Programme Code: **MT6**

Dual Degree Programme: Bachelor of Technology and Master of Technology in *Mathematics and Computing*

Department of Mathematics

The overall Credit Structure

Course Category	Credits
Institute Core Courses	
Basic Sciences (BS)	22
Engineering Arts and Science (EAS)	18
Humanities and Social Sciences (HuSS)	15
Programme-linked Courses	12.5
Departmental Courses	
Departmental Core	59.5
Departmental Electives	12
Open Category Courses	10
Total B.Tech. Credit requirement	**149**
Non Graded Units	**15**
M.Tech. Part	
Programme Core Courses	22
Programme Electives Courses	16
Total M.Tech. Requirement	**38**
Grand Total Credit Requirement	**187**

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
	Total Credits				***22***

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	Engineering Visualization	0	0	4	2
MCP101	Product Realization through Manufacturing	0	0	4	2
	Total Credits				***18***

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
	Total Credits				***12.5***

Humanities and Social Sciences

Courses from Humanities, Social Sciences and Management offered under this category **15**

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
MTL411	Functional Analysis	3	0	0	3
MTL445	Computational Methods for Differential Equations	3	0	2	4
MTL782	Data Mining	3	0	2	4
	Total Credits				***59.5***

Departmental Electives

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

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
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

Program Core

MTD851	Major Project Part-I	0	0	12	6
MTD852	Major Project Part-II	0	0	32	16
MTD853	Major Project Part-I	0	0	8	4
MTD854	Major Project Part-II	0	0	36	18
	Total Credits				***22***

Program Electives

COL728	Compiler Design	3	0	3	4.5
COL729	Compiler Optimization	3	0	3	4.5
COL730	Parallel Programming	3	0	2	4
COL732	Virtualization and Cloud Computing	3	0	2	4
COL740	Software Engineering	3	0	2	4
COL750	Foundations of Automatic Verification	3	0	2	4
COL751	Algorithmic Graph Theory	3	0	0	3
COL752	Geometric Algorithms	3	0	0	3
COL753	Complexity Theory	3	0	0	3
COL754	Approximation Algorithms	3	0	0	3
COL756	Mathematical Programming	3	0	0	3
COL757	Model Centric Algorithm Design	3	0	2	4
COL758	Advanced Algorithms	3	0	2	4
COL759	Cryptography & Computer Security	3	0	0	3
COL760	Advanced Data Management	3	0	2	4
COL762	Database Implementation	3	0	2	4
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

Dual Degree Programme: B. Tech. and M. Tech. in Mathematics and Computing

MT6

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 3 0 2 4	MCP100 Introduction to Engineering Visualization 0.5 0 3 2	PYL100 Electromagnetic Waves and Quantum Mechanics 3 0 0 3	MTL100 Calculus 3 1 0 4	PYP100 Physics Laboratory 0 0 4 2	MCP101 Product Realization through Manufacturing 0 0 4 2	NIN100 Introduction to Engineering (Non-graded) 0 0 2 1	NEN100 Professional Ethics and Social Responsibility-1 (Non-graded) 0 0 1 0.5	NLN100 Language and Writing Skills-1 (Non-Graded) 0 0 2 1	9.5	1	13	17.0	2.5	28.5
II	APL100 Engineering Mechanics 3 1 0 4	COL100 Introduction to Computer Science 3 0 2 4	CML100 Introduction to Chemistry 3 0 0 3	MTL101 Linear Algebra and Differential Equations 3 1 0 4	CMP100 Chemistry Laboratory 0 0 4 2			NEN100 Professional Ethics and Social Responsibility-2 (Non-graded) 0 0 1 0.5	NLN100 Language and Writing Skills-2 (Non-Graded) 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 3 0 4 5	MTL180 Discrete Mathematical Structures 3 1 0 4	PYL102 Principles of Electronic Materials 3 0 0 3	CVL100 Environmental Science 2 0 0 2	MTL104 Linear Algebra and Applications 3 0 0 3	HUL2XX 3 1 0 4	MTN101 Intro. to Mathematics & Computing (Non-graded) 0 0 2 1			17	2	4	21.0	1	25.0
IV	MTL122 Real and Complex Analysis 3 1 0 4	ELL201 Digital Electronics 3 0 3 4.5	MTL103 Optimization Methods and Applications 3 0 0 3	SBL100 Introduction to Biology for Engineers 3 0 2 4	MTP290 Computing Laboratory 0 0 4 2	HUL2XX 3 1 0 4				15	2	9	21.5	0	26.0
V	MTL106 Probability and Stochastic Processes 3 1 0 4	ELL305 Computer Architecture 3 0 0 3	MTL105 Algebra 3 0 0 3	MTL107 Numerical Methods and Computation 3 0 0 3	MTL342 Analysis and Design of Algorithms 3 1 0 4	HUL2XX 3 1 0 4				18	3	0	21.0	0	21.0
VI	MTL102 Differential Equations 3 0 0 3	MTL782 Data Mining 3 0 2 4	MTL390 Statistical Methods 3 1 0 4	MTL411 Functional Analysis 3 0 0 3	DE 1 3 0 0 3	ELP305 Design and System Laboratory 0 0 3 1.5				15	1	5	18.5	0	21.0
VII	MTL712 Computational Methods for Differential Equations 3 0 2 4	MTL783 Theory of Computation 3 0 0 3	DE 2 3 0 0 3	MTL358 Operating Systems 3 0 2 4	OC 1 3 0 0 3	HUL3XX 3 0 0 3				18	0	4	20.0	0	22.0
VIII	OC 2 3 0 0 3	OE 1 3 0 0 3	PE 1 3 0 0 3	PE 2 3 0 0 3	PE 3 3 0 0 3	PE 4 3 0 0 3				18	0	0	18.0	0	18.0
IX	MTD851 0 0 12 6	MTL781 3 0 0 3	MTL766 3 0 0 3	PE 5 3 0 0 3	PE 6 3 0 0 3	OE 2 3 0 0 3				15	0	12	21.0	0	27.0
X	MTD852 0 0 24 12									0	0	24	12.0	0	24.0

TOTAL=187.0