Semester IV							
THEORY							
Sl. No.	Paper Code	Paper Name	Contact Hours / Week				Credit
			L	T	P	Total	
1	**Open Elective**						
	MCAN-OE401	Open Elective **[1] Open Electives must be opted from the NPTEL/Swayam Platform.** [2] While opting for a course for pursuing the Open Elective, a student needs to ensure that: i) **Course must be of Post Graduate Category.** ii) The duration of the course must be minimum of 12-Weeks or of allotted credit. iii) While opting for the online elective, a student needs to ensure that the course was not opted in previous semesters of the program. iv) Date of Exam and publication of result should be within the tenure of the academic session. [3] Student must submit course domain at the time of enrollment of semester. [4] Student must submit the course completion certificate issued by NPTEL/Swayam only.	-	-	-	3	3
SESSIONAL							
1	MCAN-481	Compressive Viva-voce	-	-	-	-	2
2	MCAN-482	Major Project and Viva-voce	-	-	28	28	20
Total Class / Credit						**28**	**25**

Second Year: Semester-IV

Code: MCAN-OE401 **Paper: Open Elective**

A minimum 12-week online course from NPTEL Platform is to be opted in one of the following courses, but not limited to:

Data Science
- Data Analytics
- Learning Analytics Tools
- Deep Learning
- Deep Learning for Computer Vision
- Reinforcement Learning
- Computer Vision
- Natural Language Processing
- Applied Natural Language Processing
- Machine Learning
- Big Data Analysis
- Soft Computing

Algorithm
- Randomized Algorithms
- Parameterized Algorithms
- Parallel Algorithms.
- Computational Geometry
- Computational Complexity
- Arithmetic Circuit Complexity
- Foundations of Cryptography
- Computational Geometry
- Arithmetic Circuit Complexity
- Foundations of Cryptography
- Computational Number Theory and Algebra

Systems
- Compiler Design
- Cloud computing
- Parallel programming
- Internet of Things
- Cryptography and Network Security
- Real-Time Systems
- Advance Distributed Systems

Computational Biology
- BioInformatics: Algorithms and Applications
- Computational Systems Biology
- Proteogenomics
- Algorithms for protein modeling and engineering
- Computational Neuroscience

Communications and Signals
- Digital Signal Processing
- Digital Signal Processing Techniques and its Applications
- Information Theory
- Coding Theory
- Wireless and Cellular Communications
- Digital Image Processing
- Stochastic control and communication
- Real-Time Digital Signal Processing

Security
- Cyber Security
- Cyber Security Tools and Techniques
- Information Security
- Digital Forensics

VLSI Design
- C-Based VLSI Design
- Embedded Systems

Cognitive Science
- Cognition and its Computation

Robotics
- Introduction to Robotics

Digital Marketing

1. **The student must choose open elective in consultation with his/her program mentor.**
2. **Open Elective must be opted from the NPTEL/Swayam Platform.**
3. **Course must be of PG category (A PG Course is denote by either PG or UG/PG)**
4. **The duration of the course must be minimum of 12-Weeks.**
5. **While opting for the online elective, a student needs to ensure that the course was not opted in previous semesters of the program.**
6. **Student must submit the course details at the time of 4th semester enrollment.**
7. **Once enrolled, the opted course cannot be altered.**
8. **A student needs to submit a self-attested copy of the real certificate and marksheet of the course to his/her college authority well before the end of IV Semester.**

Code: MCAN-481	**Paper: Comprehensive Viva-Voce**	
Contacts Hours / Week: Not Applicable	**Total Contact Hours:** Not Applicable	**Credit: 2**

Course Objective

Objective of comprehensive viva-voce is to assess the overall knowledge of the student in the relevant field of computer science and application acquired over 2 years of study in the MCA Program. The viva shall normally cover the subjects taught in all the semesters of MCA Program. This will test the student's learning and understanding during the course. In doing so, the main objective of this course is to prepare the students to face interview both in the academic and the industrial sector.

Code: MCAN-482	**Paper: Major Project & Viva-Voce**	
Contacts Hours / Week: 28	**Total Contact Hours: 12-15 Weeks**	**Credit: 20**

A student needs to pursue a research/application based project in any of the following modes:

[A] In his/her institution under the supervision/mentorship of assigned teacher(s) belonging to that institution.

[B] In his/her institution under the joint supervision/mentorship of assigned teacher(s) belonging to that institution and invited external expert(s).

[C] In a research/software/hardware organization under the joint supervision/mentorship of assigned teacher(s) belonging to that institution and external expert(s) belonging to that research/software/hardware organization. On completion of the same, an evaluation will be made by the institution on the basis of Project Report, Project Presentation, Viva-voce and sufficient measures will be taken by the institution to understand that the project is an outcome based work as a product of student's sole effort.