

**B.Tech in 'Mathematics and Computing' Curriculum (2024)**

<b>Semester 1 (16 credits)</b>			
	<b>Core Courses</b>	<b>Type of course</b>	<b>Credit</b>
MA1110	Calculus I	Basic Sciences	1
MA1220	Calculus II	Basic Sciences	1
CY1010	Environmental Chemistry	Basic Sciences	2
EP1108	Modern Physics	Basic Sciences	2
MA1130	Vector Calculus	Departmental Core Theory	1
LA1760	Communication Skills	Liberal Arts (Soft Skills)	2
MA1000	Math Foundation	Departmental Core Theory	3
ID1063	Introduction to Programming	Basic Engineering Skills	3
BT1010	Introduction to Life Sciences	Basic Sciences (Soft Skills)	1
			<b>16</b>

<b>Semester 2 (18 credits)</b>			
	<b>Core Courses</b>	<b>Type of course</b>	<b>Credit</b>
MA1140	Elementary Linear Algebra	Basic Sciences	1
MA1150	Differential Equations	Basic Sciences	1
EP1031	Physics Lab - 1	Basic Sciences	2
MA1230	Series of Functions	Departmental Core Theory	1
MA1250	Introduction to Number Theory	Departmental Core Theory	3

AI1100	Artificial Intelligence	Basic Engineering Skills	1
EE1102	Basic Electrical Engineering	Basic Engineering Skills	3
	LA/CA Electives	Liberal Arts Elective/Creative Arts	3
	<i>Departmental Elective*</i>	<i>Departmental Elective</i>	3
			<b>18</b>

\*The elective course may be converted into the core or maybe moved to some other semesters.

<b>Semester 3 (18 credits)</b>			
	<b><i>Core Courses</i></b>	<b><i>Type of course</i></b>	<b><i>Credit</i></b>
EE1206	Linear Systems and Signal Processing	Basic Engineering Skills	3
ID2230	Data Structures & Applications	Basic Engineering Skills	3
MA2120	Transform Techniques	Basic Science	1
MA2150	Introduction to Metric Spaces	Departmental Core Theory	1
MA2233	Data Structures & Applications Lab	Departmental Core Laboratory	3
MA2550	Linear Algebra	Departmental Core Theory	3
MA2540	Probability Theory	Departmental Core Theory	3
	LA/CA Electives	Liberal Arts Elective/Creative Arts	1
			<b>18</b>

<b>Semester 4 (18 credits)</b>			
	<b><i>Core Courses</i></b>	<b><i>Type of course</i></b>	<b><i>Credit</i></b>
MA2101/AI2101	Convex Optimization	Departmental Core Theory	3
MA2130	Complex Variables	Basic Science	1
CS2030	Theory of Computation	Departmental Core Theory (cross listed course)	3
CS2443	Algorithms	Departmental Core Theory (cross listed course)	3
MA2030	Ordinary Differential Equations	Departmental Core Theory	3
MA2570	Applied Statistics	Departmental Core Theory	3
MA2070	Introduction to Group Theory	Departmental Core Theory	1
CS3320	Compilers-I	Basic Engineering Skills	1
			<b>18</b>

<b>Semester 5 (17 credits)</b>			
	<b><i>Core Courses</i></b>	<b><i>Type of course</i></b>	<b><i>Credit</i></b>
MA4050	Combinatorics and Graph theory	Departmental Core Theory	3
CS3510	Operating Systems I	Basic Engineering Skills	1
CS3550	DBMS 1	Basic Engineering Skills	1
MA3010	Real Analysis	Departmental Core Theory	3
MA3070	Algebra I - Groups and Rings	Departmental Core Theory	3
MA3060	Numerical Analysis	Departmental Core Theory	3
	Free Electives	Free Elective	3
			<b>17</b>

<b>Semester 6 (14 credits)</b>			
	<b><i>Core Courses</i></b>	<b><i>Type of course</i></b>	<b><i>Credit</i></b>
	MA Electives	Departmental Elective	3
	MA Computational Electives	Departmental Elective	3
	Basic Science (MA Elective)	Basic Science	3
	Free Electives	Free Elective	3
	LA/CA Electives	Liberal Arts Elective/Creative Arts	2
	<b><i>Project optional (3 or 6 credits)</i></b>		<b><i>Credit</i></b>
MA3615	Credited Research Project - I		3
MA3405	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.

<b>Semester 7 (16 credits)</b>			
	<b><i>Core Courses</i></b>	<b><i>Type of course</i></b>	<b><i>Credit</i></b>
MA4420	Functional Analysis	Departmental Core Theory	3
	MA Electives	Departmental Elective	6
	MA Computational Electives	Departmental Elective	3
	Free Electives	Free Elective	3
LA1770	Personality development	Liberal Arts (Soft Skills)	1
	<b><i>Project optional (3 credits)</i></b>		<b><i>Credit</i></b>
MA4715	Credited Research Project - II		3

<b>Semester 8 (12 credits)</b>			
	<i>Courses</i>	<i>Type of course</i>	<i>Credit</i>
	MA Electives	Departmental Elective	6
	MA Computational Electives	Departmental Elective	3
	Free Electives	Free Elective	3
	<b><i>Project optional (3 credits)</i></b>		<b><i>Credit</i></b>
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 Mathematics and Computing curriculum credits distribution:**

Sem	Dept Core + Elec	LA/CA	Basic Sci	Basic Engg	Free Ele	Total credits	# 3 credit courses
1	4	2	7	3	0	16	2
2	7	3	4	4	0	18	2
3	10	1	1	6	0	18	5
4	16	0	1	1	0	18	5
5	12	0	0	2	3	17	4
6	6	2	3	0	3	14	
7	12	1	0	0	3	16	1
8	9	0	0	0	3	12	
<b>Total</b>	<b>76</b>	<b>9</b>	<b>16</b>	<b>16</b>	<b>12</b>	<b>129</b>	<b>19</b>

<b>Split-up of 129 credits</b>	<b>Credits range</b>	<b>B.Tech Mathematics and Computing curriculum</b>
Approx. 12-13% Basic Sciences	15-17	16
Approx. 12-13% Basic Engg skills	15-17	16
Approx. 55-60% Departmental subjects	71 - 77	76
Approx. 7-8% Liberal/Creative Arts	9 - 10	9
Approx. 10% Free electives	12-13	12
		<b>129</b>

- Maximum of 6 LA courses or a maximum of 4 CA courses.
- **The number of 3 credits courses:** 19 courses at present. We expect more 3 credits courses from 38 credits of electives ( 25 credits of Dept electives and 13 credits of free electives.)
- **6 credits of Industry project** in the 6th semester in place of Dept. electives
- **Soft Skill courses:** Communication Skills, Personality development, Artificial Intelligence, Introduction to Life Sciences, Introduction to Entrepreneurship.