

B. Tech (M & C) – Curriculum

Semester I									
Course No.	Course Name	Credits	Segments						
			1	2	3	4	5	6	
MA 1110	Calculus I	1	■	■					
MA 1220	Calculus II	2			■	■	■	■	
MA 1500	Math Foundation	1			■	■	■		
MA 1501	Introduction to Number System	1						■	■
CS 1310	Discrete Structures I	2	■	■	■	■			
ID 1054	Digital Fabrication	2							
ID 1035	Independent Project	1							
ID 1303	Introduction to Programming	2			■	■	■	■	
ID 1330	Applied Logic Digital Design	1	■	■					
PH /CY	Science Elective	1			■	■			
LA/CA	Electives	1							
	Total	15							

Semester II									
Course No	Course Name	Credits	Segments						
			1	2	3	4	5	6	
MA1130	Vector Calculus	1	■	■					
MA1140	Linear Algebra	1			■	■			
MA1150	Differential Equations	1						■	■
CS 1340	Discrete Structures II	2						■	■
CS1353	Introduction to Data Structures	3	■	■	■	■	■		
EE1210	Basic Control Theory	1	■	■					
ID 1370	Digital Signal Processing	1			■	■			
ID1360	Embedded Programming	1						■	■
LA /CA	LA / CA Electives	1	■	■					
FE ****	Free Elective	1							
PH /CY	Science Elective	2							
	Total	15							

	Semester								Total
	1	2	3	4	5	6	7	8	
MA Core	5	3	5	8	3	6	3	0	33
MA Elec	0	0	1	0	9	6	6	9	31
CS	2	5	7	6	2	0	0	0	22
EE	1	2	1	1	0	0	0	0	5
LA/CA	1	1	1	0	0	1	3	3	10
FE	0	1	0	0	2	3	3	3	12
Sci Elec	1	2	0	1	0	0	0	0	4
ID	5	1	1	1	0	0	0	0	8
Total	15	15	16	17	16	16	15	15	125

Semester III									
Course No	Course Name	Credits	Segments						
			1	2	3	4	5	6	
MA 2110	Probability	1	■	■					
MA 2120	Transforms	1			■	■			
MA 4020	Linear Algebra	3	■	■	■	■	■	■	
MnC ****	Dept Elective-I	1							
CS 2233	Data Structures	3	■	■	■	■	■	■	
CS 2323	Computer Architecture	2							
	Principles of Programming Languages I	1							
CS 2400	OS-I	1	■	■					
EE 2230	Random Processes	1						■	■
ID 1350	IoT	1	■	■					
LA/CA	Electives	1						■	■
	Total	16							

Semester IV									
Course No	Course Name	Credits	Segments						
			1	2	3	4	5	6	
MA 2130	Complex Variables	1	■	■					
MA 2140	Statistics	1			■	■			
MA 5060	Numerical Analysis	3	■	■	■	■	■	■	
MA 2150	Convex Optimization	3	■	■	■	■	■	■	
CS 2443	Algorithms	3	■	■	■	■	■	■	
CS 2410	Theory of Computation	2	■	■	■	■			
CS 2420	Intro to Complexity Theory	1						■	■
EE 2340	Information Sciences	1	■	■					
ID ****	AI	1							
PH/CY	Science Elective	1							
	Total	17							

Semester V									
Course No	Course Name	Credits	Segments						
			1	2	3	4	5	6	
MA 4010	Analysis of Functions of Single Variable	3	■	■	■	■	■	■	
MnC ****	Dept Electives - II	9	■	■	■	■	■	■	■
CS 3550	DBMs-I	1							
CS 3530	Computer Networks-I	1							
FE ****	Free Elective	2							
	Total	16							

Semester VI									
Course No	Course Name	Credits	Segments						
			1	2	3	4	5	6	
MA 4070	Groups and Rings	3	■	■	■	■	■	■	
MA 4090	Analysis of Functions of Several Variables	3	■	■	■	■	■	■	
MnC ****	Dept Electives - III	6	■	■	■	■	■	■	■
FE	Free Elective	3							
LA/CA	Professional Ethics	1							
	Total	16							

Semester VII									
Course No	Course Name	Credits	Segments						
			1	2	3	4	5	6	
MA 5020	Functional Analysis	3	■	■	■	■	■	■	
MnC ****	Dept Electives - IV	6	■	■	■	■	■	■	■
FE ****	Free Elective	3							
LA/CA	Electives	3							
	Total	15							

Semester VIII									
Course No	Course Name	Credits	Segments						
			1	2	3	4	5	6	
MnC ****	Dept Electives - V	9	■	■	■	■	■	■	■
LA/CA	Elective	3							
FE	Free Electives	3							
	Total	15							

S. No	Baskets
1	Theoretical Maths
2	Computational Mechanics
3	Coding and Cryptography
4	Computational Intelligence
5	Computing Labs

List of Electives and Suggestive Baskets*

B1 - Theoretical Maths:

MA4030 ORDINARY DIFFERENTIAL EQUATIONS
 MA4060 COMPLEX ANALYSIS
 MA4080 PARTIAL DIFFERENTIAL EQUATIONS
 MA5030 MEASURE AND INTEGRATION
 MA5050 MATHEMATICAL METHODS
 MA5040 TOPOLOGY
 MA5100 INTRODUCTION TO ALGEBRAIC TOPOLOGY
 MA5110 FOURIER ANALYSIS AND APPLICATIONS
 MA5140 MATHEMATICAL INTRODUCTION TO ELLIPTIC CURVES
 MA5150 ALGEBRAIC NUMBER THEORY
 MA5160 AN INTRODUCTION TO MODULAR FORMS
 MA5170 BASIC INTRODUCTION TO ALGEBRAIC GEOMETRY
 MA5180 ADVANCED MEASURE THEORY
 MA5190 ADVANCED PARTIAL DIFFERENTIAL EQUATIONS
 MA6070 APPROXIMATION THEORY
 MA6090 OPERATOR THEORY
 MA6110 CONVEX FUNCTIONS AND THEIR APPLICATIONS
 MA6120 AN INTRODUCTION TO OPERATOR ALGEBRAS
 MA6130 BANACH SPACE THEORY
 MA6150 DISCRETE DYNAMICAL SYSTEMS
 MA6160 BANACH ALGEBRAS
 MA6190 TRANSCENDENTAL NUMBER THEORY
 MA6080 MEASURE THEORETIC PROBABILITY
 MA5120 NUMERICAL LINEAR ALGEBRA

B2 - Computational Mechanics:

MnC 5700 CONTINUUM MECHANICS
 MnC 5710 INCOMPRESSIBLE FLUID FLOW
 MnC 5720 FINITE ELEMENT METHOD
 MnC 5730 COMPUTATIONAL FLUID DYNAMICS
 MnC 5740 ADVANCED FINITE ELEMENT METHOD
 MnC 5750 VARIATIONAL METHODS IN MECHANICS
 MnC 5760 ADVANCED FEM
 MnC 5770 ADVANCED COMPUTATIONAL FLUID DYNAMICS
 MnC 5780 COMPRESSIBLE FLOW AND ITS COMPUTATION

B3 - Coding and Cryptography:

MnC 5300 INFORMATION THEORY & CODING
 MnC 6300 COMPUTATIONAL NUMBER THEORY & ALGEBRA
 MnC 5310 ERROR CORRECTING CODES
 MnC 6310 QUANTUM COMPUTING
 MnC 5320 APPROXIMATION ALGORITHMS
 MnC 6320 TOPICS IN COMBINATORICS

B4 - Computational Intelligence:

MA6100 MATHEMATICS BEHIND MACHINE LEARNING
 MA6050 WAVELETS AND APPLICATIONS
 MA6060 REDUNDANT AND SPARSE REPRESENTATION THEORY
 MA6040 FUZZY LOGIC CONNECTIVES AND THEIR APPLICATIONS
 MA6140 COMPRESSIVE SENSING
 MnC 5500 INTRODUCTION TO MACHINE LEARNING
 MnC 5510 PATTERN RECOGNITION AND MACHINE LEARNING
 MnC 5510 INTRODUCTION TO STATISTICAL NLP
 MnC 5520 VISUAL RECOGNITION
 MnC 6500 MACHINE LEARNING
 MnC 6510 OPTIMIZATION METHODS IN MACHINE LEARNING
 MnC 6520 BAYESIAN DATA ANALYSIS
 MnC 6530 ADVANCED MACHINE LEARNING
 MnC 6540 ADVANCED TOPICS IN MACHINE LEARNING
 MnC 6550 QUEUING THEORY
 MnC 6560 STATISTICAL LEARNING THEORY

B5 - Computing Labs:

MnC 2111 INTRODUCTION TO MATLAB
 MnC 2121 INTRODUCTION TO R
 MnC 2101 INTRODUCTION TO PYTHON
 MnC 3101 FINITE ELEMENT METHODS LAB
 MnC 3111 COMPUTATIONAL FLUID DYNAMICS LAB
 MnC 5101 COMPUTATIONAL FLUID DYNAMICS TOOLS
 MnC 5111 MATHEMATICAL ELEMENTS FOR GEOMETRICAL MODELING
 MnC 5131 COMPUTATIONAL MATHEMATICS LAB

A Sample List of Electives for the Computational Intelligence Track

Semester 5

**MA 5120 Numerical Linear Algebra
 MnC 6520 Bayesian Data Analysis
 MnC 5500 Introduction to ML**

Semester 6

**MA 2150 onvex Optimisation
 MA6100 Math Behind ML
 MA5030 Measure Theory
 MnC 5510 PRML**

Semester 7

**MA 5020 Functional Analysis
 MnC 6510 Optimization for ML
 MA 6080 Measure Theoretic Probability**

Semester 8

**MnC 6560 Stat Learning Theory
 MA 6060 Sparse Rep Theory
 MnC 6530 Advance ML**

* Please note that (i) The splitting into baskets and the Sample Track are for illustration purposes only. (ii) All the electives may not be offered during all the semesters.