



Indian Institute of Information Technology - Allahabad

Deoghat, Jhalwa- 211015, Prayagraj, Uttar Pradesh

Department of Applied Sciences

M.Tech Curriculum 2023-24

Department of Applied Science

(NEP based Curriculum)

Guidelines for M. Tech & Dual degree M. Tech-PhD 2023-24

PC- Programme Core, PE- Programme Elective, ES- Engineering Science, BS- Basic Science, OE- Open Elective, HM- Humanities and Management, MR- Minor, HR- Honor, AC- Audit Course

L-T-P (hr)

Lecture (L): 1 Credit = 1 hr/ week, Tutorial (T): 1 Credit = 1hr/week, Practical (P): 1 credit = 2 hr/week

The credits for all courses are given in LTP format. L stands for Lecture, T for Tutorial, P for Practice/Practical. L=3 signifies 3 hours of Lectures per week, T=1 signifies 1 hour of Tutorial per week, and P=1 corresponds to 2 hours Practice/Practical per week. For M. Tech. students, T and P need not be explicitly mentioned in the Time Table. The Practice/Practical component of the course could also be a Term paper or Term Paper along with the lab. The discretion is left to the Teacher teaching the course.

The dual degree M.Tech.-Ph.D. Programme has been kept reserved. This is in tune with the spirit of NEP 2020. It is envisaged with a target towards research leading to a PhD programme with a minimum duration of 04 years, and with a possible exit for the award of MTech degree and/or PG Diploma after securing required credits.

Please refer to the M.Tech. and Ph.D. Ordinance for the other details of the M. Tech. and Ph.D. programs that is available at the following link: <https://aaa.iita.ac.in/>

The AS Department is offering the following specializations in each group:



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Bioinformatics (M.Tech & Dual degree M.Tech-PhD)

Bioinformatics is one of the interdisciplinary courses which involve study of biology, computer science, and information technology. Bioinformatics uses both computation and assessment tools to collect and translate biological data. This is suitable for development of algorithms and tools suitable for large biological databases, design data frameworks, and develop and adjust algorithms. M. Tech Bioinformatics at the Indian Institute of Information Technology – Allahabad, is a four semester's program designed to develop the skills in Information Technology and Data science applied on Biological Data. M. Tech in Bioinformatics is an excellent avenue to build your career, which provides an interdisciplinary platform through the amalgamation of Information Technology, Statistics, Mathematics and Biology. The coursework is designed to include a balance of functional knowledge as well as practical learning spread over four semesters covering, Computer programming, Data structure and Algorithms, Database Management System/Biological Information System and Management(Applied on Large Scale Biological Data), Mathematics, Statistics, Machine Learning and emerging topics such as Big Data, Deep Learning, Pattern Recognition as electives.

Total Credit Distribution

Semester	Semester I	Semester II	Summer Semester	Semester III	Semester IV	Total Credits
M. Tech	18	19	0	17	12	66
PG Diploma	18	19	5	-	-	42

Dual degree M. Tech-PhD*	20	19	*After Second semester, Dual degree M. Tech-PhD students will follow PhD ordinance/Curriculum
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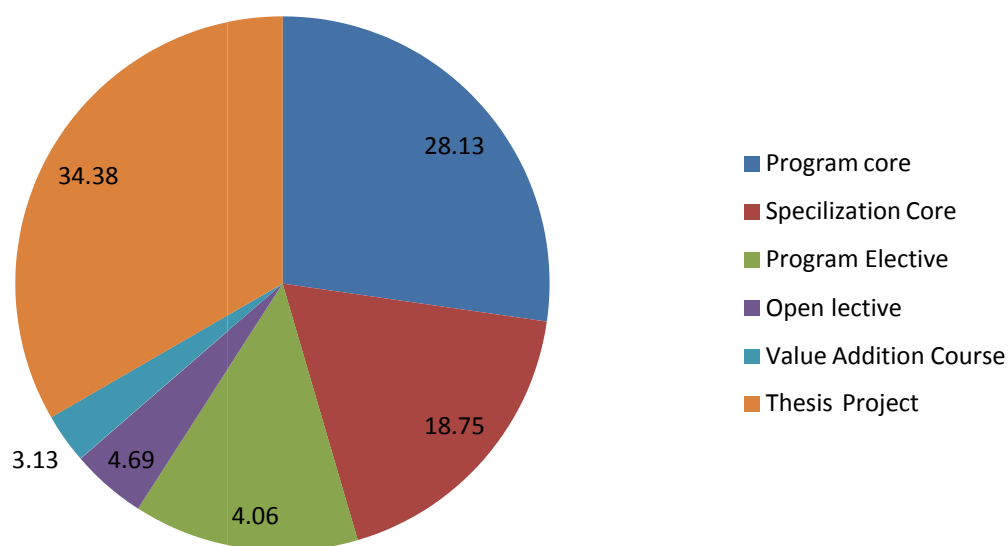
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M.Tech BI, Credit Distribution

M. Tech BI		I	II	III	IV	Total Credits	
Program core		6	12			18	28.13 %
Specialization Core		12				12	18.75%
Program Elective			3	6		9	14.06%
Open Elective				3		3	4.69%
Value Addition Course			2			2	3.13%
Thesis/Project			2	8	12	22	34.38%

1





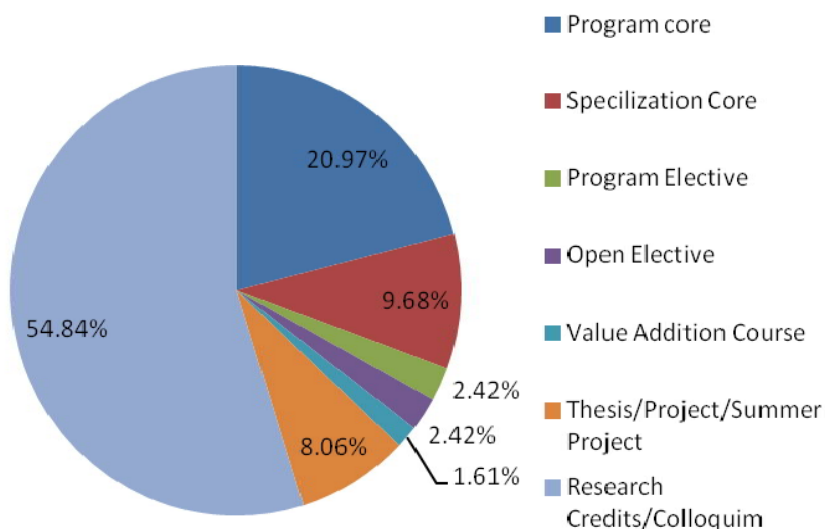
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Department of Applied Sciences

Dual Degree M. Tech-PhD BI, Credit Distribution

M. Tech BI		I	II	III	IV	V	VI	VII	VIII	Total Credits	
1.	Program core	6	12	8						26	20%
2.	Specialization Core	12								12	10%
3.	Program Elective		3							3	2.5%
4.	Open Elective			3						3	2.5%
5.	Value Addition Course		2							2	1.6%
6.	Thesis/Project/Summer Project		2	8						10	8%
7.	Research Credit/Colloquium			8	12	12	12	12	12	68	57%



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Table 1: First Semester (M. Tech and Dual Degree M. Tech-PhD)

Sl. No.	Course Name	Code	Type	Credit	Hours
					L-T-P-S
1.	OMICS	BS-AS-OMI501	PCC	4	3-0-2-0
2.	Biological Data Analytics	PC-AS-BDA501	PCC	4	3-0-2-0
3.	Scripting and Computer Environments	ES-AS-SCE501	PCC	4	2-0-4-0
4.	Data Structure and Algorithms	ES-AS-DSA502	PCC	4	2-0-4-0
5.	Research Methodology & IPR (for M. Tech and M. Tech-PhD)	PC-AS-RMA504	ELC	2	2-0-0-0
6.	Research Methodology (for M. Tech-PhD)	PC-AS-RMA505	ELC	2	2-0-0-0
Total Credit:				18/20	24Hrs./week 26Hrs./week

Table 2: Second Semester (M. Tech and Dual Degree M. Tech-PhD)

Sl. No.	Course Name	Code	Type	Credit	Hours
					L-T-P-S
1.	Next Generation Sequencing Tools and Algorithms	PC-AS-NGS502	PCC	4	3-0-2-0
2.	Molecular Structure Prediction and visualization	PC-AS-MPV502	PCC	4	3-0-2-0
3.	Biological Information System and Management	ES-AS-BIM503	PCC	4	3-0-2-0
4.	HSMC	HM-AS-RMI501	VEC	2	2-0-0-0
5.	Elective-1	PE-AS-XXX	PEC	3	3-0-0-0
6.	Mini Project	PC-AS-MPJ510	ELC	2	0-0-4-0
Total Credit :				19	24 Hrs./week

EXIT: after the end of second Semester, after clearing all the papers, the M. Tech student may be eligible for PG Diploma in Bioinformatics. However, these students have to secure **additional 5 credits** from summer semester for awarding PG diploma, which is mandatory.



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Dual degree M. Tech-Ph.D.: After the end of II Semester the M. Tech-PhD student moves into the Ph. D Section of the Degree and will be henceforth governed by the Ph.D. ordinance. Please note that there is a **Summer Semester** which will be between II and III Semester. For regular M. Tech students there is no need of summer semester.

Table 3: Summer Semester

Sl. No.	Course Name	Code	Type	Credit	Hours
					L-T-P-S
1.	Summer Project (for PG Diploma)	PC-AS-SPJ503	ELC	2	0-0-4-0
2.	Systems Biology/ Cheminformatics/NPTEL (for PG Diploma)	PC-AS-SCN509	PCC	3	3-0-0-0
3.	Summer Project (for M. Tech-PhD)	PC-AS-SPJ504	ELC	8	0-0-16-0
Total Credit:				5/8	7 Hrs./week 16 Hrs./week

Table 4: Third Semester (M. Tech)

Sl. No.	Course Name	Code	Type	Credit	Hours
					L-T-P-S
1.	Elective II	PE-AS-XXX	PEC	3	3-0-0-0
2.	Elective III	PE-AS-XXX	PEC	3	3-0-0-0
3.	Open Electives	OE-EC/IT	OEC	3	3-0-0-0
4.	Major Project	PC-AS-MRP501	ELC	8	0-0-16-0
Total Credit :				17	25 Hrs./week

Table 5: Third Semester (M. Tech-PhD)

Sl. No.	Course Name	Code	Type	Credit	Hours
					L-T-P-S
1.	Research specific breadth course/Self study	PC-AS-RSB501	PCC	4	0-0-0-8
2.	Research specific depth course/Self study	PC-AS-RSD502	PCC	4	0-0-0-8
3.	Open Electives	OE-EC/IT	OEC	3	3-0-0-0
4.	Research Credit	PC-AS-RGC 601	ELC	8	0-0-16-0
Total Credit :				19	35 Hrs./week



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Table 6: Fourth Semester (M. Tech)

Sl. No.	Course Name	Code	Type	Credit	Hours
					L-T-P-S
1.	M. Tech Thesis	PC-MTH502	ELC	12	0-0-24-0
Total Credit:				12	24 Hrs./week

Table 7: Fourth Semester (M. Tech-PhD)

Sl. No.	Course Name	Code	Type	Credit	Hours
					L-T-P-S
1.	Research Credit	PC-AS-RPC601		12	0-0-24-0
Total Credit :				12	24 Hrs./week

Table 8: List of Electives (for elective I, II and III)

Sl. No.	Course Name	Code	Type	Credit	Hours
					L-T-P-S
1.	Machine Learning for Biological Systems	PE-AS-MLB501	PEC	3	2-0-1-0
2.	Cheminformatics	PE-AS-CHI502	PEC	3	3-0-0-0
3.	Molecular Medicine	PE-AS-MOM503	PEC	3	3-0-0-0
4.	Cognitive Modeling	PE-AS-CGM504	PEC	3	3-0-0-0
5.	Advance Data Analytics Deep Learning	PE-AS-ADD505	PEC	3	2-0-1-0
6.	Systems Biology	PE-AS-SYS506	PEC	3	3-0-0-0
7.	Parallel Computing	PE-AS-PLP507	PEC	3	3-0-0-0
8.	Pattern Recognition	PE-AS-PRE508	PEC	3	2-0-1-0
9.	Numerical Methods	PE-AS-NUM509	PEC	3	3-0-0-0
1	All the electives provided in M. Tech BME basket are available for M. Tech BI students also				
1	OPEN ELECTIVES				
1	Open elective from IT	OE-IT		3	
1	Open elective ECE	OE-ECE		3	