



**Programme Structure of IIITB**  
**iMTECH – Computer Science and Engineering**

Course Name	Credits	Course Category	Level
<b>SEMESTER 1</b>			
<b>18</b>			
Mathematics - 1	4	Mathematics and Basic Sciences	Level 1
Programming in C	2	Programming	Level 1
Programming in Python	2	Programming	Level 1
Digital Design	4	Systems	Level 1
Physical Education 1	0	Others	Level 1
English	2	HSS/M Core	Level 1
Economics	4	HSS/M Core	Level 1
<b>SEMESTER 2</b>			
<b>20</b>			
Mathematics - 2	4	Mathematics and Basic Sciences	Level 1
Computer Architecture	4	Systems	Level 1
Data Structures and Algorithms	4	Engineering Core	Level 1
Data Structures Lab	2	Engineering Core	Level 1
Computer Networks	4	Engineering Core	Level 1
Technical Communication	2	HSS/M Core	Level 1
Physical Education 2	0	Others	Level 1
<b>SEMESTER 3</b>			
<b>20</b>			
Mathematics - 3	4	Mathematics and Basic Sciences	Level 1
Programming II	4	Programming	Level 1
Physics (Theory)	3	Mathematics and Basic Sciences	Level 1
Physics (Lab)	1	Mathematics and Basic Sciences	Level 1
Signals and Systems	4	Systems	Level 1
Discrete Mathematics	4	CSE Core Engineering	Level 1
<b>SEMESTER 4</b>			
<b>19</b>			
Operating Systems (Theory)	3	Systems	Level 1
Operating Systems (Lab)	1	Systems	Level 1
Design and Analysis of Algorithms	3	CSE Core Engineering	Level 1
Database systems (Theory)	3	CSE Core Engineering	Level 1





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Database systems (Lab)	1	CSE Core Engineering	Level 1
1 Elective in the pool of Maths and Science	4	Mathematics and Basic Sciences	Level 1
History of Ideas	4	HSS/M Core	Level 1
<b>SEMESTER 5</b>	<b>23</b>		
Introduction to Automata theory and Computability	3	CSE Core	Level 1
Software Engineering (Theory)	3	CSE Core	Level 1
Software Engineering (Lab)	1	CSE Core	Level 1
Elective-1 *	4	Elective	Level 1
Elective-2 *	4	Elective	Level 1
Elective-3 *	4	Elective	Level 1

Course Name	Credits	Course Category	Level
Elective-4 *	4	Elective	Level 1
<b>SEMESTER 6</b>	<b>20</b>		
Elective-5 *	4	Elective	Level 2
Elective-6 *	4	Elective	Level 2
Elective-7 *	4	Elective	Level 2
Elective-8 *	4	Elective	Level 2
Elective-9 *	4	Elective	Level 2
<b>SEMESTER 7</b>	<b>20</b>		
Elective-10 *	4	Elective	Level 2 / Level 3
Elective - 11 *	4	Elective	Level 2 / Level 3
Elective - 12 *	4	Elective	Level 2 / Level 3
Elective - 13 *	4	Elective	Level 2 / Level 3
Elective - 14 *	4	Elective	Level 2 / Level 3
<b>SEMESTER 8</b>	<b>20</b>		
Elective - 15 *	4	Elective	Level 2 / Level 3
Elective - 16 *	4	Elective	Level 2 / Level 3
Elective - 17 *	4	Elective	Level 2 / Level 3
Elective - 18 *	4	Elective	Level 2 / Level 3
Elective - 19 *	4	Elective	Level 2 / Level 3
<b>SEMESTER 9</b>	<b>20</b>		
Combination of Courses and Project	20	Masters Project	Masters Project
<b>SEMESTER 10</b>	<b>20</b>		
M.Tech. Project / Thesis	20	Masters Project	Masters Project

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**iMTECH – Electronics Communication and Engineering**

Course Name	Credits	Course Category	Level
<b>Semester 1</b>			
<b>18</b>			
Mathematics - 1	4	Mathematics and Basic Sciences	Level 1
Programming in C	2	Programming	Level 1
Programming in Python	2	Programming	Level 1
Digital Design	4	Systems	Level 1
Physical Education 1	0	Others	Level 1
English	2	HSS/M Core	Level 1
Economics	4	HSS/M Core	Level 1
<b>Semester 2</b>			
<b>20</b>			
Mathematics - 2	4	Mathematics and Basic Sciences	Level 1
Computer Architecture	4	Systems	Level 1
Data Structures and Algorithms	4	Engineering Core	Level 1
Data Structures Lab	2	Engineering Core	Level 1
Computer Networks	4	Engineering Core	Level 1
Technical Communication	2	HSS/M Core	Level 1
Physical Education 2	0	Others	Level 1
<b>Semester 3</b>			
<b>20</b>			
Mathematics - 3	4	Mathematics and Basic Sciences	Level 1
Programming II	4	Programming	Level 1
Physics (Theory)	3	Mathematics and Basic Sciences	Level 1
Physics (Lab)	1	Mathematics and Basic Sciences	Level 1
Signals and Systems	4	Systems	Level 1
Electronic Circuits	2	ECE Core	Level 1
Electronics Lab	2	ECE Core	Level 1
<b>Semester 4</b>			
<b>23</b>			
Operating Systems (Theory)	3	Systems	Level 1
Operating Systems (Lab)	1	Systems	Level 1
Analog Circuits	3	ECE Core Engineering	Level 1
Analog Circuits lab	1	ECE Core Engineering	Level 1
Signal Processing	3	ECE Core Engineering	Level 1
1 Elective in the pool of Maths and Science	4	Mathematics and Basic Sciences	Level 1
History of Ideas	4	HSS/M Core	Level 1
Principles of Communication System	3	ECE Core Engineering	Level 1
Principles of Communication System Lab	1	ECE Core Engineering	Level 1
<b>Semester 5</b>			
<b>19</b>			
Digital Communication	3	ECE Core Engineering	Level 1

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Digital Communication Lab	1	ECE Core Engineering	Level 1
Control Theory	3	ECE Core Engineering	Level 1

Course Name	Credits	Course Category	Level
Mobile Computing	4	ECE Core Engineering	Level 1
Elective-1 *	4	Electives	Level 1
Elective-2 *	4	Electives	Level 1
<b>Semester 6</b>	<b>20</b>		
Elective-3 *	4	Elective	Level 2
Elective-4 *	4	Elective	Level 2
Elective-5 *	4	Elective	Level 2
Elective-6 *	4	Elective	Level 2
Elective-7 *	4	Elective	Level 2
<b>Semester 7</b>	<b>20</b>		
Elective-8 *	4	Elective	Level 2 / Level 3
Elective - 9 *	4	Elective	Level 2 / Level 3
Elective - 10 *	4	Elective	Level 2 / Level 3
Elective - 11 *	4	Elective	Level 2 / Level 3
Elective - 12 *	4	Elective	Level 2 / Level 3
<b>Semester 8</b>	<b>20</b>		
Elective - 13 *	4	Elective	Level 2 / Level 3
Elective - 14 *	4	Elective	Level 2 / Level 3
Elective - 15 *	4	Elective	Level 2 / Level 3
Elective - 16 *	4	Elective	Level 2 / Level 3
Elective - 17 *	4	Elective	Level 2 / Level 3
<b>Semester 9</b>	<b>20</b>		
Combination of Courses and Project	20	Masters Project	Masters Project
<b>Semester 10</b>	<b>20</b>		
M.Tech. Project / Thesis	20	Masters Project	Masters Project

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**MTECH – Computer Science and Engineering Program Structure**

Term	Duration	Credits	Courses
Preparatory Term	2 weeks	Not applicable	Orientation sessions on various topics
Semester 1	16 weeks	16 credits	<p>Foundation Courses</p> <ol style="list-style-type: none"> <li>1. Algorithms</li> <li>2. Networking and Communication</li> <li>3. Machine Learning</li> <li>4. Mathematics for Machine Learning</li> <li>5. Software Systems</li> <li>6. Discrete Mathematics and Computability</li> </ol> <p><b>Each course here is of 4 credits.</b></p>
Semester 2	16 weeks	16 credits	<p>Electives</p> <p>The number of electives to be completed by each student is <b>eight</b>. Thus the total number of credits that can be accumulated through electives is now 32 credits. Each elective will be associated with one or more areas of specialization</p> <p><b>Elective list is given below</b></p>
		0 credits	Technical Communication for those found deficient in a test conducted in Semester 1 (Pass /Fail)
Semester 3	16 weeks	16 credits	Electives
Semester 4	26 weeks	16 credits	Masters Project / Thesis
<b>Total</b>			<b>64 credits</b>

**MTECH – Electronics and Communication Engineering**

Term	Duration	Credits	Courses
Preparatory Term	2 weeks	Not applicable	Orientation sessions on various topics
Semester 1	16 weeks	16 credits	Foundation Courses  1. Digital CMOS VLSI Design (4 Credits) 2. Analog CMOS VLSI Design (4 Credits) 3. Machine Learning (4 Credits) 4. Mathematics for Machine Learning (4 Credits) 5. Networking and Communication (4 Credits) 6. System Software (2 Credits) 7. System design with FPGA (2 Credits) 8. Principles of Embedded Systems (2 Credits)
Semester 2	16 weeks	16 credits	Electives  The number of electives to be completed by each student is <b>eight</b> . Thus the total number of credits that can be accumulated through electives is now 32 credits. Each elective will be associated with one or more areas of specialization  <b>Elective list is given below</b>
		0 credits	Technical Communication for those found deficient in a test conducted in Semester 1 (Pass /Fail)
Semester 3	16 weeks	16 credits	Electives
Semester 4	26 weeks	16 credits	Masters Project / Thesis
<b>Total</b>			<b>64 credits</b>

**MSc DIGITAL SOCIETY**

<b>Term</b>	<b>Duration</b>	<b>Credits</b>	<b>Courses</b>
Preparatory Term	2 weeks	Not applicable	Programming Foundations Social Science Foundations
Term 1	15 weeks	18 credits	<u>5 core courses</u>  1. Digital Components of a Connected Society (4) 2. Application Development for a Connected Society (2) 3. Human Computer Interaction (4) 4. Research Methods (Quantitative and Qualitative) (4) 5. Technology and Society (4)
Term 2	15 weeks	16 credits	<u>3 core courses</u> 1. Technology in Development (4) 2. ICT Policy and Regulation (4) 3. Social Complexity and Systems Thinking (4)  <u>1 Elective Course</u> 1. Elective I (4)  <b>Elective list is given below</b>
Term 3	15 weeks	16 credits	4 Electives  <b>Elective list is given below</b>
Term 4	26 weeks	16 credits	Masters Project / Thesis
<b>Total</b>			<b>66 credits</b>



**ELECTIVE COURSE LIST**

Sl. No	Course code	Course name
1	CS 602	Advanced Algorithms
2	VL 853	Advanced ARM Architectures
3	SE 610	Advanced Computer Architecture
4	CS 714	Advanced Computer Graphics
5	NC 861	Advanced Computer Networks
6	NC 866	Advanced Cyber Security
7	DS 832	Advanced Data Visualization
8	NC 865	Advanced Digital Image Processing
9	NC 866	Advanced Machine Perception
10	CS 701	Advanced Operating Systems
11	DT 303	Advanced Qualitative Research Methods
12	SP 836	Advanced Visual Recognition
13	CS 835	Algorithmic Thinking
14	CS 511	Algorithms
15	DS 862	Algorithms for Massive Data
16	ECE 509	Analog Circuits and Systems
17	VL 502	Analog CMOS VLSI Design
18	VL 503	Analysis and design of CMOS Digital IC
19	VL 801	Analysis and Design of VLSI Sub-systems
20	CS 853	Approximation Algorithms
21	AI 720	Artificial General Intelligence
22	CS 604	Artificial Intelligence
23	CS 891	Automata Theory and Computability
24	CS 703	Automated Formal Verification
25	SP 823	Automatic Speech Recognition
26	DS 818	Block Chain and Cryptocurrencies
27	DS 815	Cloud Computing and Big Data in Practice
28	CS 814	Competitive Programming
29	SE 851	Compiler Design
30	CS 868	Compilers
31	CS 717	Computational Geometry
32	CS 872	Computational Sustainability
33	CS 304	Computer Graphics
34	CS 716	Computing on Private Data
35	CS 873	Cryptographic Engineering
36	CS 603	Cryptography
37	NC 285	Cryptography & Network Security
38	NC 824	Cyber Security Fundamentals with tools and techniques for







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Sl. No	Course code	Course name
		defense
39	DT 385	Cyberspace, Globalization, and Location
40	DS 707	Data Analytics
41	DS 822	Data Management for AI
42	CS 605	Data Modeling
43	DS 732	Data Visualization
44	AI 826	Deep Learning for Automatic Speech Recognition
45	SE 270	Design and Analysis of Safety-Critical Systems
46	SE 701	Design Patterns and Enterprise System Development
47	SE 220	Design Patterns and Software Architecture
48	NCE 855	Designing Gaming Simulations
49	VL 855	Device Driver Development
50	VL 503	Digital CMOS VLSI Design
51	ESD 817	Digital Control Systems
52	NC 854	Digital Image Processing
53	DT 309	Digital Platforms: Technology & Business Components
54	DT 304	Digital Product Development
55	NC 603	Digital Signal Processing
56	DT 215	Digital Sociology
57	CS 512	Discrete Mathematics and Computability
58	DS 702	Distributed Computing
59	GEN 806	Distributed Systems and Control
60	ITS 601	Dynamics of the Information Technology Industry
61	ITS 703	E-Governance Application Design
62	DT 110	Enterprise Software Development
63	HSS 105	Ethics
64	DS 812	Foundations of Big Data Algorithms
65	CS 616	Foundations of Cryptography
66	DT 305	From Territorial Place to Cyberspace: The Political Economy of Location
67	CS 826	Fully Homomorphic Encryption and Applications
68	VL 701	Functional Verification of SOC Designs
69	AI 703	Geographic Information Systems
70	CS 709	Geometric Modelling
71	CS 825	Graph Theory
72	VL 602	High Level Synthesis and Optimization of Digital Circuits
73	NC 831	Image Analysis
74	CS 869	Information Technology Product Management
75	NC 801	Inter device communication
76	GEN 810	Interdisciplinary Robotics

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Sl. No	Course code	Course name
77	NC 812	Internet of Things
78	VL 502	Introduction to CMOS Fabrication and Analog CMOS VLSI Design
79	GEN 297B	Introduction to literature
80	SM 602	Introduction to Nonlinear Dynamical Systems
81	GEN 811	Introduction to Robotics
82	GEN 601	Introduction to Scientific Computing
83	DS 823	Introduction to Text Processing and Information Retrieval
84	GEN 705	IT Project and Product Management
85	GEN 504	Linear Algebra
86	AI 511	Machine Learning
87	DS 612	Machine Learning I
88	DS 866	Machine Learning II
89	NC 863	Machine Perception
90	CS 851	Mathematical Analysis of Networks
91	ESD 501	Mathematics for Electronic Systems Design
92	GEN 501	Mathematics for IT
93	GEN 611	Mathematics for Machine Learning
94	NC 701	Mobile Computing with IMS Architecture
95	ESD 705	Model Based Hardware-Software Co-Synthesis of Embedded Systems
96	ESD 816	Modern Operating Systems
97	AI 704	Multi-Agent Systems
98	AI 829	Natural Language Processing
99	AI 608	Network Science for the web
100	NC 852	Network Security
101	NC 501	Networking and Communication
102	DS 856	Neural Networks and Reinforcement Learning
103	DT 216	News Literacies in the Digital Society.
104	AI 817	Optimization, Learning and Cognition
105	DS 820	Optimization, Learning and Cognition-2
106	VL 820	Physical design of ASICs
107	ESD 505	Principles of Embedded Systems
108	NC802	Principles of Intelligent systems
109	DT 306	Privacy in the Digital Age
110	CS 821	Privacy-Preserving Machine Learning
111	SP 828	Probabilistic Graphical Models
112	GEN 503	Probability and Statistics
113	CS 870	Program Analysis for Software Engineering
114	GEN 812	Quantum Computing and Quantum Information





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Sl. No	Course code	Course name
115	VL 813	Real Time Operating Systems
116	AI 856	Reinforcement Learning
117	SE 853	Requirement Engineering
118	GEN 807	Robotics and Control
119	GEN 701	Scientific Computing II
120	NC 857	Secure Computation
121	DS 870	Seminar Course on Algorithms Compilers
122	DS 867	Seminar in Large Scale Applications of Algorithms
123	NC 816	Signal and Text Analytics
124	ITS 712	Smart Cities: Urban Labelling and Beyond.
125	ITS 711	Social Media Communication
126	NC 864	Software Defined Network and Network Function Virtualization
127	SE 510	Software Engineering Practices
128	CS 819	Software Models and Architectural Principles
129	CS 816	Software Production Engineering
130	CS 513	Software Systems
131	CS 731	Software Testing
132	DS 821	Spatial Computing
133	NC 822	Speech Processing
134	VL 504	System design with FPGA
135	VL 506	System Software
136	DT 212	Techno-Economics of Networks
137	DT 104	Technology and Society
138	VL 601	Testing & Design For Testability
139	HSS 102	The City
140	ITS 602	The Digital and its Discontents
141	DT 307	The Web and the Mind
142	DS 601	Theory of Computation
143	DS 815	Topological Data Analysis
144	SE 802	Usability Engineering
145	VL 818	Virtual Machines
146	AI 825	Visual Recognition
147	DS 604	Web Information Retrieval
148	NC 601	Wireless Access Networks
149	NC 827	Wireless Communication



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