2024 onwards Curriculum for B. Tech. in Mathematics and Computing

General Course Structure and Theme

Definition of Credit:

1 Hr. Lecture (L) per week 1 credit

1 Hr. Tutorial (T) per week 1 credit

1 Hr. Practical (P) per week 0.5 credit

2 Hours Practical (P) per week 1 credit

The total number of credits proposed for the Four-Year B. Tech. program in Mathematics and Computing is 160.

S. No	Category	Code	Credit Breakup (As per 2018 revision)	Revised Credit Breakup (2024 onwards)
1	Humanities and Social Sciences including Management courses	HSC	14	12
2	Basic Science courses	BSC	24	25
3	Engineering Science courses including workshop, drawing, basics of electronics/electrical/mechanical/computer etc.	ESC	25	18
4	Professional core courses	PCC	45	54
5	Professional Elective courses relevant to chosen specialization/branch	PEC	24	21
6	Open subjects – Electives from other technical and /or emerging subjects	OEC	09	08
7	Project work, seminar and internship in industry or elsewhere	PRC	16	22
8	Mandatory Courses [Environmental Sciences, Induction Program, Indian Constitution, Essence of Indian Knowledge Tradition]	OMC	3	(non-credit)
	Total		160	160

4 Year B. Tech. Degree Course-Mathematics and Computing

w.e.f. 2024-25 Batch

FIRST SEMESTER

S. No.	Course Code	Course Title	Category	Contact Hours L	T	P	Total	Credits
1.	15B11MA111	Mathematics-1	BSC	3	1	0	4	4
2.	15B11PH111	Physics-1	BSC	3	1	0	4	4
3.	15B11CI111	Software Development Fundamentals-I	ESC	3	1	0	4	4
4.	15B11HS112	English	HSC	1	0	2	3	2
5.	15B17PH171	Physics Lab-1	BSC	0	0	2	2	1
6.	24B15CS111	Software Development Fundamentals Lab-I	ESC	0	0	2	2	1
7.	18B15GE111	Engineering Drawing & Design	ESC	0	0	3	3	1.5
8	24B11EC111	Basic Electronics	ESC	3	1	0	4	4
9	24B15EC111	Basic Electronics Lab	ESC	0	0	2	2	1
		TOTAL					28	22.5

SECOND SEMESTER

S. No.	Course Code	Course Title	Category	Contact Hours L	T	P	Total	Credits
1.	15B11MA211	Mathematics-2	BSC	3	1	0	4	4
2.	15B11PH211	Physics-2	BSC	3	1	0	4	4
3.	15B11CI121	Software Development Fundamentals-II	ESC	3	1	0	4	4
4.	15B17PH271	Physics Lab-2	BSC	0	0	2	2	1
5.	24B15CS121	Software Development Fundamentals Lab-II	ESC	0	0	2	2	1
6.	24B16HS111	Life Skills & Professional Communication Lab	HSC	0	0	2	2	Qualifying
7.	18B15GE112	Workshop	ESC	0	0	3	3	1.5
8	24B11HS111	Universal Human Values (UHV)	HSC	2	1	0	3	3
		TOTAL					24	18.5

THIRD SEMESTER

S. No.	Course			Contact Hours				Credits
	Course Code	Course Title	Category	L	T	P	Total	
1.	25B11MA211	Mathematical Foundations of Probability and Statistics	BSC	3	1	0	4	4
2.	25B11MA212	Discrete Mathematical Structures	PCC	3	1	0	4	4
3.	15B11CI311	Data Structures	PCC	3	1	0	4	4
4.	15B11CI312	Database Systems and Web	PCC	3	1	0	4	4
5	15B17CI371	Data Structures Lab	PCC	0	0	2	2	1
6.	15B17CI372	Database Systems and Web Lab	PCC	0	0	2	2	1
7.	24B15CS215	Object Oriented Programming using Java	PCC	0	0	2	2	1
8.	15B11HS211	Economics	HSC	2	1	0	3	3
9	24B37MA211	Summer Training-I (4 weeks)	PRC	0	0	0	0	2
10	19B13BT211	Environmental Studies	OMC	3	0	0	3	Qualifying
		TOTAL					28	24

FOURTH SEMESTER

S. No.	Course			Contact Hours				Credits
	Course Code	Course Title	Category	L	T	P	Total	
1.	XXXXXX	HSS Elective – 1	HSC	2	1	0	3	3
2.	24B31MA212	Numeral Methods and Computation	PCC	3	1	0	4	4
3.	15B11CI313	Computer Organization and Architecture	PCC	3	1	0	4	4
4.	15B11CI411	Algorithms and Problem Solving	PCC	3	1	0	4	4
5.	24B31MA213	Linear Algebra and Applications	PCC	3	0	0	3	3
6.	24B35MA211	Numeral Methods and Computation Lab	PCC	0	0	2	2	1
7	24B35MA212	Python Software Lab	PCC	0	0	2	2	1
8	15B17CI471	Algorithms and Problem-Solving Lab	PCC	0	0	2	2	1
9	XXXXXX	Discipline Elective-1	PEC	3/2	0	0/2	3/4	3
		TOTAL					27/28	24

FIFTH SEMESTER

S. No.	Course Code	Course Title	Category	Contact Hours L	T	P	Total	Credits
1.	24B31MA311	Real and Complex Analysis	PCC	3	1	0	4	4
2.	15B11CI412	Operating Systems and Systems Programming	PCC	3	1	0	4	4
3	24B35MA311	R-Software Lab	PCC	0	0	2	2	1
4.	15B17CI472	Operating Systems and Systems Programming Lab	PCC	0	0	2	2	1
5.	XXXXXX	Discipline Elective– 2	PEC	3/2	0	0/2	3/4	3
6	XXXXXX	Discipline Elective– 3	PEC	3/2	0	0/2	3/4	3
7	XXXXXX	Science Elective	BSC	3		0	3	3
8	18B12HS311	Indian Constitution & Traditional Knowledge	OMC	3	0	0	3	Qualifying
9	24B37MA311	Summer Training-II (6 weeks)	PRC	0	0	0	0	2
		TOTAL					24/26	21

SIXTH SEMESTER

S. No.	Course Code	Course Title	Category	Contact Hours L	T	P	Total	Credits
1.	18B11CS311	Computer Networks and Internet of Things	PCC	3	0	0	3	3
2.	15B11CI514	Artificial Intelligence	PCC	3	0	0	3	3
3.	24B31MA312	Theory of Computation	PCC	3	0	0	3	3
4.	XXXXXX	Discipline Elective – 4	PEC	3/2	0	0/2	3/4	3
5	XXXXXX	Discipline Elective-5	PEC	3/2	0	0/2	3/4	3
6	XXXXXX	Open Elective - 1	OEC	2	0	0	2	2
7	XXXXXX	Selected Value-Added Course	Value added	2	0	0	2	Audit
8	18B15CS311	Computer Networks and Internet of Things Lab	PCC	0	0	2	2	1
9	15B17CI574	Artificial Intelligence Lab	PCC	0	0	2	2	1
10	24B15HS311	Soft Skill for Employability	HSC	0	0	2	2	1
11	24B37MA312	Minor Project	PRC	0	0	4	4	2
		TOTAL					29	22

SEVENTH SEMESTER

S. No.	Course		Contact Hours				Credits	
	Course Code	Course Title	Category	L	T	P	Total	
1.	XXXXXX	Discipline Elective – 6	PEC	3/2	0	0/2	3/4	3
2.	XXXXXX	Open Elective - 2	OEC	3	0	0	3	3
3.	24B37MA411	Major Project Part-1	PRC	0	0	0	8	4
4.	24B37MA412	Summer Training-III (6 weeks)	PRC	0	0	0	0	4
		TOTAL					14	14

EIGHTH SEMESTER

S. No.	Course			Contact Hours				Credits
	Course Code	Course Title	Category	L	T	P	Total	
1.	XXXXXX	Discipline Elective -7	PEC	3/2	0	0/2	3/4	3
2.	XXXXXX	Open Elective -3	OEC	3	0	0	3	3
3.	24B37MA413	Major Project Part-2	PRC	0	0	16	16	8
		TOTAL					22	14

Total Credits for B. Tech. –160

Mandatory Internships/Summer Trainings

Summer Training -I (4 weeks) (In summer vacation after second semester)

Sr. No.	Course		Course Category	Contact Hours				Credits
	No.	Title		L	T	P	Total	
1.	xxxxxxx	Inter/Intra institutional activites (Training with higher Institutions; Soft skill training organized by Training and Placement Cell of the respective institutions; contribution at incubation/ innovation /entrepreneurship cell of the institute; participation in conferences/ workshops/ competitions etc.; Learning at Departmental Lab/ Tinkering Lab/ Institutional workshop; Working for consultancy/ research project within the institutes and Participation in all the activities of Institute's Innovation Council for eg: IPR workshop/ Leadership Talks/ Idea/Design/ Innovation/ Business Completion/ Technical Expos etc.)	PRC1	0	0	6	6	2
		TOTAL					6	2

Summer Training -II (6 weeks) (In summer vacation after fourth semester)

Sr. No.	Course		Course Category	Contact Hours				Credi ts
	No.	Title		L	T	P	Total	
1.	xxxxxxxx	Industrial/Govt./ NGO/MSME/Rural Internship/ Innovation /Entrepreneurship (Students may choose either to work on innovation or entrepreneurial activities resulting in start-up or undergo internship with industry/ NGO's/ Government organizations/ Micro/ Small/Medium enterprises to make themselves ready for the industry. In case student want to pursue their family, business and don't want to undergo internship, a declaration by a parent may be submitted directly to the TPO.)	PRC1	0	0	6	6	2
		TOTAL					6	2

Summer Training -III (6 weeks) (In summer vacation after sixth semester)

Sr. No.	Course		Course Category	Contact Hours				Credits
	No.	Title		L	T	P	Total	
1.	xxxxxxxx	Industrial/Govt./ NGO/MSME/Rural Internship/ Innovation /Entrepreneurship (Students may choose either to work on innovation or entrepreneurial activities resulting in start-up or undergo internship with industry/ NGO's/ Government organizations/ Micro/ Small/Medium enterprises to make themselves ready for the industry. In case student want to pursue their family business and don't want to undergo internship, a declaration by a parent may be submitted directly to the TPO.)	PRC1	0	0	8	8	4
		TOTAL					8	4

Electives:

Discipline Elective-1	Fundamentals of Machine Learning
	Fundamentals of Computer Security
	Introduction to Big Data and Data Analytics
	Object oriented Analysis and Design using JAVA
	Image Processing and Computer Vision
	Automata Theory and its applications

Discipline Elective-2	Operations Research
	Modern Algebra
	Number Theory

Discipline Elective-3	Smart systems and IoT
	Big Data with Hadoop and Spark
	Introduction to Deep Learning
	Secure Design of Software System

Discipline Elective-4	Cryptography
	Applied Mathematical Methods
	Topology/ Time Series Analysis
	Fuzzy set and Fuzzy Logic
	Mathematical Modelling and Simulation

Discipline Elective-5	Machine Learning and Big Data
	Computing for Data Science
	Introduction to DevOps
	Cloud computing Essentials: Azure and AWS
	IoT Analytics
Discipline Elective-6	Optimization Techniques
	Applicational Aspects of Differential Equations
	Statistics
	Multi Attribute Decision making
	Multivariate Analysis
	Matrix Computation

Discipline Elective-7	Machine Learning and Naturl Language
	Fog and Edge Computing
	Social Network Analysis
	Ethical Hacking and Prevention
	Software Construction using kubernetes and microservices
	Cryptocurrency Technologies

Open Elective-1	Waste to Energy Conversion
	Solid State Elctronic Devices
	Photovoltaic Techniques
	Applied Statictical Mechanics
	Medical and Inductrial Applications of Nuclear Radiations
	Cyber Security
	Introduction to Information Theory
	Sociology of Youth
Open Elective-2	Healthcare Marketplace
	Stress: Biology, Behaviour and Management
	HUMAN RESOURCE ANALYTICS
	Superconducting Materials, Magnets and Devices
	Introduction to Quantum Information Processing
	Nanoscience and Technology
	Algorithm and Analysis and AI
Open Elective-3	Machine Learning Tools in Bioinformatics
	Gender Studies
	International Studies
	Urban Sociology
	Solar Engineering
	Photonics and Applications
	Astrophysics
	Biophysics
	Plasma Physics

HSS Elective-1	Positive Psychology
	Financial Management
	Introduction to Contemporary forms of Literature
	Sociology of Media
	Management Accounting
	Technology and Culture
	Planning and Economic Development

Value Added	Java Programming
	Problem Solving using C and C++
	Non-linear Data Structures & problem solving
	Front End Programming
	BIORISK AND BIOSECURITY
	TELECOMMUNICATION NETWORKS
	VLSI Design
	Mechatronics
	Renewable Energy-value added
	Workplace Communication
	Theatre and Performance
	Basics of creative writing
	Biorisk AND BIOSECURITY

***Science Electives (to be decided)**