Networks			
MCA/Gen /3/DSC3	(a) Discrete Mathematics	4		
	(b) Theory of Computations			
	(c) Compiler Construction			
MCA/Gen /4/DSC4	(a) Soft Computing	4		
	(b) Machine Learning			
MCA/Gon /4/DSC5	(c) Genetic Algorithms	1		
WICA/OEII/4/DSCJ	(a) Data Watehousing and Data Winning (b) Big Data Analytics	4		
	(c) Data Science			
	Skill Enhancement Courses			
MCA/Gen /3/SEC1	Presentation/Viva on Internship	4		
MCA/Gen /4/SEC2	Project Work	8		
	Bridge Courses			
MCA/Gen /1/BC1	MCA Bridge Course 1	6		
MCA/Gen /2/BC2	MCA Bridge Course 2	6		
Add-On Courses				
MCA/Gen /3/AOC1	Green Computing	2		
MCA/Gen /4/AOC2	Cyber Laws and Ethics in Computing	2		
Open Elective Courses offered for Students of other Departments				
Udd & Even Semester				
CSE/9/OEC1	Fundamentals of Information Technology	4		
CSE/9/OEC2	Windows and Office Automation Tools	4		
CSE/9/OEC3	Introduction to Cyber Space	4		
CSE/9/OEC4	Information Technology for Lifelong Learning	4		



