Department of Computer Science & Engineering

Birla Institute of Technology, Mesra, Ranchi - 835215 (India)

M.Tech in Computer Science

Institute Vision

To become a Globally Recognized Academic Institution in consonance with the social, economic and ecological environment, striving continuously for excellence in education, research and technological service to the National needs.

Institute Mission

To educate students at Undergraduate, Postgraduate, Doctoral, and Post-Doctoral levels to perform challenging engineering and managerial jobs in industry.

- To provide excellent research and development facilities to take up Ph.D. programmes and research projects.
- To develop effective teaching and learning skills and state of art research potential of the faculty.
- To build national capabilities in technology, education and research in emerging areas.
- To provide excellent technological services to satisfy the requirements of the industry and overall academic needs of society.

Department Vision

The department strives to be recognized globally for outstanding education and research, leading to excellent professionals and innovators in the field of Computer Science and Engineering, who can positively contribute to the society.

Department Mission

To impart quality education and equip the students with strong foundation that could make them capable of handling challenges of the new century.

2. To maintain state of the art research facilities and facilitate interaction with world's leading universities, industries and research organization for constant improvement in the quality of education and research.

Programme Educational Objectives (PEOs) – M.Tech in Computer Science

PEO1: Students are trained in such a way that makes them capable of exploiting and enhancing theoretical and practical knowledge in various domains of Computer Science.

PEO2: Students are imparted with strong base of knowledge that makes them suitable for both industry teaching and research.

PEO3: Students are trained to develop practical and efficient solutions to the challenges in the growing field of software industry to gain leadership positions in their organization and/or teams.

PEO4: Students are inculcated with the sensitivity towards ethics, public policies and their responsibilities towards the society to gain trust and respect of others as ethical team members.

PROGRAM OUTCOMES (POs) for MTech (COMPUTER SCIENCE)

PO1: An ability to independently carry out research /investigation and development work to solve practical problems.

PO2: An ability to write and present a substantial technical report/document.

PO3: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.

PO4: In depth understanding of fundamental principles and concepts of various domains of Computer Science.

PO5: Ability for analytical and critical thinking in order to analyse, design and improve existing tools and techniques.

PO6: Knowledge of contemporary issues in the field of Computer Science and ability to engage in lifelong learning.

BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI

NEW COURSE STRUCTURE – WEF academic session 2025-26

Based on CBCS & OBE model

Recommended scheme of study for M.Tech. (Computer Science & Engineering)

SEMESTR / Session of Study (Recommended)	**Course Level**	**Category of Course**	**Course Code**	**Courses**	**Mode of delivery & credits*L-Lecture; T-Tutorial; P- Practicals***			**Total Credits*C-Credits***
					L (*Periods/ week*)	T *(Periods /week)*	P *(Periods /week)*	C
	THEORY							
FIRST /Monsoon	Fifth	Programme Core (PC)	CS531	Data Structures andAlgorithms	3	0	0	3
			CS532	Image Processing	3	0	0	3
			CS534	Internet of Things	3	0	0	3
			CS539	Data Mining and Data Warehousing	3	0	0	3
			CS541	Applied Cryptography	3	0	0	3
								15
		LABORATORIES						
	Fifth	Programme Core (PC) Lab	CS550	Data Structures andalgorithms Lab	4	0	0	2
			CS554	Image Processing Lab	4	0	0	2
			MT132	Communication Skill-I	0	0	3	1.5
								5.5
		TOTAL						15+5.5= 20.5
SECOND / Spring	Fifth	Programme Elective (PE)		PE I	3	0	0	3
				PE II	3	0	0	3

				PE III	3	0	0	3
				PE IV	3	0	0	3
				PE V	3	0	0	3
								15
		LABORATORIES						
	Fifth	Programme Elective (PE)Lab		PE I Lab	0	0	4	2
				PE II LAB	0	0	4	2
			MT133	Communication Skill-II	0	0	3	1.5
		TOTAL						15+5.5 =20.5
TOTAL FOR FIFTH LEVEL								20.5+20.5 =41
THIRD /Monsoon	Sixth	Programme Core (PC)	CS600	Thesis Part I				8
		Open Elective(OE)	*	OE 1/MOOC-I	3	0	0	3
		Open Elective(OE)	*	OE 2/MOOC-II	3	0	0	3
		TOTAL						8+6=14
FOURTH / Spring	Sixth	Programme Core (PC)	CS650	Thesis Part II				16
		TOTAL						16
TOTAL FOR SIXTH LEVEL								14+16= 30
GRAND TOTAL FOR M.TECH. PROGRAMME (46 + 24)								71

Open Elective List for M. Tech Program

Course Code	**Courses**	**Mode of delivery & credits** ***L-Lecture; T-Tutorial; P- Practicals***			**Total Credits** ***C-Credits***
IT570	Basics of Python Programming	0	1	4	3

List of Electives

SPECIALIZATION I: Machine Learning

Course Code	**Courses**	**Mode of delivery & credits** ***L-Lecture; T-Tutorial; P- Practicals***			**Total Credits** ***C-Credits***
CS630	Modern Optimization Techniques	3	0	0	3
CS631	Deep Learning	3	0	0	3
CS632	Data Analysis and Interpretation	3	0	0	3
CS633	Natural Language Processing	3	0	0	3
CS635	Reinforcement Learning	3	0	0	3
CS636	Evolutionary Computing	3	0	0	3
CS638	Computational Network Analysis	3	0	0	3

SPECIALIZATION II: Image Processing and Computer Vision

Course Code	**Courses**	**Mode of delivery & credits** ***L-Lecture; T-Tutorial; P- Practicals***			**Total Credits** ***C-Credits***
CS660	Content based Image Retrieval	3	0	0	3
CS661	Machine Learning for Computer Vision	3	0	0	3
CS662	Computer Vision	3	0	0	3
CS664	GPU Computing	3	0	0	3
CS666	Data Compression	3	0	0	3
CS667	Signal Processing	3	0	0	3
CS668	Digital video processing	3	0	0	3

SPECIALIZATION III: Network Security

Course Code	Courses	Mode of delivery & credits *L-Lecture; T-Tutorial; P- Practicals*			Total Credits *C-Credits*
CS670	Biometric Security	3	0	0	3
CS672	Cyber Security and Digital Forensics	3	0	0	3
CS673	Data Compression Techniques	3	0	0	3
CS674	Introduction to Blockchain Technology	3	0	0	3
CS676	Security in Cyber Physical Systems	3	0	0	3
CS677	Quantum Cryptography	3	0	0	3

Program Elective Labs

Course Code	Courses	Mode of delivery & credits *L-Lecture; T-Tutorial; P- Practicals*			Total Credits *C-Credits*
CS680	Matlab Programming	0	0	4	2
CS682	Python Programming	0	0	4	2
CS639	Deep learning Lab	0	0	4	2
CS640	Data Analytics Lab	0	0	4	2
CS663	Computer Vision Lab	0	0	4	2
CS665	GPU Computing Lab	0	0	4	2
CS671	Biometric Security Lab	0	0	4	2
CS675	Introduction to Blockchain Technology Lab	0	0	4	2