TKM COLLEGE OF ENGINEERING

(Government Aided and Autonomous)

celebrating 60 years of excellence

MCA

Curriculum 2023

THANGAL KUNJU MUSALIAR COLLEGE OF ENGINEERING
(Government Aided and Autonomous)
KOLLAM-691005, KERALA

Abstract

TKMCE-Academics- MCA curriculum 2023 -orders issued

No: ACU3/656/2023   Date: 12/06/2023

Order
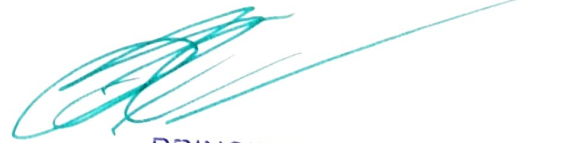
Read:
1. UGC order Ref: F. 22-1/2022(AC) dated 26th May 2022
2. U.O. No. KTU/ASST11(ADMIN)/3212/2022 dated 2nd September 2022
3. ACU3/1010/2022 dated 16th September 2022

The TKM College of Engineering was conferred with autonomous status by the UGC on 26th May 2022 vide Ref: 1 and the same was notified by the APJ Abdul Kalam Technological University, on 2nd September 2022, vide ref.2

The first meeting of the Governing Body after the notification of autonomous status was held on 15th September 2022, authorized the Principal to constitute the Academic council as per the UGC (Conferment of Autonomous Status upon Colleges and Measures for Maintenance of Standards in Autonomous Colleges) Regulations, 2018. As per the resolution of the Governing Body, the Principal has constituted the Academic council on 16th September 2022 vide ref.3. The Second Academic council meeting held on 27th May 2022, approved the Curriculum of MCA for the academic year 2023-24. The Curriculum for the MCA programmes, 2023 approved by the Academic Council, is hereby notified as the **TKM College of Engineering (Aided and Autonomous) MCA Curriculum 2023**.

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THANGAL KUNJU MUSALIAR
COLLEGE OF ENGINEERING
KOLLAM-5

Copy to All HODs, Deans, IQAC, COE, AA, AO, SS, JS(A)

TKM College of Engineering (Government Aided and Autonomous)
MCA Curriculum, 2023

This will be known as **the TKM College of Engineering MCA curriculum, 2023.** These are subject to the provisions of the UGC (Conferment of Autonomous Status upon Colleges and Measures for Maintenance of Standards in Autonomous Colleges) Regulations, 2018 and APJ Abdul Kalam Technological University Act, 2015, the statutes and ordinances if any issued in the subject from time to time. All the rules specified herein, approved by the Academic Council, will be in force and applicable to the students admitted from the Academic year 2023-24 onwards.

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Preface to the Curriculum

The TKM College of Engineering is pleased to announce the launch of its new postgraduate MCA curriculum, aiming at a comprehensive and rigorous education in computer application and technology, a holistic approach. The curriculum has been carefully designed to provide our students with the skills and knowledge needed to become competent professionals capable of tackling real-world problems in a variety of fields.

The curriculum has a total of 87 credits, spread over a period of two years, with each year comprising two semesters. The curriculum is designed to expose students to both theoretical and practical aspects and provide them with hands-on experience in the latest technologies and tools used in the industry.

The project-based courses that emphasize hands-on learning and real-world applications supported by the fundamentals of computer application is the core of this curriculum. These courses are offered with lab components, which allow students to gain practical experience in applying the concepts they have learned. In addition, there are courses which include core courses and mathematical courses with lab components, core courses without practical components, 2-hour theory courses, as well as 1-hour theory courses and 2-hour lab courses. This variety of courses ensures that students receive well-rounded education and have the flexibility to customize their own learning experience according to their interests and career goals. In addition to these core subjects, students will have the opportunity to choose from a wide range of elective courses in specialised areas.

The students can opt for MOOC courses corresponding to Elective Courses, which will give them flexibility in doing internships during their 3rd semester as part of a mini project.

An industry internship/research project is also included in the curriculum in 4th semester, giving students the opportunity to apply their theoretical knowledge to socially relevant real-world problems and gain valuable practical experience. The

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internship will also assist students in developing professional skills and expanding their industry network.

In addition to the academic curriculum, students should also participate in various extracurricular activities such as sports, cultural events, community service, and entrepreneurship. These activities will help students develop their leadership, teamwork, and communication skills, and provide them with a well-rounded education.

Major highlights of the Curriculum

- ✓ Flexible and Fragmented credit system
- ✓ Self-learning Assessment system
- ✓ IT industry readiness activities
- ✓ Internship
- ✓ Project based core courses
- ✓ Lab based core courses
- ✓ Mandatory MOOC course

GENERAL COURSE STRUCTURE

1. Credit and Courses:

Classification	Credit assigned
1 Hour Lecture (L) per week	1 Credit
1 Hour Tutorial (T) per week	1 Credit
1 Hour Project (J) per week	1 Credit
2 Hours Practical (P) per week	1 Credit

Credit pattern

Credit is a unit by which the course work is measured. It determines the number of hours of instructions required per week. All courses are considered to be offered for the entire duration of a semester. 1 Hour class room lecture (L) of 60 minutes duration per week, carried out during all weeks of the semester, shall be considered as one Instructional Unit or one Credit. A tutorial (T) of 60 minutes duration per week, carried out during all weeks of the semester, will be considered as one Instructional Unit or one credit. A project (J) of 60 minutes duration per

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week, carried out during all weeks of the semester, shall be considered as one Instructional Unit or one Credit. A minimum of 120 minutes per week of laboratory session/ practical or field work/ training (P) or a combination of these, carried out during all weeks of the semester, shall also be considered as one Instructional Unit or one Credit.

Courses are organized as 1/2/3/4/5 credit courses based on the content delivery mechanism adopted and the indented depth of the course (Theory only, Theory embedded with tutorial, Theory embedded with practice, Theory embedded with project, etc.). The L-T-P for each course indicates the number of credits delivered as Lecture (L), Tutorial (T), Practical (P) per week. Apart from lecture, tutorial, and practical/practice hours the curriculum offers Project Hour (J) and Self learning hours (S). For each course Self learning hour (number of hours a student must spent for learning) per week is calculated as:

$$S = (L*1 + T*0 + P*1 + [J/2])$$

where J belongs to the project component of a project-based course.

Thus, the L-T-P-J-S-C for each course indicates the number of credits delivered as Lecture (L), Tutorial (T), Practical (P), Project (J), Self-study hours (S) and the total instructional delivery indicated as Credits (C).

$$C = L + T + [P/2] + J$$

Sl No.	Lecture-Tutorial-Practical/Project [L-T-P-J]	Self-learning hours[S]	Credit [C]	Description
1	2-0-0-0	2	2	Theory course without ESE
2	3-1-0-0	3	4	Theory course embedded with tutorial
3	2-1-2-0	4	4	Theory course embedded with tutorial & practical
4	1-0-2-0	3	2	Theory course embedded with practical without ESE
5	2-0-2-2	5	5	Project based course
6	0-0-2-0	2	1	Seminar
7	0-0-6-0	6	3	Mini Project
8	0-0-12-0	12	6	Final year Project

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2. Course category and coding/definition:

Course category	Description
PCC	Program Core Course
PBC	Project Based Course
PEC	Professional Elective Course
MP	Mini project
SR	Seminar
PR	Main Project (Research project/Internship)
MC	Mandatory Course

Structure of PG Program

The curriculum of the MCA Program shall have a total of 87 academic credits. It should provide sufficient opportunities to students to enhance their communication, soft skills, managerial and technical skills. The structure of MCA program shall have essentially the following categories of courses with the breakup of credits as given:

Sl No:	Category	Credit Breakup
1	Program core courses	53
2	Professional Elective courses relevant to chosen specialization/ branch	12
3	Project work, seminar and internship in industry or elsewhere	18
4	Soft skill courses	2
5	Mandatory Courses	2
	Total	87

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In general, the curriculum of programme consists of courses that are grouped into different heads such as Program Core (PCC), Professional Elective (PEC), Project based courses (PBC) and mandatory courses.

Program Core Course (PCC): Courses listed under Program Core of a curriculum are program specific. Students have to complete all the courses listed under PCC to become eligible for the degree.

Project Based Course (PBC): By taking courses under PBC, students get a deeper knowledge through active exploration of real-world challenges and problems. The ultimate aim of a student is to resolve a problem by applying theoretical knowledge. Doing multiple projects improves problem solving skills.

Professional Elective Course (PEC): By taking courses under Professional Elective, students get an opportunity to study courses which are more advanced or applied or specialized than the basic courses he/she studies as part of program core courses.

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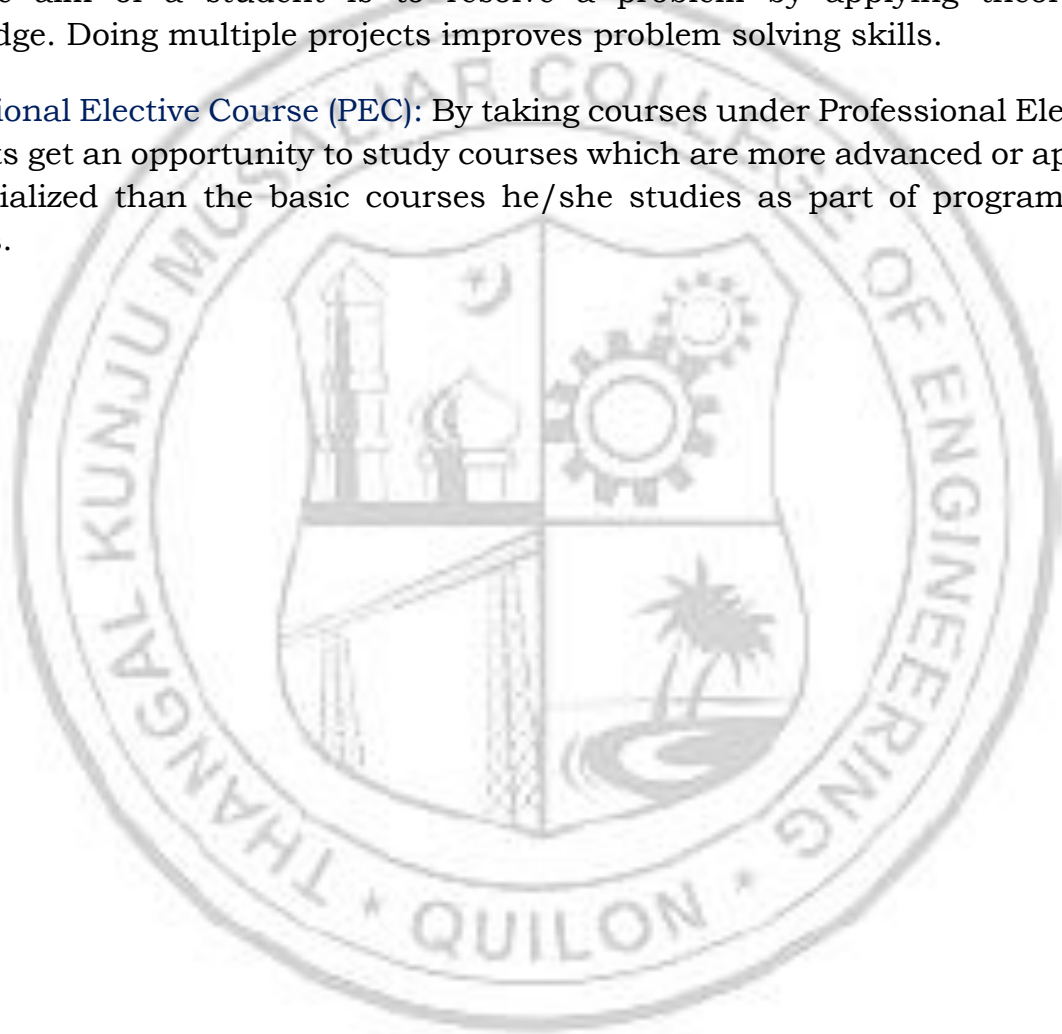
Semester wise credit distribution

Semester wise credit distribution is given below:

Semester	No. & Details of Courses	Total Hours/week	Total Credits
I	Project based course -1 Theory Course – 1 Lab based Courses – 5	29	23
II	Project based course -1 Lab based Courses – 5 Professional Elective - 1	29	23
III	Project based course -1 Theory Course – 2 Lab based Courses – 1 Professional Elective - 2 Mini Project -1	29	24
IV	Seminar Main Project (Research project/Internship)-1 MOOC Course*	29	17+2*
		TOTAL	**87**

* Additional Credits for MOOC Course.

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Course codes:

Each course will be identified by a unique Course Code consisting of eight alphanumeric characters (Two digits, Three alphabets which together followed by three digits) and is represented as YY **XXX C S NN**, which can be interpreted as given below.

YY – Year of Regulation, **XXX** – Course/Department, **C** - Category Code, **S** – Semester Number (it can have a number from 1 to 4), **NN**- Course Sequence Number.

The alphabets XXX reflect the Program MCA. The alphabet C- in the course code indicates the Course Delivery Mode, the method by which the course will be delivered. Course delivery mode can be placed into one of the eight categories given below.

SL NO	CATEGORY CODE	COURSE CATEGORY
1	T	THEORY ALONE
2	P	THEORY EMBEDDED WITH PRACTICAL COURSE
3	J	THEORY EMBEDDED WITH PROJECT (PROJECT BASED COURSE)
4	E	PROFESSIONAL ELECTIVE COURSE
5	S	SEMINAR
6	M	MINI PROJECT
7	N	MAIN PROJECT (RESEARCH PROJECT / INTERNSHIP)
8	C	MANDATORY MOOC COURSE

For eg: 23MCAT107- is a theory course offered by the department in the first semester of the 2023 scheme.
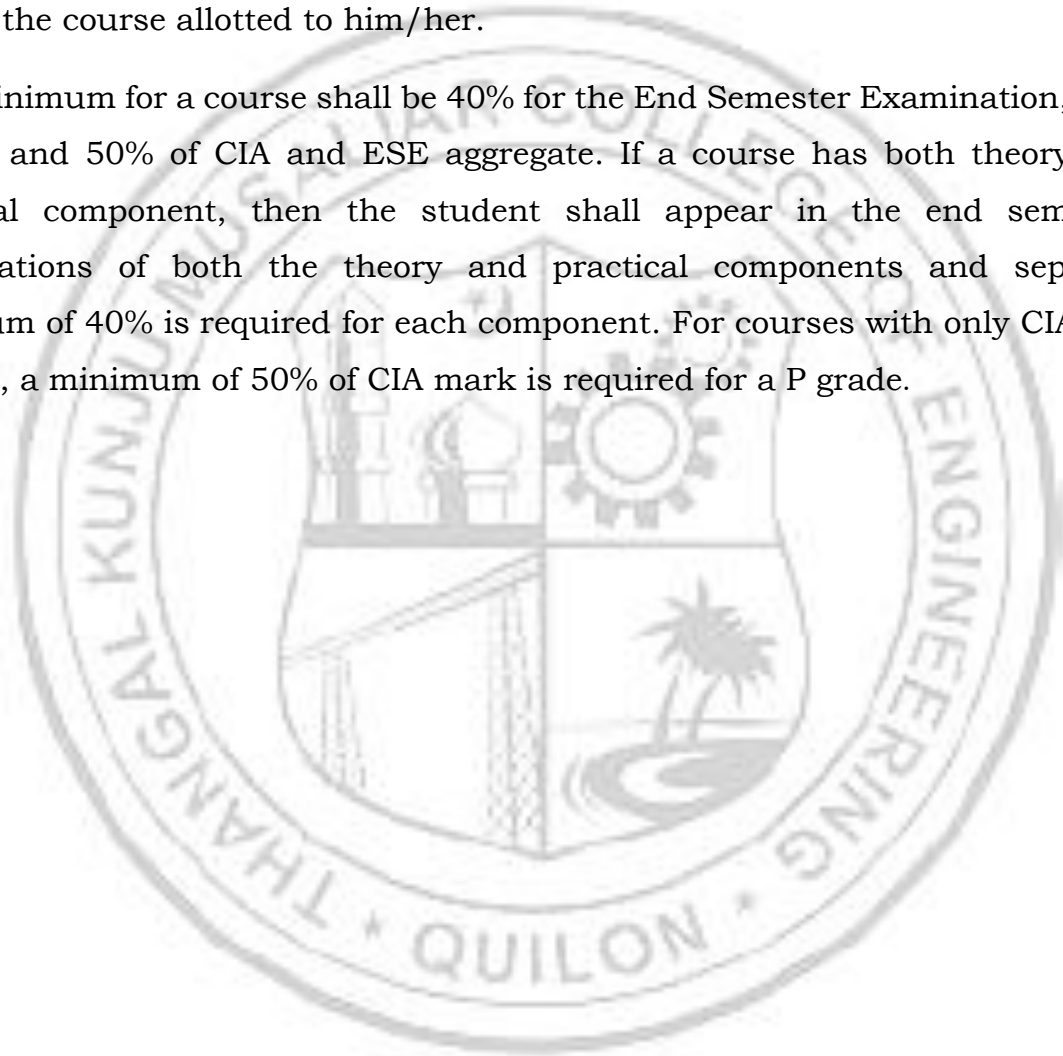
23MCAP204 - is a theory embedded practical course offered by the department in the second semester of 2023 scheme.

23MCAJ301 - is a theory embedded project based course offered by the department in the third semester of 2023 scheme.

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Assessment

In each semester, candidates shall be evaluated both by Continuous Internal Assessment (CIA) and End Semester Examinations (ESE) or by Continuous Internal Assessment alone based on the credit assigned to the course. The Continuous Internal assessment shall be on the basis of the day-to-day work, periodic tests, assignments, quizzes, presentations and other suitable tools devised by the course tutor. The faculty member (s) concerned shall carry out the CIA for the course allotted to him/her.

Pass minimum for a course shall be 40% for the End Semester Examination, 40% of CIA, and 50% of CIA and ESE aggregate. If a course has both theory and practical component, then the student shall appear in the end semester examinations of both the theory and practical components and separate minimum of 40% is required for each component. For courses with only CIA and no ESE, a minimum of 50% of CIA mark is required for a P grade.

Grade and Grade point

Grades	Grade Point [GP]	% of Total Marks obtained
S	10	90% and above
A+	9.0	85% and above but less than 90%
A	8.5	80% and above but less than 85%
B+	8	75% and above but less than 80%
B	7.5	70% and above but less than 75%
C+	7.0	65% and above but less than 70%
C	6.5	60% and above but less than 65%
D	6	55% and above but less than 60%
P [Pass]	5.5	50% and above but less than 55%
F [Fail]	0	Below 50% (CIA + ESE) or Below 40 % for ESE or Below 40% for CIA Below 50% for courses with only CIA and no ESE
FE	0	Failed due to lack of eligibility criteria
ab	0	Could not appear for the end semester examination but fulfils the eligibility criteria.
First Class with Distinction		CGPA 8.0 and above
First Class		CGPA 6.5 and above
Equivalent percentage mark shall be = 10 * CGPA – 2.5		

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Evaluation pattern for End Semester Examination

PATTERN	PART A	PART B	ESE Marks
PATTERN 1	10 Questions, each question carries 2 marks Marks: (2x10 =20 marks)	2 questions will be given from each module, out of which 1 question should be answered. Each question can have a maximum of 2 sub divisions. Each question carries 8 marks. Marks: (5x8 = 40 marks) Time: 3 hours	60
	Total Marks: 20	Total Marks: [5x8 = 40 marks]	
PATTERN 2		2 questions will be given from each module, out of which 1 question should be answered. Each question can have a maximum of 2 sub divisions. Each question carries 8 marks. Marks: (5x 8 = 40 marks) Time: 2.5 hours [150 minutes]	40
	Total Marks: 0	Total Marks: [5x8 = 40 marks]	

Assessment pattern and marks distribution for CIA and ESE

Mark Distribution

CIA

Course Structure (L-T-P-J)	Attendance	Theory (L- T)			Practical (P)		Project (J)			Total Marks
		Assignment*	Test-1	Test-2	Class work #	Lab Exam	Evaluation 1	Evalaution-2	Report	
2-0-0-0	5	35	30	30	-	-	-	-	-	**100**
1-0-2-0	5	10	20	-	25	40	-	-	-	**100**
3-1-0-0	5	15	10	10	-	-	-	-	-	**40**
2-1-2-0	5	10	10	10	15	10	-	-	-	**60**
2-0-2-2	5	-	10		20		10	10	5	**60**

* Recommended assessment tools for assignment are detailed below

Continuous Assessment of Lab

Assessment of Assignment component of CIA

Course Category	L-T-P-J	Credit	Assessment of Assignment component of CIA
Theory Course	2-0-0-0	2	One Assessment per Two and Half module
Theory Embedded with Practical	1-0-2-0		
Theory Course	3-1-0-0	4	One Assessment per Module, Best of FOUR shall be considered for Marks calculation.
Theory Embedded with Practical	2-1-2-0		

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Evaluation Type, CIA & ESE Mark Distribution: for courses with various course structure is given in the following table:

Evaluation Type	Course Category	L-T-P-J	Credit	CIA & ESE Marks	
				CIA Mark	ESE Mark
CIA only	Theory Course	2-0-0-0	2	100	--
	Theory Embedded with Practical	1-0-2-0	2		
	Seminar	0-0-2-0	1	50	
	Mini Project	0-0-6-0	3	100	
CIA + ESE	Theory Course	3-1-0-0	4	40	60
	Theory Embedded with Practical	2-1-2-0	4	60	40
	Project Based Course	2-0-2-2	5	60	40

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Assessment for Mini Project, Seminar and Main Project is given in the table given below

Course	Mark Distribution
Mini Project work	a. Continuous evaluation by Supervisor, Scrum Master and Project Guide – 50% b. Interim evaluation by the Project Assessment Board)-25% c. Final evaluation by the Project Assessment Board -25%
Seminar	The report and the presentation shall be evaluated by a team of internal members comprising two senior faculty members based on the style of presentation, technical content, adequacy of reference, depth of knowledge and overall quality of the report. a) Evaluation by Faculty Guide – 20 Marks b) Evaluation by the Faculty Committee-30 Marks **Assessment Criteria** • Scope and relevance of topic – 20% • Quality of presentation slides – 10% • Presentation Skill- 30% • Knowledge in the topic- 20% • Report-20%
Main Project (Research Project / Internship)	a) Continuous evaluation by Supervisor, Guide(s) and Scrum Master – 30 Marks(Internal) b) Evaluation by the Project Assessment Board- 40 Marks(Internal) c) Evaluation by the External expert- 30 Marks (External)

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Sl. No	Slot	Course Code	Category	Course Title	L	T	P	J	S	No. of Hours	No. of Credits	CIE Marks	ESE Marks
— SEMESTER I													
1	A	23MCAJ101	PBC	Programming in Python	2	-	2	2	5	6	5	60	40
2	B	23MCAP103	PCC	Mathematical Foundations for Computing	2	1	2		4	5	4	60	40
3	C	23MCAP105	PCC	Advanced Data Structures	2	1	2		4	5	4	60	40
4	D	23MCAT107	PCC	Computer Networks	3	1			3	4	4	40	60
5	I	23MCAP09	PCC	Data Analytics and Visualization	1	-	2		3	3	2	100	-
6	J	23MCAP11	PCC	Linux Commands and Shell Scripting	1	-	2		3	3	2	100	-
7	K	23MCAP13	PCC	Professional Communication & business etiquettes	1	-	2		3	3	2	100	-
				Mandatory course (Bridge Course : C, DBMS fundamentals and Operating System)									
					12	3	12	2	25	29	23		

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				SEMESTER II									
Sl. No	Slot	Course Code	Category	Course Title	L	T	P	J	S	No. of Hours	No. of Credits	CIE Marks	ESE Marks
1	A	23MCAJ202	PBC	Web Application Development	2	-	2	2	5	6	5	60	40
2	B	23MCAP204	PCC	Object Oriented Programming (JAVA)	2	1	2		4	5	4	60	40
3	C	23MCAP206	PCC	Advanced Database Management Systems	2	1	2		4	5	4	60	40
4	D	23MCAE2--	PEC	Elective 1 / MOOC Course	3	1			3	4	4	40	60
5	I	23MCAP208	PCC	Cloud Computing	1	-	2		3	3	2	100	-
6	J	23MCAP210	PCC	Applied Statistics with R	1	-	2		3	3	2	100	-
7	K	23MCAP212	PCC	Virtualisation and Containers	1	-	2		3	3	2	100	-
					12	3	12	2	25	29	23		

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SEMESTER III

Sl. No	Slot	Course Code	Category	Course Title	L	T	P	J	S	No. of Hours	No. of Credits	CIE Marks	ESE Marks
1	A	23MCAJ301	PBC	Machine Learning	2	-	2	2	5	6	5	60	40
2	B	23MCAT302	PCC	Advanced Software Engineering	3	1			3	4	4	40	60
3	C	23MCAE3--	PEC	Elective 2 / MOOC Course	3	1			3	4	4	40	60
4	D	23MCAE3--	PEC	Elective 3 / MOOC Course	3	1			3	4	4	40	60
5	I	23MCAP305	PCC	Mobile Application Development (Flutter)	1	-	2		3	3	2	100	-
6	L	23MCAT306	PCC	Cyber Security	2	-			2	2	2	100	-
7	U	23MCAM307	MP	Mini Project		-	6		6	6	3	100	-
					14	**3**	**10**	**2**	**25**	**29**	**24**		

SEMESTER IV

Sl. No	Slot	Course Code	Category	Course Title	L	T	P	J	S	No. of Hours	No. of Credits	CIE Marks	ESE Marks
1	U	23MCAN302	PR	Main Project (Research Project / Internship)	-	-	27		14	27	14	70	30
2	S	23MCAS304	SR	Seminar and Technical writing	-	-	2		2	2	1	50	-
3		23MCAC304	MC	Mandatory course : One MOOC Course					2	-	2		
							29		18	29	17	70	30
			TOTAL						**93**	**116**	**87**		

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Professional Elective Courses

Elective - 1	
23MCAE232	Design and Analysis of Algorithms
23MCAE234	Functional Programming
23MCAE236	Advanced Operating Systems
23MCAE238	Compiler Design
23MCAE240	Object Oriented Modelling and Design
23MCAE242	Organisational Behaviour
23MCAE244	Data Mining
23MCAE246	IPR and Cyber laws
23MCAE248	Cyber Forensics
23MCAE250	Mobile Communication
Elective 2 / Elective 3	
23MCAE331	Artificial Intelligence
23MCAE333	Data Visualisation Techniques
23MCAE335	Distributed Computing
23MCAE337	Digital Image Processing
23MCAE339	Big Data Analytics
23MCAE341	Operations Research
23MCAE343	Artificial Intelligence in medicine
23MCAE345	Artificial Intelligence in cyber Security
23MCAE347	Natural Language Processing
23MCAE349	Accountancy and Financial Management
23MCAE351	Optimization Techniques
23MCAE353	Wireless Sensor Networks
23MCAE355	Advanced Computer Graphics
23MCAE357	Internet of Things
23MCAE359	Computer Vision
23MCAE361	Deep Learning

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23MCAE363	Bioinformatics
23MCAE365	Social Network Analysis
23MCAE367	Embedded Systems
23MCAE369	Pattern Recognition
23MCAE371	Business Management
23MCAE373	Cryptography and Cyber Security

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