

# Bachelor of Technology in Mathematics and Computing

Department of Mathematics

## The overall Credit Structure

Course Category	Credits
<b>Institute Core Courses</b>	
Basic Sciences (BS)	22
Engineering Arts and Science (EAS)	18
Humanities and Social Sciences (HuSS)	15
<b>Programme-linked Courses</b>	12.5
<b>Departmental Courses</b>	
Departmental Core	63.5
Departmental Electives	12
<b>Open Category Courses</b>	10
<b>Total Graded Credit requirement</b>	<b>153</b>
<b>Non Graded Units</b>	<b>15</b>

MTL146	Combinatorics	3	0	0	3
MTL260	Boundary Value Problems	3	0	0	3
MTL270	Measure Integral and Probability	3	0	0	3
MTL311	Parallel Algorithms	3	0	0	3
MTD350	Mini Project	0	0	6	3
MTL365	Mathematical Programming Techniques	3	0	0	3
MTL373	Wavelets and Applications	3	0	0	3
MTL375	Programming Languages	3	0	0	3
MTL376	Graph Algorithms	3	0	0	3
MTL381	Finite Element Theory and Applications	3	0	0	3
MTL465	Parallel Computing	3	0	0	3
MTL466	Multivariate Statistical Methods	3	0	0	3
MTL468	Graph Theory	3	0	0	3

## Institute Core : Basic Sciences

CML100	General Chemistry	3	0	0	3
CMP100	Chemistry Laboratory	0	0	4	2
MTL100	Calculus	3	1	0	4
MTL101	Linear Algebra and Differential Equations	3	1	0	4
PYL100	Electromagnetic Waves and Quantum Mechanics	3	0	0	3
PYP100	Physics Laboratory	0	0	4	2
SBL100	Introductory Biology for Engineers	3	0	2	4
<b>Total Credits</b>		<b>22</b>			

## Institute Core: Engineering Arts and Sciences

APL100	Engineering Mechanics	3	1	0	4
COL100	Introduction to Computer Science	3	0	2	4
CVL100	Environmental Science	2	0	0	2
ELL100	Introduction to Electrical Engineering	3	0	2	4
MCP100	Introduction to Engineering Visualization	0	0	4	2
MCP101	Product Realization through Manufacturing	0	0	4	2
<b>Total Credits</b>		<b>18</b>			

## Programme-Linked Basic / Engineering Arts / Sciences Core

COL106	Data Structures and Algorithms	3	0	4	5
ELL201	Digital Electronics	3	0	3	4.5
PYL102	Principles of Electronic Materials	3	0	0	3
<b>Total Credits</b>		<b>12.5</b>			

## Departmental Core

ELL305	Computer Architecture	3	0	0	3
ELP305	Design and System Laboratory	0	0	3	1.5
MTL102	Differential Equations	3	0	0	3
MTL103	Optimization Methods and Applications	3	0	0	3
MTL104	Linear Algebra and Applications	3	0	0	3
MTL105	Algebra	3	0	0	3
MTL106	Probability and Stochastic Processes	3	1	0	4
MTL107	Numerical Methods and Computations	3	0	0	3
MTL122	Real and Complex Analysis	3	1	0	4
MTL180	Discrete Mathematical Structures	3	1	0	4
MTP290	Computing Laboratory	0	0	4	2
MTL342	Analysis and Design of Algorithms	3	1	0	4
MTL358	Operating Systems	3	0	2	4
MTL383	Theory of Computation	3	0	0	3
MTL390	Statistical Methods	3	1	0	4
MTD411	B.Tech. Project	0	0	8	4
MTL411	Functional Analysis	3	0	0	3
MTL445	Computational Methods for Differential Equations	3	0	2	4
MTL782	Data Mining	3	0	2	4
<b>Total Credits</b>		<b>63.5</b>			

## Departmental Electives

COL334	Computer Networks	3	0	2	4
MTL145	Number Theory	3	0	0	3

## PG Courses

COL728	Compiler Design	3	0	3	4.5
ELL715	Digital Image Processing	3	0	2	4
ELL785	Computer Communication Networks	3	0	0	3
ELL786	Multimedia Systems	3	0	0	3
ELL789	Intelligent Systems	3	0	0	3
ELL792	Computer Graphics	3	0	0	3
ELL793	Computer Vision	3	0	0	3
ELL884	Information Retrieval	3	0	0	3
MTL704	Numerical Optimization	3	0	0	3
MTL710	Database Management Systems	3	0	2	4
MTL717	Fuzzy Sets and Applications	3	0	0	3
MTL720	Neurocomputing and Applications	3	0	0	3
MTL725	Stochastic Processes and its Applications	3	0	0	3
MTL728	Category Theory	3	0	0	3
MTL729	Computational Algebra and its Applications	3	0	0	3
MTL730	Cryptography	3	0	0	3
MTL731	Introduction to Chaotic Dynamical Systems	3	0	0	3
MTL732	Financial Mathematics	3	0	0	3
MTL733	Stochastic of Finance	3	0	0	3
MTL735	Advanced Number Theory	3	0	0	3
MTL738	Commutative Algebra	3	0	0	3
MTL739	Representation of Finite Groups	3	0	0	3
MTL741	Fractal Geometry	3	0	0	3
MTL742	Operator Theory	3	0	0	3
MTL743	Fourier Analysis	3	0	0	3
MTL744	Mathematical Theory of Coding	3	0	0	3
MTL745	Advanced Matrix Theory	3	0	0	3
MTL747	Mathematical Logic	3	0	0	3
MTL751	Symbolic Dynamics	3	0	0	3
MTL754	Principles of Computer Graphics	3	0	0	3
MTL755	Algebraic Geometry	3	0	0	3
MTL756	Lie Algebras and Lie Groups	3	0	0	3
MTL757	Introduction to Algebraic Topology	3	0	0	3
MTL760	Advanced Algorithms	3	0	0	3
MTL761	Basic Ergodic Theory	3	0	0	3
MTL762	Probability Theory	3	0	0	3
MTL763	Introduction to Game Theory	3	0	0	3
MTL765	Parallel Computing	3	0	0	3
MTL766	Multivariate Statistical Methods	3	0	0	3
MTL770	Combinatorial Optimization	3	0	0	3
MTL785	Natural Language Processing	3	0	0	3
MTL792	Modern Methods in Partial Differential equations	3	0	0	3
MTL793	Numerical Methods for Hyperbolic PDEs	3	0	0	3
MTL794	Advanced Probability Theory	3	0	0	3
MTL795	Numerical Method for Partial Differential Equations	3	1	0	4
MTV791	Special Module in Dynamical System	1	0	0	1

## B. Tech. in Mathematics and Computing

## MT1

Semester	Course-1	Course-2	Course-3	Course-4	Course-5	Course-6	Course-7	Course-8	Course-9	L	T	P	Credits	Non-Graded Units	Contact Hours
	I	ELL100 Introduction to Electrical Engineering	MCP100 Introduction to Engineering Visualization	PYL100 Electromagnetic Waves and Quantum Mechanics	MTL100 Calculus	PYP100 Physics Laboratory	MCP101 Product Realization through Manufacturing	NIN100 Introduction to Engineering (Non-graded)	NEN100 Professional Ethics and Social Responsibility-1 (Non-graded)	NLN100 Language and Writing Skills-1 (Non-Graded)					
3 0 2 4		0.5 0 3 2	3 0 0 3	3 1 0 4	0 0 4 2	0 0 4 2	0 0 2 1	0 0 1 0.5	0 0 2 1	9.5	1	13	17.0	2.5	28.5
II	APL100 Engineering Mechanics	COL100 Introduction to Computer Science	CML100 Introduction to Chemistry	MTL101 Linear Algebra and Differential Equations	CMP100 Chemistry Laboratory			NEN100 Professional Ethics and Social Responsibility-2 (Non-graded)	NLN100 Language and Writing Skills-2 (Non-Graded)						
	3 1 0 4	3 0 2 4	3 0 0 3	3 1 0 4	0 0 4 2			0 0 1 0.5	0 0 2 1	12	2	6	17.0	1.5	23.0
Note: Courses 1-6 above are attended in the given order by half of all first year students. The other half of First year students attend the Courses 1-6 of II semester first.															
III	COL106 Data Structures & Algorithms	MTL180 Discrete Mathematical Structures	PYL102 Principles of Electronic Materials	CVL100 Environmental Science	MTL104 Linear Algebra and Applications	HUL2XX	MTN101 Intro. to Mathematics & Computing (Non-graded)								
	3 0 4 5	3 1 0 4	3 0 0 3	2 0 0 2	3 0 0 3	3 1 0 4	0 0 2 1			17	2	4	21.0	1	25.0
IV	MTL122 Real and Complex Analysis	ELL201 Digital Electronics	MTL103 Optimization Methods and Applications	SBL100 Introduction to Biology for Engineers	MTP290 Computing Laboratory	HUL2XX									
	3 1 0 4	3 0 3 4.5	3 0 0 3	3 0 2 4	0 0 4 2	3 1 0 4				15	2	9	21.5	0	26.0
V	MTL106 Probability and Stochastic Processes	ELL305 Computer Architecture	MTL105 Algebra	MTL107 Numerical Methods and Computation	MTL342 Analysis and Design of Algorithms	HUL2XX									
	3 1 0 4	3 0 0 3	3 0 0 3	3 0 0 3	3 1 0 4	3 1 0 4				18	3	0	21.0	0	21.0
VI	MTL102 Differential Equations	MTL782 Data Mining	MTL390 Statistical Methods	MTL411 Functional Analysis	DE 1	ELP305 Design and System Laboratory									
	3 0 0 3	3 0 2 4	3 1 0 4	3 0 0 3	3 0 0 3	0 0 3 1.5				15	1	5	18.5	0	21.0
VII	MTL712 Computational Methods for Differential Equations	MTL783 Theory of Computation	DE 2	MTL458 Operating Systems	OC 1	HUL3XX									
	3 0 2 4	3 0 0 3	3 0 0 3	3 0 2 4	3 0 0 3	3 0 0 3				18	0	4	20.0	0	22.0
VIII	OC 2	OC 3	DE 3	DE 4	MTD421 B.Tech. Project										
	3 1 0 4	3 0 0 3	3 0 0 3	3 0 0 3	0 0 8 4					12	1	8	17.0	0	21.0

**TOTAL=153.0**