B.Tech in 'Mathematics and Computing' Curriculum (2021) | 4 Years

Note: The following courses are open to all B.Tech students under the Basic Sciences category.

Sem	Courses	Code	Credits	Seg	Remarks	Type
1	Calculus I	MA1110	1	12	Open to all	Basic Sciences
1	Calculus II	MA1220	1	34	Open to all (Prereq: MA 1110)	Basic Sciences
2	Elementary Linear Algebra	MA1140	1	12	Open to all	Basic Sciences
2	Differential Equations	MA1150	1	34	Open to all	Basic Sciences
3	Introduction to Probability	MA 2110	1	12	Open to all	Basic Sciences
4	Introduction to Statistics	MA 2140	1	12	Open to all (Prereq: MA 2110)	Basic Sciences

Semester 1 (4+0+11=15 credits)			
	Core Courses	Type of course	Credit
MA1240	Combinatorics	Departmental Core Theory	3
MA1500	Math Foundation	Departmental Core Theory	1
MA1110	Calculus I (Mandatory)	Basic Sciences	1
MA1220	Calculus II (Mandatory)	Basic Sciences	1
CY1018	Environmental Chemistry (Mandatory)	Basic Sciences	2
EP1108	Modern Physics (Mandatory)	Basic Sciences	2
ID1063	Introduction to Programming (Mandatory)	Basic Engineering Skills	3
LA1760	Communication Skills (Mandatory)	Soft Skills	2

Semester 2 (9+4+3=16 credits)			
	Core Courses	Type of course	Credit
MA1140	Elementary Linear Algebra	Basic Sciences	1
MA1150	Differential Equations	Basic Sciences	1
MA1230	Series of Functions	Departmental Core Theory	1
MA1250	Introduction to Number Theory	Departmental Core Theory	3

BO1010	Introduction to Life Sciences	Basic Sciences	1
EP1031	Physics Lab - 1	Basic Sciences	2
	Electives (2 credits)		*Credit*
	LA/CA Electives	Liberal Arts Elective/Creative Arts	1
	Basic Science course	Basic Sciences	3
AI1100	Artificial Intelligence(Mandatory)	Soft Skills	2
EM3020	Introduction to Entrepreneurship (Mandatory)	Soft Skills	1

Semester 3 (16+0+1=17 credits)			
	Core Courses	*Type of course*	*Credit*
EE1202	Digital Circuits	Basic Engineering Skills	3
MA2120	Transform Techniques	Departmental Core Theory	1
MA2150	Introduction to Metric Spaces	Departmental Core Theory	1
ID2230	Data Structures & Applications	Basic Engineering Skills	3
MA2233	Data Structures & Applications Lab	Departmental Core Laboratory	2
MA4020	Linear Algebra	Departmental Core Theory	3
MA4040	Probability Theory	Departmental Core Theory	3
	Electives (1 credit)		*Credit*
	Basic Science course	Basic Sciences	1

Semester 4 (17+0+0=17 credits)			
	Core Courses	*Type of course*	*Credit*
CS2030	Theory of Computation	Departmental Core Theory (cross listed course)	3
MA2070	Introduction to Group Theory	Departmental Core Theory	1
MA2101/AI2101	Convex Optimization	Departmental Core Theory	3
MA2130	Complex Variables	Departmental Core Theory	1
CS2443	Algorithms	Departmental Core Theory (cross listed course)	3
MA4030	Ordinary Differential Equations	Departmental Core Theory	3
MA4240	Applied Statistics	Departmental Core Theory	3

Semester 5 (14+3+0=17 credits)			
	Core Courses	**Type of course**	**Credit**
EE1206	Linear Systems and Signal Processing	Basic Engineering Skills	3
CS3510	Operating Systems I	Basic Engineering Skills	1
CS3550	DBMS 1	Basic Engineering Skills	1
MA4010	Analysis of Functions of Single Variables	Departmental Core Theory	3
MA4070	Algebra I - Groups and Rings	Departmental Core Theory	3
MA5060	Numerical Analysis	Departmental Core Theory	3
	Electives (3 credits)		**Credit**
	Free Electives	Free Elective	3

Semester 6 (4+11+0=15 credits)			
	Core Courses	**Type of course**	**Credit**
CS3320	Compilers-I	Basic Engineering Skills	1
MA4090	Multivariable Calculus	Departmental Core Theory	3
	Electives (11 credits)		**Credit**
	MA Electives	Departmental Elective	3
	MA Computational Electives	Departmental Elective	6
	Free Electives	Free Elective	2
	Project optional (3 or 6 credits)		**Credit**
MA3615	Credited Research Project - I		3
	Industry Project		6

Note: A B.Tech Maths and Computing (M&C) student can take a Credited Research Project - I of 3 credits from the Department electives. Moreover, If an M&C student wishes to take up the **Industry project worth 6 credits**, he/she can take the same in place of the Department electives in the 6th semester worth 6 credits.

Semester 7 (3+12+1=16 credits)			
	Core Courses	**Type of course**	**Credit**
MA5020	Functional Analysis	Departmental Core Theory	3
	Electives (12 credits)		**Credit**
	MA Electives	Departmental Elective	3
	MA Computational Electives	Departmental Elective	3
	LA/CA Electives	Liberal Arts Elective/Creative Arts	2
	Free Electives	Free Elective	4
	Personality development (Mandatory)	Soft Skills	1
	Project optional (3 credits)		**Credit**
MA4715	Credited Research Project - II		3

Semester 8 (0+15+0=15 credits)			
	Core Courses		**Credit**
	Electives (15 credits)		**Credit**
	MA Electives	Departmental Elective	6
	MA Computational Electives	Departmental Elective	3
	LA/CA Electives	Liberal Arts Elective/Creative Arts	3
	Free Electives	Free Elective	3
	Project optional (3 credits)		**Credit**
MA4715	Credited Research Project - III		3

Credited Research Projects: The Department of Mathematics offers the students of B.Tech M&C, the following option:

(i) To undertake credited research projects worth up to a maximum of 6 credits in lieu of equal course credits.

(ii) This can be undertaken during the 6th to 8th semesters and up to a maximum of 3 credits in any of the semesters.

B.Tech MnC curriculum credits distribution:

Sem	Dept: Core + Elec + Project	Dept. cross-listed	LA/CA	Basic Sci	Basic Engg	Soft Skills	Free	Total credits	# 3 credit courses
1	4	0	2	6	3	0	0	15	2
2	4	0	0	8	2	3	0	16	1
3	10	0	0	1	6	0	0	17	4
4	11	6	0	0	0	0	0	17	5
5	9	0	0	0	5	0	3	17	4
6	12	0	0	0	1	0	2	15	1+
7	9	0	3	0	0	1	4	16	1+
8	9	0	3	0	0	0	3	15	0+
Total	68	6	8	15	15	4	12	**128**	**18+**

Split-up of 125-130 credits:

Split-up of 125-130 credits:	Credits	M&C Curriculum	Description
Approx. 12-13% basic sciences,	~ 15 - 16	15	4 from M&C + 10 Basic sci + 1 Mandatory
Approx. 12-13% basic engineering skills	~ 15 - 16	15	15 credits of Basic Eng. Skills
Approx. 55-60% departmental subjects	~ 68 - 75	68+6	68 from Dept + 6 Dept. cross listed courses
Approx. 7-8% liberal/creative arts	~ 8 - 9	8	8 LA/CA Elective
Approx. 10% free electives	~ 12 - 13	12	
Soft Skills		4	AI + Entrep. course + Personality development.
		128	

- **8 LA/CA Elective*** - Maximum of 6 LA courses or a maximum of 4 CA courses.
- **The number of 3 credits courses:** 18 courses + more from 24 credits of Dept electives and 12 credits of free electives.
- **6 credits of Industry project** in the 6th semester in place of Dept. electives
- **Mandatory SS courses**: Communication Skills, Personality development, Artificial Intelligence, Introduction to Entrepreneurship.