DVV Clarifications
Metrics Level Deviations

1.2.2	**Percentage of Programmes in which Choice Based Credit System (CBCS) / elective course system has been implemented (Data for the latest completed academic year).** 1.2.2.1. **Number of Programmes in which CBCS / Elective course system implemented.** HEI Input : 17	Provide Circulars stating University/HEIs implementation of CBCS/Electives. Provide Structure of the program clearly indicating courses, credits/Electives as approved by the competent body for year 2020-21.

Supporting Documents:

1. **Circular of Parent University**
2. **Minutes of relevant Academic Council and notice issued regarding transfer of credit**
3. **Structure of the program clearly indicating CBCS/Elective courses**

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Recommended MOOCs courses for attaining the Honours for AICTE UG programmes.

(Coordinator, MOOCs, MAKAUT, WB)

Note: MOOCs for the Credit Transfer and MOOCs for attainment of the Honours are two separate recommendations.

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List of MOOCs for UG Honours degree (AICTE Programmes)
Effective for Odd Semester of 2020-21

MOOC for First Year AICTE Programmes (Affiliated Colleges) ODD SEM 2020

Module	Course	Provider	Duration	Credits	Name of University / Institute	Status
Ethics	Ethics in Engineering Practice	NPTEL	8weeks	3	IIT Kharagpur	Active
	A Life of Happiness and Fulfilment	Coursera	6 weeks	2	Indian School of Business	Active
	Introduction to Philosophy	Coursera	5 weeks	1	University of Edinburgh	Active
	Ethical Leadership Through Giving Voice	Coursera	4 weeks	2	University of Virginia	Active
Soft Skills	Technical English for engineers	NPTEL	8 Weeks	3	IIT Madras	Active
	Body Language: Key to Professional Success	NPTEL	4 Weeks	1	IIT Ropar	Active
	Psychology at Work	Coursera	6 weeks	2	University of Western Australia	Active
	Communication in the 21st Century Workplace	Coursera	4 weeks	1	University of California	Active
	Successful Career Development	Coursera	7 weeks	2	University System of Georgia	Active
	Working in Teams: A Practical Guide	edX	4 weeks	1	University of Queensland	Active
	Communication theory: bridging academia and practice	Coursera	9 weeks	3	Higher School of Economics	Active

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	Write Professional Emails in English	Coursera	5 weeks	2	Georgia Institute of Technology	Active
	Technical Writing	Coursera	5 weeks	1	Moscow Institute of Physics and Technology	Active
	Interpersonal Communication for Engineering Leaders	Coursera	4 weeks	1	Rice University	Active
Programming Skills	Introduction to Programming with MATLAB	Coursera	9 weeks	3	Vanderbilt University	Active
	Programming In C++	NPTEL	8 weeks	3	IIT Kharagpur	Active
	Learn to Program: The Fundamentals	Coursera	7 weeks	2	University of Toronto	Active
	Introduction to computer Science	Edx	4-5 weeks	2	Microsoft	Active
	Introduction to Computer Science and Programming Using Python	Edx	Self Paced	4	MIT, USA	Active
	Statistics and R	edX	Self Paced	4	Harvard University	Active
	Introduction to Programming in C	Coursera	4 weeks	4	Duke University	Active
	Java Programming: Solving Problems with Software	Coursera	4 weeks	4	Duke University	Active
	Responsive Website Basics: Code with HTML, CSS, and JavaScript	Coursera	4 weeks	1	University of London Microsoft	Active

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	Introduction to HTML5	Coursera	3 weeks	1	University of Michigan	Active
	HTML5 Coding Essentials and Best Practices	edX	6 weeks	2	W3C	Active
	Problem solving through Programming In C	NPTEL	12 Weeks	4	IIT Kharagpur	Active
	Joy of computing using Python	NPTEL	12 Weeks	4	IIT Ropar	Active
	Programming, Data Structures and Algorithm Using Python	NPTEL	8 Weeks	3	CMI	Active
	Foundation of Data Structures	edX	6 weeks	2	IIT Bombay	Active
	Learn to Program: The Fundamentals	Coursera	7 weeks	3	University of Toronto	Active
	Web Design for Everybody (Basics of Web Development and Coding) Specialization	Coursera	15weeks	4	University of Michigan	Active
	Programming Basics	edX	9 weeks	3	IIT Bombay	Active
Statistics	Inferential Statistics	Coursera	7 weeks	2	University of Amsterdam	Active
	Linear Regression and Modelling	Coursera	4 weeks	1	Duke University	Active

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List of MOOCs for UG Honours degree (AICTE Programmes)
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Environmental Studies	The Science of Well Being	Coursera	6 weeks	2	Yale University	Active
	Ecology: Ecosystem Dynamics and Conservation	Coursera	5 weeks	1	American Museum of Natural History, Howard Hughes Medical Institute	Active
	Effective Problem Solving and Decision Making	Coursera	4 weeks	1	University of California	Active
	Moralities of Everyday Life	Coursera	6 weeks	2	Yale University	Active
	Introduction to Logic	Coursera	10 weeks	3	Stanford University	Active
	The Science of Everyday Thinking	edX	12 weeks	4	University of Queensland	Active
	Digital Security and Human Rights	edx	3 weeks	1	Amnesty InternationalX	Active
	Ethics in Engineering Practices	NPTEL	8 weeks	4		Active
	Introduction to Philosophy: God, Knowledge, and Consciousness	edX	12 weeks	4	MIT	Active
	Development of Sociology in India	NPTEL	4 Weeks	1	IIT Kanpur	Archived
	Introduction to Logic	NPTEL	12 weeks	4	IIT Kanpur	Archived

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	Introduction to Problem-solving and Programming	NPTEL	12 weeks	4	IIT Kanpur	Archived
	Speak English Professionally : In Person, Online & On the Phone	Course era	4 weeks	1	Georgia Tech	Active
	Java Fundamentals for Android Development	edX	6 weeks	2	GalileoX	Active
	Environmental Studies: A Global Perspective	edX	Self Paced	4	Curtin University	Active
	Science, Technology and Society	NPTEL	12 weeks	4		Active
	Critical Thinking &Problem Solving	edX	3 weeks	3	Rochester Institute of Technology	Active

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List of MOOCs for UG Honours degree (AICTE Programmes)

Effective for Odd Semester of 2020-21

MOOCS for MECHANICAL ENGINEERING

For odd Sem 2020

No.	Course Name	Duration (Weeks)	Credit	Name of the Mooc websites	Status
1	Business Analytics & Text Mining Modeling Using Python	8	3	Swayam	Active
2	Drones and Autonomous Systems I: Fundamentals	6		Edx	Active
3	Data Science: Productivity Tools	8		Edx	Active
4	Product Design: The Delft Design Approach	7		Edx	Active
5	Lean Production	6		Edx	Active
6	Data Science for Engineers	8	3	Swayam	Active
7	Introduction to Machine Learning (IITM)	12	4	Swayam	Active
8	Python for Data Science	4	2	Swayam	Active
9	Introduction to Internet of Things	12	4	Swayam	Active
10	Artificial Intelligence (AI)	12		Edx	Active
11	Machine Learning	12		Edx	Active
12	Artificial Intelligence Search Methods For Problem Solving	12	4	Swayam	Active
13	Introduction to the Internet of Things (IoT)	6		Edx	Active

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List of MOOCs for UG Honours degree (AICTE Programmes)

Effective for Odd Semester of 2020-21

MOOCS for FOOD TECHNOLOGY

For Odd Sem 2020

No.	Course Name	Duration (Weeks)	Credit	Name of the Mooc websites	Status
1	Commercial Fruit Production: Pomegranate & Guava	4	2	SWAYAM	Inactive
2	Life with Diabetes	5	2	EDX	Active
3	Nutrition and Health: Food Risks	8	3	EDX	Active
4	Thermal Operations in Food Process Engineering: Theory and Applications	12	4	Swayam	Active
5	Introduction to the Internet of Things (IoT)	6	3	Edx	Active
6	Introduction to Machine Learning (IITM)	12	4	Swayam	Active
7	Developing Soft Skills and Personality	8	3	Swayam	Active
8	Data Science for Engineers	8	3	Swayam	Active
10	Nutrition, Heart Disease and Diabetes	5		Edx	Active
11	Science & Cooking:From Haute Cuisine to Soft Matter Science (physics)	16		Edx	Active
12	Sustainable Agri food Marketing	8		Edx	Active

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13	Sustainable Food Security: Food Access	6		Edx	Active
14	Sustainable Food Security: The value of systems thinking	6		Edx	Active
15	Food for Thought	15		Edx	Active

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List of MOOCs for UG Honours degree (AICTE Programmes)
Effective for Odd Semester of 2020-21
ELECTRICAL & ELECTRONICS ENGINEERING

Course Name	Duration (Weeks)	Credit	Name of the Mooc websites	Availability of Course (Active/Inactive)
Fabrication Techniques for MEMs- based sensors: clinical Perspective	12	4	Swayam	Active
Introduction to computer vision with Watson and opencv	4	2	Coursera	Active
Solar Energy Basics	5	3	Coursera	Active
Introduction to the Internet of Things (IoT) and embedded system	4	2	Coursera	Active
IoT Networking and Fog Layer Devices	4	2	Edx	Active
Artificial Intelligence Search Methods For Problem Solving	12	4	Swayam	Active
Data Science for Engineers	8	3	Swayam	Active
Introduction to Machine Learning (IITM)	12	4	Swayam	Active
Python for Data Science	4	2	Swayam	Active
Introduction to cyber security	12	4	Swayam	Active
Statistics with Python Specialization	3	2	Coursera	Active
Artificial Intelligence (AI)	12	4	Edx	Active

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Machine Learning with Python: from linear models to deep learning	15	4	Edx	Active
Deep learning and neural network for financial engineering	7	3	Edx	Active

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List of MOOCs for UG Honours degree (AICTE Programmes)
Effective for Odd Semester of 2020-21
MOOCs for APPLIED ELECTRONICS & INSTRUMENTATION ENGINEERING

Course Name	Duration (Weeks)	Credit	Name of the Mooc websites	Availability of Course (Active/Inactive)
Data Science: Visualization	8	3	Edx	Active
Drones and Autonomous Systems I: Fundamentals	6	3	Edx	Active
Introduction to the Internet of Things (IoT) and embedded system	4	2	Coursera	Active
IoT Networking and Fog Layer Devices	8	3	Edx	Active
Artificial Intelligence Search Methods For Problem Solving	12	4	Swayam	Active
Data Science for Engineers	8	3	Swayam	Active
Electric Cars: Introduction	4	2	Edx	Active
Programming for the Internet of Things Project	4	2	Coursera	Active
Introduction to cyber security	12	4	Swayam	Active

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Effective for Odd Semester of 2020-21

Statistics with Python Specialization	3	2	Coursera	Active
Introduction to Internet of Things	12	4	Swayam	Active
Artificial Intelligence (AI)	12	4	Edx	Active
Machine Learning with Python: from linear models to deep learning	15	4	Edx	Active
Machine Learning fundamentals	10	4	Edx	Active
Introduction to Machine Learning (IITM)	12	4	Swayam	Active

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List of MOOCs for UG Honours degree (AICTE Programmes)
Effective for Odd Semester of 2020-21
MOOCS for Biotechnology

Course Name	Duration (Weeks)	Credit	Name of the Mooc websites	Availability of Course (Active/Inactive)
Learning Analytics tool	12	4	Swayam	Active
Introduction to Biostatistics	8	3	Swayam	Active
Data Science for Engineers	8	3	Swayam	Active
Introduction to Machine Learning (IITM)	12	4	Swayam	Active
Patenting in Biotechnology	4	2	Coursera	Active
Drug Discovery	3	2	Coursera	Active
Introduction to the Internet of Things (IoT) and embedded system	4	2	Coursera	Active
Artificial Intelligence Search Methods For Problem Solving	12	4	Swayam	Active
Programming for the Internet of Things Project	4	2	Coursera	Active
Introduction to Internet of Things	12	4	Swayam	Active
Artificial Intelligence (AI)	12	4	Edx	Active
Machine Learning with Python: from linear models to deep learning	15	4	Edx	Active

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List of MOOCs for UG Honours degree (AICTE Programmes)
Effective for Odd Semester of 2020-21
ELECTRICAL ENGINEERING

Course Name	Duration (Weeks)	Credit	Name of the Mooc websites	Availability of Course (Active/Inactive)
Fabrication Techniques for MEMs- based sensors: clinical Perspective	12	4	Swayam	Active
Introduction to computer vision with Watson and opencv	4	2	Coursera	Active
Solar Energy Basics	5	3	Coursera	Active
Introduction to the Internet of Things (IoT) and embedded system	4	2	Coursera	Active
IoT Networking and Fog Layer Devices	4	2	Edx	Active
Artificial Intelligence Search Methods For Problem Solving	12	4	Swayam	Active
Data Science for Engineers	8	3	Swayam	Active
Introduction to Machine Learning (IITM)	12	4	Swayam	Active
Python for Data Science	4	2	Swayam	Active
Introduction to cyber security	12	4	Swayam	Active
Statistics with Python Specialization	3	2	Coursera	Active
Artificial Intelligence (AI)	12	4	Edx	Active

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Machine Learning with Python: from linear models to deep learning	15	4	Edx	Active
Deep learning and neural network for financial engineering	7	3	Edx	Active

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List of MOOCs for UG Honours degree (AICTE Programmes)
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MOOCS for CHEMICAL ENGINEERING (Odd sem)

No	Course Name	Duration	Credit	Platform	Active Link
1	Infrared Spectroscopy for Pollution Monitoring	4 weeks	2	NPTEL	https://onlinecourses.nptel.ac.in/noc20_ch23/preview
2	Technologies for Clean and Renewable Energy Production	8 weeks	4	NPTEL	https://onlinecourses.nptel.ac.in/noc20_ch37/preview
3	Introduction to Deep Earth Science	5 weeks	3	EDX	https://www.edx.org/course/introduction-to-deep-earth-science
4	Basic Analytical Chemistry	6 weeks	3	EDX	https://www.edx.org/course/basic-analytical-chemistry
5	Air Pollution – a Global Threat to our Health	3 weeks	2	Coursera	https://www.coursera.org/learn/air-pollution-health-threat
6	Data Science for Engineers	8 weeks	4	NPTEL	https://onlinecourses.nptel.ac.in/noc20_cs72/preview
7	Demand and Supply Analytics	12 weeks	6	EDX	https://www.edx.org/course/demand-and-supply-analytics
8	Introduction to Engineering and Design	3 weeks	2	EDX	https://www.edx.org/course/introduction-to-engineering-and-design
9	Biorefinery: From Biomass to Building Blocks of Biobased Products	7 weeks	4	EDX	https://www.edx.org/course/biorefinery-from-biomass-to-building-blocks-of-bio
10	Water quality and the biogeochemical engine	13 weeks	6	EDX	https://www.edx.org/course/water-quality-and-the-biogeochemical-engine
11	Programming for the Internet of Things Project	4 weeks	2	Coursera	https://www.coursera.org/learn/internet-of-things-project
12	IoT: From hardware to practice	8 weeks	4	EDX	https://www.edx.org/course/a-subjective-introduction-to-the-iot

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13	AI for everyone	4 weeks	2	EDX	https://www.edx.org/course/artificial-intelligence-for-everyone
14	Intro to Machine Learning	12 weeks	6	NPTEL	https://onlinecourses.nptel.ac.in/noc20_cs73/preview
15	Cyber security	15 weeks	6	NPTEL	https://onlinecourses.swayam2.ac.in/cec20_cs15/preview
16	Fundamentals of Scalable Data Science(by IBM)	12	4	Coursera	Active
17	Data Analysis and Interpretation	12	4	Coursera	Active
18	Machine Learning for Accounting with Python	12	4	Coursera	Active
19	Data Processing Using Python	12	4	Coursera	Active
20	Introduction to Artificial Intelligence (by IBM)	8	4	Coursera	Active
21	Data Science: Foundations using R Specialization	12	4	Coursera	Active
22	Python for Data Science and AI	8	4	Coursera	Active
23	Data Science: Statistics and Machine Learning Specialization	12	4	Coursera	Active
24	R Programming	20	4	Coursera	Active
25	Python and Statistics for Financial Analysis	4	2	Coursera	Active
26	Applied Machine Learning in Python	12	4	Coursera	Active
27	Machine Learning, ML	12	4	Coursera	Active

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List of MOOCs for UG Honours degree (AICTE Programmes)

Effective for Odd Semester of 2020-21

MOOCs for Civil & Environmental Engineering (Odd sem)

No.	Course Name	Duration(Weeks)	Credit	Name of the Moocs websites	Status
1	Earthquake Resistant Design of Foundations	8	4	Swayam	Active
2	Environmental Chemistry	12	4	Swayam	Active
3	Earth science for Civil Engineering	8	4	SWAYAM	Active
4	Geotechnical Engineering Lab	4	2	Swayam	Active
5	Global Navigation satellite systems and applications	4	2	Swayam	Active
6	River Engineering	8	4	Swayam	Active
7	Remote sensing and GIS	4	2	Swayam	Active
8	Python for Data Science	4	2	Swayam	Active
9	Fundamentals of Scalable Data Science(by IBM)	12	4	Coursera	Active
10	Data Analysis and Interpretation	12	4	Coursera	Active
11	Machine Learning for Accounting with Python	12	4	Coursera	Active
12	Data Processing Using Python	12	4	Coursera	Active
13	Introduction to Artificial Intelligence (by IBM)	8	4	Coursera	Active
14	Data Science: Foundations using R Specialization	12	4	Coursera	Active
15	Python for Data Science and AI	8	4	Coursera	Active
16	Data Science: Statistics and Machine Learning Specialization	12	4	Coursera	Active
17	R Programming	20	4	Coursera	Active
18	Python and Statistics for Financial Analysis	4	2	Coursera	Active
19	Applied Machine Learning in Python	12	4	Coursera	Active
20	Machine Learning, ML	12	4	Coursera	Active

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List of MOOCs for UG Honours degree (AICTE Programmes)
Effective for Odd Semester of 2020-21
MOOCS FOR B. Arch (Odd Sem)

Course Name	Duration(Weeks)	Credit	Name of the Mooc websites	Status
Sustainability in Architecture: An Interdisciplinary Introduction	4	2	EDx	Active
Future Cities	10	4	EDx	Active
Quality of Life: Livability in Future Cities	11	4	Edx	Active
Realistic Architectural 3D Modeling	4	2	EDx	Active
Responsive Cities	10	4	Edx	Active
3D Modeling from Architectural Drawings	4	2	Edx	Active
Eco design for Cities and Suburbs	6	3	EDx	Active
Smart Cities	10	4	EDx	Active
Interpreting Vernacular Architecture in Asia	6	3	EDx	Active
The Architectural Imagination	10	4	EDx	Active
Zero-Energy Design: an approach to make your building sustainable	7	3	EDx	Active
Fundamentals of Scalable Data Science(by IBM)BM DATA SCIENCE	12	4	Coursera	Active
Data Analysis and Interpretation	12	4	Coursera	Active
Machine Learning for Accounting with Python	12	4	Coursera	Active
Data Processing Using Python	12	4	Coursera	Active

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Introduction to Artificial Intelligence (by IBM)	8	4	Coursera	Active
Data Science: Foundations using R Specialization	12	4	Coursera	Active
Python for Data Science and AI	8	4	Coursera	Active
Data Science: Statistics and Machine Learning Specialization	12	4	Coursera	Active
R Programming	20	4	Coursera	Active
Python and Statistics for Financial Analysis	4	2	Coursera	Active
Applied Machine Learning in Python	12	4	Coursera	Active
Machine Learning, ML	12	4	Coursera	Active

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MOOCs for Civil Engineering (Odd sem)

Course Name	Duration(Weeks)	Credit	Name of the Moocs websites	Status
Earthquake Resistant Design of Foundations	8	4	Swayam	Active
Environmental Chemistry	12	4	Swayam	Active
Earth science for Civil Engineering	8	4	SWAYAM	Active
Geotechnical Engineering Lab	4	2	Swayam	Active
Global Navigation satellite systems and applications	4	2	Swayam	Active
River Engineering	8	4	Swayam	Active
Remote sensing and GIS	4	2	Swayam	Active
Python for Data Science	4	2	Swayam	Active
Fundamentals of Scalable Data Science(by IBM)	12	4	Coursera	Active
Data Analysis and Interpretation	12	4	Coursera	Active
Machine Learning for Accounting with Python	12	4	Coursera	Active
Data Processing Using Python	12	4	Coursera	Active
Introduction to Artificial Intelligence (by IBM)	8	4	Coursera	Active
Data Science: Foundations using R Specialization	12	4	Coursera	Active
Python for Data Science and AI	8	4	Coursera	Active
Data Science: Statistics and Machine Learning Specialization	12	4	Coursera	Active
R Programming	20	4	Coursera	Active
Python and Statistics for Financial Analysis	4	2	Coursera	Active
Applied Machine Learning in Python	12	4	Coursera	Active
Machine Learning, ML	12	4	Coursera	Active

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List of MOOCs for UG Honours degree (AICTE Programmes)
Effective for Odd Semester of 2020-21

MOOCs for ELECTRONICS & COMMUNICATION ENGG

Course Name	Duration (Weeks)	Credit	Name of the Mooc websites	Availability of Course (Active/Inactive)
Data Science: Visualization	8	3	Edx	Active
Drones and Autonomous Systems I: Fundamentals	6	3	Edx	Active
Introduction to the Internet of Things (IoT) and embedded system	4	2	Coursera	Active
IoT Networking and Fog Layer Devices	8	3	Edx	Active
Artificial Intelligence Search Methods For Problem Solving	12	4	Swayam	Active
Data Science for Engineers	8	3	Swayam	Active
Electric Cars: Introduction	4	2	Edx	Active
Programming for the Internet of Things Project	4	2	Coursera	Active
Introduction to cyber security	12	4	Swayam	Active

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Statistics with Python Specialization	3	2	Coursera	Active
Introduction to Internet of Things	12	4	Swayam	Active
Artificial Intelligence (AI)	12	4	Edx	Active
Machine Learning with Python: from linear models to deep learning	15	4	Edx	Active
Machine Learning fundamentals	10	4	Edx	Active
Introduction to Machine Learning (IITM)	12	4	Swayam	Active

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List of MOOCs for UG Honours degree (AICTE Programmes)
Effective for Odd Semester of 2020-21

MOOCs for B.TECH (Hons.) CSE

Course Name	Duration (weeks)	Credit	Name of the Mooc websites	Availibility
AP Computer Science A: Java Programming Polymorphism and Advanced Data Structures	6	2	EDX	available
Build your very first iOS app	8	3	EDX	Available
Gameplay Programming for Video Game Designers	5	2	EDX	Available
Introduction to Computer Science & Programming Specialization	8	3	COURSERA	Available
Introduction to scripting in Python	8	3	COURSERA	Available
Foundation of Data Structures	6	2	EDX	Available
Synthesis of Digital Systems	12	3	MIT ONLINE COURSE	Available
Bayesian Statistics: Techniques and Models	5	2	COURSERA	Available
Mathematical Modelling Basics	9	3	EDX	Available
Animation and CGI Motion	12	3	EDX	Available
Web Application Development	6	2	COURSERA	Available
Web Design for Everybody	12	3	COURSERA	Available
The Bits and Bytes of Computer Networking	4	1	COURSERA	Available
Introduction to Cisco Networking	4	1	COURSERA	Available

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Introduction to Computing for Data Analysis with Python	6	2	EDX	Available
Introduction to data science in python	3	1	COURSERA	Available
What is Data Science?	3	1	COURSERA	Available
Introduction to Big Data	3	1	COURSERA	Available
The Data Science Tool Box	2	1	COURSERA	Available
Data Driven Decision Making	2	1	COURSERA	Available
A Crash Course in Data Science	1	1	COURSERA	Available
Digital Security and Human Rights	3	1	EDX	Available
Data Analysis and Interpretation	12	3	COURSERA	Available
Introduction to Design Thinking	5	2	EDX	Available
Introduction to Soft Computing	8	2	SWAYAM	Available
Introduction to Data Modelling	4	1	EDX	Available
Java Fundamentals for Android Development	6	2	EDX	Available
Using Databases with Python	5	2	COURSERA	Available
Data Base Management System	8	2	NPTEL	Available
Discrete Mathematics	12	3	NPTEL	Available
Programming, Data Structures and Algorithms using Python	8	2	NPTEL	Available
Design and Analysis of Algorithms	8	2	NPTEL	Available
Algorithm Specialization	16	4	COURSERA	Available

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List of MOOCs for UG Honours degree (AICTE Programmes)
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Divide and Conquer, Sorting, Searching and Randomized Algorithm	4	1	COURSERA	Available
Cloud Computing	8	2	NPTEL	Available
Cloud Computing	5	2	COURSERA	Available
Bitcoin and Crypto currency Technologies	11	3	COURSERA	Available
Ethical Hacking	8	2	UDEMY	Available
Cyber security and its 10 domains	7	2	COURSERA	Available
Introduction to Internet of Things	12	3	NPTEL	Available
Introduction to the Internet of Things	6	2	EDX	Available
IoT Programming and Big Data	5	2	EDX	Available
Data Communications and Network Services	4	1	COURSERA	Available
UML Class Diagrams for Software Engineering	3	1	EDX	Available
Formal Software Verification	8	2	EDX	
Software testing	12	3	COURSERA	
Software Engineering	12	3	EDX	
Software Project Management	12	3	COURSERA	Available
Software Product Management Specialization	16	4	COURSERA	Available
Entrepreneurship in Emerging Economies	6	2	EDX	Available
Patent Drafting for Beginners	4	1	EDX	Available
Patent Law for Engineers and Scientists	12	3	EDX	Available
Introduction to Computational Thinking and Data	10	3	EDX	Available

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Science				
Data Mining: Theories and Algorithms for Big Data	14	4	EDX	Available
Big Data Fundamentals	10	3	EDX	Available
Big Data Analytics	10	3	EDX	Available
Foundations of Data Science : Computational Thinking with Python	5	2	EDX	Available
How to win a Data Science Competition : Learn from Top Kagglers	5	2	COURSERA	Available
Virtual Reality	4	1	COURSERA	Available
Principles of Machine Learning	6	2	EDX	Available
Machine Learning	12	4	COURSERA	Available
AI For Everyone	4	1	COURSERA	Available
Robotics: Aerial Robotics	6	2	COURSERA	Available
Deep learning in Computer Vision	5	2	COURSERA	Available
Deep Learning – Part 1	12	3	COURSERA	Available
Artificial Intelligence Search Method for Problem Solving	12	3	COURSERA	Available
Machine Learning for Engineering and Science Applications	12	3	COURSERA	Available
Computer Vision	12	3	EDX	Available
Introduction to Machine Learning	12	3	COURSERA	Available
Introduction to Machine Learning	8	2	COURSERA	Available
Functional Programming in Scala	6	2	COURSERA	Available

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List of MOOCs for UG Honours degree (AICTE Programmes)
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Using python to access web data	6	2	COURSERA	Available
Python Data Structures	2	1	COURSERA	Available
Object oriented analysis and design	8	2	COURSERA	Available
Python 3 Programming Specialization	8	2	COURSERA	Available
Natural Language Processing	5	2	COURSERA	Available
Applied Natural Language Processing	12	3	EDX	Available
Natural Language Processing	12	3	EDX	Available
Embedded Systems	12	3	NPTEL	Available
Introduction to Industry 4.0 and Industrial Internet of Things	12	3	NPTEL	Available
A System View of Communications: From Signals to Packets (Part – 2)	6	2	Edx	Available
Software Testing fundamentals	8	2	Edx	Available
Software Testing and Management	8	2	EDX	Available
Neural Network & Deep Learning	4	1	COURSERA	Available
Teamwork and Collaboration	3	1	EDX	Available
Demystifying Networking	4	1	EDX	Available
Cyber security and Privacy in the IoT	5	2	EDX	Available
IoT System Design: Software and Hardware Integration	4	1	EDX	Available
Blockchain and Fin Tech: Basics, Applications, and Limitations	6	2	EDX	Available

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Block Chain Specialization	8	2	EDX	Available
A System View of Communications: From Signals to Packets (Part 3)	5	2	EDX	Available
Internet of Things	12	3	NPTEL	Available
Computational Thinking for Modeling and Simulation	6	2	EDX	Available
Mathematics For Machine Learning: Multivariate Calculas	6	2	COURSERA	Available
Becoming an Entrepreneur	6	2	EDX	Available
Marketing Fundamentals	4	1	EDX	Available
IBM Data Science Professional Certificate	8	2	COURSERA	Available
Data Science with Python	10	3	EDX	Available
Artificial Intelligence	12	3	NPTEL	Available
Foundations of Data Science: Prediction and MachineLearning	6	2	EDX	Available
Robotics: Vision Intelligence & Machine Learning	12	3	EDX	Available
Deep Learning Specialization	12	3	COURSERA	Available
Machine learning with Tensor Flow on Google Cloud Platform Specialization	4	1	COURSERA	Available
Applied Machine Learning with Python	3	1	COURSERA	Available
Convolution Neural Network	4	1	COURSERA	Available
Sequence Model	2	1	COURSERA	Available
Deep Learning	6	2	EDX	Available
Deep Learning	12	3	NPTEL	Available

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Reinforcement Learning	12	3	EDX	Available
Neural Networks for Machine Learning	16	4	COURSERA	Available
Cloud Computing for Enterprises	8	2	EDX	Available
Cloud Computing Management	8	2	EDX	Available
Cloud Computing Infrastructure	8	2	EDX	Available
Data Engineering on Google Cloud Platform Specialization	4	1	COURSERA	Available
Security in Google Cloud Platform Specialization	4	1	COURSERA	Available
AWS Fundamental: Going Cloud Native	5	2	COURSERA	Available
Remote Sensing	12	3	NPTEL	Available
Google cloud Platform Big data and Machine Learning Platform	2	1	COURSERA	Available
Leadership for Engineers	6	2	EDX	Available
Computer Forensics	8	2	EDX	Available
Compliance in Office 365: Data Governance	4	1	EDX	Available
Human Computer Interactions	8	2	EDX	Available
Social Networks	12	3	NPTEL	Available
Machine Learning	8	2	NPTEL	Available
Introduction to Machine Learning	12	3	NPTEL	Available
Deep Learning	12		NPTEL	Available
Data Science for Engineers	8	2	NPTEL	Available
Introduction to Internet of Things	12	3	NPTEL	Available

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Introduction to Industry 4.0 and Industrial Internet of Things	12	3	NPTEL	Available

MOOCs for B.TECH (Hons.) IT

No.	Course Name	Duration (weeks)	Credit	Name of the Mooc websites	Availibility
1	AP Computer Science A: Java Programming Polymorphism and Advanced Data Structures	6	2	EDX	available
2	Build your very first iOS app	8	3	EDX	Available
3	Gameplay Programming for Video Game Designers	5	2	EDX	Available
4	Introduction to Computer Science & Programming Specialization	8	3	COURSERA	Available
5	Introduction to scripting in Python	8	3	COURSERA	Available
6	Foundation of Data Structures	6	2	EDX	Available
7	Synthesis of Digital Systems	12	3	MIT ONLINE COURSE	Available
8	Bayesian Statistics: Techniques and Models	5	2	COURSERA	Available
9	Mathematical Modelling Basics	9	3	EDX	Available
10	Animation and CGI Motion	12	3	EDX	Available
11	Web Application Development	6	2	COURSERA	Available
12	Web Design for Everybody	12	3	COURSERA	Available

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13	The Bits and Bytes of Computer Networking	4	1	COURSERA	Available
14	Introduction to Cisco Networking	4	1	COURSERA	Available
15	Introduction to Computing for Data Analysis with Python	6	2	EDX	Available
16	Introduction to data science in python	3	1	COURSERA	Available
17	What is Data Science?	3	1	COURSERA	Available
18	Introduction to Big Data	3	1	COURSERA	Available
19	The Data Science Tool Box	2	1	COURSERA	Available
20	Data Driven Decision Making	2	1	COURSERA	Available
21	A Crash Course in Data Science	1	1	COURSERA	Available
22	Digital Security and Human Rights	3	1	EDX	Available
23	Data Analysis and Interpretation	12	3	COURSERA	Available
24	Introduction to Design Thinking	5	2	EDX	Available
25	Introduction to Soft Computing	8	2	SWAYAM	Available
26	Introduction to Data Modelling	4	1	EDX	Available
27	Java Fundamentals for Android Development	6	2	EDX	Available
28	Using Databases with Python	5	2	COURSERA	Available
29	Data Base Management System	8	2	NPTEL	Available
30	Discrete Mathematics	12	3	NPTEL	Available

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31	Programming, Data Structures and Algorithms using Python	8	2	NPTEL	Available
32	Design and Analysis of Algorithms	8	2	NPTEL	Available
33	Algorithm Specialization	16	4	COURSERA	Available
34	Divide and Conquer, Sorting, Searching and Randomized Algorithm	4	1	COURSERA	Available
35	Cloud Computing	8	2	NPTEL	Available
36	Cloud Computing	5	2	COURSERA	Available
37	Bitcoin and Crypto currency Technologies	11	3	COURSERA	Available
38	Ethical Hacking	8	2	UDEMY	Available
39	Cyber security and its 10 domains	7	2	COURSERA	Available
40	Introduction to Internet of Things	12	3	NPTEL	Available
41	Introduction to the Internet of Things	6	2	EDX	Available
42	IoT Programming and Big Data	5	2	EDX	Available
43	Data Communications and Network Services	4	1	COURSERA	Available
44	UML Class Diagrams for Software Engineering	3	1	EDX	Available
45	Formal Software Verification	8	2	EDX	
46	Software testing	12	3	COURSERA	
47	Software Engineering	12	3	EDX	
48	Software Project Management	12	3	COURSERA	Available
49	Software Product Management Specialization	16	4	COURSERA	Available
50	Entrepreneurship in Emerging Economies	6	2	EDX	Available

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51	Patent Drafting for Beginners	4	1	EDX	Available
52	Patent Law for Engineers and Scientists	12	3	EDX	Available
53	Introduction to Computational Thinking and Data Science	10	3	EDX	Available
54	Data Mining: Theories and Algorithms for Big Data	14	4	EDX	Available
55	Big Data Fundamentals	10	3	EDX	Available
56	Big Data Analytics	10	3	EDX	Available
57	Foundations of Data Science : Computational Thinking with Python	5	2	EDX	Available
58	How to win a Data Science Competition : Learn from Top Kagglers	5	2	COURSERA	Available
59	Virtual Reality	4	1	COURSERA	Available
60	Principles of Machine Learning	6	2	EDX	Available
61	Machine Learning	12	4	COURSERA	Available
62	AI For Everyone	4	1	COURSERA	Available
63	Robotics: Aerial Robotics	6	2	COURSERA	Available
64	Deep learning in Computer Vision	5	2	COURSERA	Available
65	Deep Learning – Part 1	12	3	COURSERA	Available
66	Artificial Intelligence Search Method for Problem Solving	12	3	COURSERA	Available
67	Machine Learning for Engineering and Science Applications	12	3	COURSERA	Available
68	Computer Vision	12	3	EDX	Available

69	Introduction to Machine Learning	12	3	COURSERA	Available
70	Introduction to Machine Learning	8	2	COURSERA	Available
71	Functional Programming in Scala	6	2	COURSERA	Available
72	Using python to access web data	6	2	COURSERA	Available
73	Python Data Structures	2	1	COURSERA	Available
74	Object oriented analysis and design	8	2	COURSERA	Available
75	Python 3 Programming Specialization	8	2	COURSERA	Available
76	Natural Language Processing	5	2	COURSERA	Available
77	Applied Natural Language Processing	12	3	EDX	Available
78	Natural Language Processing	12	3	EDX	Available
79	Embedded Systems	12	3	NPTEL	Available
80	Introduction to Industry 4.0 and Industrial Internet of Things	12	3	NPTEL	Available
81	A System View of Communications: From Signals to Packets (Part – 2)	6	2	Edx	Available
82	Software Testing fundamentals	8	2	Edx	Available
83	Software Testing and Management	8	2	EDX	Available
84	Neural Network & Deep Learning	4	1	COURSERA	Available
85	Teamwork and Collaboration	3	1	EDX	Available
86	Demystifying Networking	4	1	EDX	Available
87	Cyber security and Privacy in the IoT	5	2	EDX	Available

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88	IoT System Design: Software and Hardware Integration	4	1	EDX	Available
89	Blockchain and Fin Tech: Basics, Applications, and Limitations	6	2	EDX	Available
90	Block Chain Specialization	8	2	EDX	Available
91	A System View of Communications: From Signals to Packets (Part 3)	5	2	EDX	Available
92	Internet of Things	12	3	NPTEL	Available
93	Computational Thinking for Modeling and Simulation	6	2	EDX	Available
94	Mathematics For Machine Learning: Multivariate Calculas	6	2	COURSERA	Available
95	Becoming an Entrepreneur	6	2	EDX	Available
96	Marketing Fundamentals	4	1	EDX	Available
97	IBM Data Science Professional Certificate	8	2	COURSERA	Available
98	Data Science with Python	10	3	EDX	Available
99	Artificial Intelligence	12	3	NPTEL	Available
100	Foundations of Data Science: Prediction and MachineLearning	6	2	EDX	Available
101	Robotics: Vision Intelligence & Machine Learning	12	3	EDX	Available
102	Deep Learning Specialization	12	3	COURSERA	Available
103	Machine learning with Tensor Flow on Google Cloud Platform Specialization	4	1	COURSERA	Available
104	Applied Machine Learning with Python	3	1	COURSERA	Available
105	Convolution Neural Network	4	1	COURSERA	Available

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106	Sequence Model	2	1	COURSERA	Available
107	Deep Learning	6	2	EDX	Available
108	Deep Learning	12	3	NPTEL	Available
109	Reinforcement Learning	12	3	EDX	Available
110	Neural Networks for Machine Learning	16	4	COURSERA	Available
111	Cloud Computing for Enterprises	8	2	EDX	Available
112	Cloud Computing Management	8	2	EDX	Available
113	Cloud Computing Infrastructure	8	2	EDX	Available
114	Data Engineering on Google Cloud Platform Specialization	4	1	COURSERA	Available
115	Security in Google Cloud Platform Specialization	4	1	COURSERA	Available
116	AWS Fundamental: Going Cloud Native	5	2	COURSERA	Available
117	Remote Sensing	12	3	NPTEL	Available
118	Google cloud Platform Big data and Machine Learning Platform	2	1	COURSERA	Available
119	Remote Sensing and Digital Image Processing of Satellite Data	8	2	NPTEL	Not Available
120	Leadership for Engineers	6	2	EDX	Available
121	Computer Forensics	8	2	EDX	Available
122	Compliance in Office 365: Data Governance	4	1	EDX	Available
123	Human Computer Interactions	8	2	EDX	Available
124	Social Networks	12	3	NPTEL	Available
129	Machine Learning	8	2	NPTEL	Available

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130	Introduction to Machine Learning	12	3	NPTEL	Available
133	Deep Learning	12		NPTEL	Available
134	Data Science for Engineers	8	2	NPTEL	Available
136	Introduction to Internet of Things	12	3	NPTEL	Available
137	Introduction to Industry 4.0 and Industrial Internet of Things	12	3	NPTEL	Available

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MOOCs for B. Pharm (Hons)

Effective for Odd Semester of 2020-21(REVISED)

Course Name	Duration (weeks)	Credit	Name of the Mooc websites	Availibility
Fundamentals of Spectroscopy	12	3	SWAYAM	Available
Organometallic Chemistry	4	1	SWAYAM	Available
Biochemistry	12	3	SWAYAM	Available
Principles and application of NMR spectroscopy	8	2	SWAYAM	Available
Medical Biomaterials	8	2	SWAYAM	Available
Computational systems Biology	12	3	SWAYAM	Available
Bio engineering: An interface with biology and medicine	8	2	SWAYAM	Available
Bio-informatics: Algorithms and application	12	3	SWAYAM	Available
Medical Biomaterials	8	2	SWAYAM	Available
Mass transfer operation-I	12	2	SWAYAM	Available
Soft nano technology	8	2	SWAYAM	Available
Enhancing soft skills and personality	8	2	SWAYAM	Available
Soft skill development	8	2	SWAYAM	Available
Introduction to materials Science and Engineering	12	3	SWAYAM	Available
Statistical Inference	8	2	SWAYAM	Available

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Regulatory requirements for medical Device	4	3	SWAYAM	Available
Business statistics	12	3	SWAYAM	Available
Business analysis and data mining modelling using R	12	3	SWAYAM	Available
Basic Real analysis	12	3	SWAYAM	Available
Prescription Drug Regulation, Cost, and Access: Current Controversies in Context	8	2	EDX	Available
Medicinal Chemistry: The Molecular Basis of Drug Discovery	7	2	EDX	Available
Human Anatomy	6	2	EDX	Available
Principle of Biochemistry	15	4	EDX	Available
Health Informatics: The Cutting Edge	5	2	EDX	Available
CERTAIN : Pragmatic Clinical Trials and Healthcare Delivery Evaluations	8	2	EDX	Available
Molecular Biology - Part 1: DNA Replication and Repair	8	2	EDX	Available
Molecular Biology - Part 2: Transcription and Transposition	7	2	EDX	Available
Proteins: Biology's Workforce	5	2	EDX	Available
Autophagy: Research behind the 2016 Nobel Prize in Physiology or	3	1	EDX	Available

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Medicine				
The Immune System: New Developments in Research - Part 1	4	1	EDX	Available
Metabolomics in Life Sciences	4	1	EDX	Available
BioStatistics	8	2	EDX	Available
Fundamentals of Scalable Data Science(by IBM)	12	3	COURSERA	Available
Data Analysis and Interpretation	12	3	COURSERA	Available
Machine Learning for Accounting with Python	12	3	COURSERA	Available
Data Processing Using Python	12	3	COURSERA	Available
Introduction to Artificial Intelligence (by IBM)	8	2	COURSERA	Available
Data Science: Foundations using R Specialization	12	3	COURSERA	Available
Python for Data Science and AI	8	2	COURSERA	Available
Data Science: Statistics and Machine Learning Specialization	12	3	COURSERA	Available
Python and Statistics for Financial Analysis	4	1	COURSERA	Available
Applied Machine Learning in Python	12	4	COURSERA	Available
Machine Learning	8	2	NPTEL	Available
Introduction to Machine Learning	12	3	NPTEL	Available
Data Science for Engineers	8	2	NPTEL	Available

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Introduction to Internet of Things	12	3	NPTEL	Available
Infrared spectroscopy for pollution monitoring	4	2	NPTEL	Available
Computer Aided Drug Design	8	2	NPTEL	Available
Spectroscopic Techniques for Pharmaceutical and Biopharmaceutical Industries	12	3	NPTEL	Available
Principles Of Downstream Techniques In Bioprocess	12	3	NPTEL	Available
Fundamentals of micro and nanofabrication	12	3	NPTEL	Available
Drug Delivery: Principles and Engineering	12	3	NPTEL	Available
Biomedical nanotechnology	4	2	NPTEL	Available
Non-Parametric Statistical Inference	4	2	SWAYAM	Available
Introduction to Biostatistics	8	2	NPTEL	Available
Business statistics	12	3	SWAYAM	Available
One and two dimensional NMR Spectroscopy for chemists	12		Nptel	Available
Prescription Drug Regulation, Cost, and Access: Current Controversies in Context	8	2	EDX	Available
Medicinal Chemistry: The Molecular Basis of Drug Discovery	7	2	EDX	Available

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Human Anatomy	6	2	EDX	Available
Principle of Biochemistry	15	4	EDX	Available
Health Informatics: The Cutting Edge	5	2	EDX	Available
CERTAIN : Pragmatic Clinical Trials and Healthcare Delivery Evaluations	8	2	EDX	Available
Molecular Biology - Part 1: DNA Replication and Repair	8	2	EDX	Available
Molecular Biology - Part 2: Transcription and Transposition	7	2	EDX	Available
Proteins: Biology's Workforce	5	2	EDX	Available
Autophagy: Research behind the 2016 Nobel Prize in Physiology or Medicine	3	1	EDX	Available
The Immune System: New Developments in Research - Part 1	4	1	EDX	Available
Metabolomics in Life Sciences	4	1	EDX	Available
BioStatistics	8	2	EDX	Available
Fundamentals of Scalable Data Science(by IBM)	12	3	COURSERA	Available
Data Analysis and Interpretation	12	3	COURSERA	Available
Machine Learning for Accounting with Python	12	3	COURSERA	Available
Data Processing Using Python	12	3	COURSERA	Available

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Introduction to Artificial Intelligence (by IBM)	8	2	COURSERA	Available
Data Science: Foundations using R Specialization	12	3	COURSERA	Available
Python for Data Science and AI	8	2	COURSERA	Available
Data Science: Statistics and Machine Learning Specialization	12	3	COURSERA	Available
Python and Statistics for Financial Analysis	4	1	COURSERA	Available
Applied Machine Learning in Python	12	4	COURSERA	Available
Introduction to Machine Learning	12	3	NPTEL	Available
Data Science for Engineers	8	2	NPTEL	Available
Introduction to Internet of Things	12	3	NPTEL	Available
Industrial Pharmacy I	12	3	Swayam	Available

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MOOCS for AUTOMOBILE ENGINEERING

Course Name	Duration (Weeks)	Credit	Name of the Mooc websites	ACTIVE(Y/N)
Control of Nonlinear Spacecraft Attitude Motion	4	2	COURSERA	Y
Introduction to Self-Driving Cars	7	2	COURSERA	Y
Drones and Autonomous Systems I: Fundamentals	6	3	Edx	Y
Electric Cars: Introduction	6	3	Edx	Y
Programming for the Internet of Things Project	4	2	Coursera	Y
Electric and Conventional Vehicles	6	3	Edx	Y
Fundamentals of Scalable Data Science(by IBM)	12	4	Coursera	
Data Analysis and Interpretation	12	4	Coursera	
Machine Learning for Accounting with Python	12	4	Coursera	
Data Processing Using Python	12	4	Coursera	

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Introduction to Artificial Intelligence (by IBM)	8	4	Coursera	
Data Science: Foundations using R Specialization	12	4	Coursera	
Python for Data Science and AI	8	4	Coursera	
Data Science: Statistics and Machine Learning Specialization	12	4	Coursera	
R Programming	20	4	Coursera	
Python and Statistics for Financial Analysis	4	2	Coursera	
Applied Machine Learning in Python	12	4	Coursera	
Machine Learning	12	4	Coursera	

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MOOCs for HOTEL MANAGEMENT & CATERING TECHNOLOGY

Course Name	Duration (Weeks)	Credit	Name of the Mooc websites	ACTIVE(Y/N)
Hotel Management: Distribution, Revenue and Demand Manage ment	4		COURSERA	Y
Demand and Supply Analytics	12		Edx	N
Thermal Operations in Food Process Engineering: Theory and Applications	12	4	Swayam	N
Introduction To Learning Analytics	4	2	Swayam	N
Introduction to Global Hospitality Management	6		Edx	Y
Introduction to Machine Learning (IITM)	12	4	Swayam	y
Hospitality and Tourism Technology and Innovation	6		Edx	Y
Managing Human Resources in the Hospitality and Tourism Industry	6		Edx	Y

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Introduction to Internet of Things	12	4	Swayam	Y
Artificial Intelligence (AI)	12		Edx	N
Fundamentals of Scalable Data Science(by IBM)	12	4	Coursera	Active
Data Analysis and Interpretation	12	4	Coursera	Active
Machine Learning for Accounting with Python	12	4	Coursera	Active
Data Processing Using Python	12	4	Coursera	Active
Introduction to Artificial Intelligence (by IBM)	8	4	Coursera	Active
Data Science: Foundations using R Specialization	12	4	Coursera	Active
Python for Data Science and AI	8	4	Coursera	Active
Data Science: Statistics and Machine Learning Specialization	12	4	Coursera	Active

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List of MOOCs for UG Honours degree (AICTE Programmes)
Effective for Odd Semester of 2020-21

R Programming	20	4	Coursera	Active
Python and Statistics for Financial Analysis	4	2	Coursera	Active
Applied Machine Learning in Python	12	4	Coursera	Active
Machine Learning	12	4	Coursera	Active

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List of MOOCs for UG Honours degree (AICTE Programmes)

Effective for Odd Semester of 2020-21

MOOCS for INSTRUMENTATION & CONTROL ENGINEERING

No.	Course name	Duration (weeks)	Credit	Name of MOOC website	link
1	Data Science: Inference and Modeling	8		edX	https://www.edx.org/course/data-science-inference-and-modeling
2	Professional Certificate in Drones and Autonomous Systems	12		edX	https://www.edx.org/professional-certificate/umgc-usmx-drones-and-autonomous-systems
3	Professional Certificate in IoT: from hardware to practice	16		edX	https://www.edx.org/professional-certificate/itmox-iot-from-hardware-to-practice
4	Introduction to Internet of Things	12		SWAYAM	https://www.nptel.ac.in/noc/courses/noc20/SEM1/noc20-cs22/
5	Artificial Intelligence Search Methods For Problem Solving	12		SWAYAM	https://onlinecourses.nptel.ac.in/noc20_cs81/preview
6	Data Science for Engineers	8		SWAYAM	https://onlinecourses.nptel.ac.in/noc20_cs72/preview
7	Electric Cars: Introduction	4		edX	https://www.edx.org/course/electric-cars-introduction
8	Programming for the Internet of Things Project	4		Coursera	https://www.coursera.org/learn/internet-of-things-project
9	Introduction to Cyber Security	12		swayam	https://onlinecourses.swayam2.ac.in/nou20_cs02/preview
10	Introduction to internet of things	12		swayam	https://onlinecourses.nptel.ac.in/noc20_cs66/preview

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List of MOOCs for UG Honours degree (AICTE Programmes)
Effective for Odd Semester of 2020-21

11	Artificial Intelligence (AI)	12		edX	https://www.edx.org/course/artificial-intelligence-ai
12	Machine Learning with Python: from Linear Models to Deep Learning	15		edX	https://www.edx.org/course/machine-learning-with-python-from-linear-models-to
13	Machine Learning Fundamentals	10		edX	https://www.edx.org/course/machine-learning-fundamentals-2
14	Introduction to Machine Learning	12		swayam	https://onlinecourses.nptel.ac.in/noc20_cs73/preview

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List of MOOCs for UG Honours degree (AICTE Programmes)

Effective for Odd Semester of 2020-21

MOOCS for LEATHER TECHNOLOGY

No.	Course name	Duration (weeks)	Credit	Name of MOOC website	link
1	Learning Analytics Tools	12		swayam	https://onlinecourses.nptel.ac.in/noc20_cs89/preview
2	Industrial Safety Engineering	12		swayam	https://onlinecourses.nptel.ac.in/noc20_mg43/preview
3	Continuous Quality Improvement : Tools and Techniques	12		swayam	https://onlinecourses.swayam2.ac.in/imb20_mg46/preview
4	Air Pollution – a Global Threat to our Health	3		Coursera	https://www.coursera.org/learn/air-pollution-health-threat
5	Data Science for Engineers	8		SWAYAM	https://onlinecourses.nptel.ac.in/noc20_cs72/preview
6	Demand and Supply Analytics	12		edX	https://www.edx.org/course/demand-and-supply-analytics
7	Programming for the Internet of Things Project	4		Coursera	https://www.coursera.org/learn/internet-of-things-project
8	Introduction to internet of things	12		swayam	https://onlinecourses.nptel.ac.in/noc20_cs66/preview
9	Artificial Intelligence (AI)	12		edX	https://www.edx.org/course/artificial-intelligence-ai
10	Machine Learning with Python: from Linear Models to Deep Learning	15		edX	https://www.edx.org/course/machine-learning-with-python-from-linear-models-to

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List of MOOCs for UG Honours degree (AICTE Programmes)
Effective for Odd Semester of 2020-21

11	Machine Learning Fundamentals	10		edX	https://www.edx.org/course/machine-learning-fundamentals-2
12	Introduction to the Internet of Things (IoT)	6		edX	https://www.edx.org/course/introduction-to-the-internet-of-things-iot

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List of MOOCs for UG Honours degree (AICTE Programmes)
Effective for Odd Semester of 2020-21

MOOCS for TEXTILE TECHNOLOGY

Odd Sem - 2020

Course Name	Duration (weeks)	Credit	Name of the Mooc websites	Availibility
Big Data Analysis with Scala and Spark	4	2	Coursera	Available
Data Science for Engineers	8	3	SWAYAM	Available
Python for Data Science	4	2	SWAYAM	Available
Introduction to the Internet of Things (IoT)	6		Edx	Available
Artificial Intelligence Search Methods For Problem Solving	12	4	SWAYAM	Available
Programming for the Internet of Things Project	4		Coursera	Available
Introduction to Internet of Things	12	4	SWAYAM	Available
Artificial Intelligence (AI)	12		Edx	Available
Principles of Machine Learning: Python Edition	6		Edx	Available
Machine Learning	12		Edx	Available

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List of MOOCs for UG Honours degree (AICTE Programmes)
Effective for Odd Semester of 2020-21

MOOCs for Apparel & Production Management

Odd Sem - 2020

Course Name	Duration (weeks)	Credit	Name of the Mooc websites	Availibility
Big Data Analysis with Scala and Spark	4	2	Coursera	Available
Data Science for Engineers	8	3	SWAYAM	Available
Python for Data Science	4	2	SWAYAM	Available
Introduction to the Internet of Things (IoT)	6		Edx	Available
Artificial Intelligence Search Methods For Problem Solving	12	4	SWAYAM	Available
Programming for the Internet of Things Project	4		Coursera	Available
Introduction to Internet of Things	12	4	SWAYAM	Available
Artificial Intelligence (AI)	12		Edx	Available
Principles of Machine Learning: Python Edition	6		Edx	Available
Machine Learning	12		Courser	Available
Science of Clothing Comfort	12	4	SWAYAM	Available

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List of MOOCs for UG Honours degree (AICTE Programmes)
Effective for Odd Semester of 2020-21

MOOCs for Bio-Medical Engineering (Hons)

Course Name	**Duration (Weeks)**	**Credit**	**Name of the Mooc websites**	Status
Biomedical nanotechnology	4	2	Swayam	Active
Computer Aided Drug Design	8	3	Swayam	Active
Demystifying Biomedical Big Data: A User's Guide	8	3	Edx	Active
Introduction to Biomedical Engineering	4	2	Coursera	Active
So You Want to Become a Biomedical Engineer	4	2	edX	Active
Data Science for Engineers	8	3	Swayam	Active
Introduction to Machine Learning	12	4	Swayam	Active
Ultrasounds, X-ray, positron emission tomography (PET) and application	7		Edx	Active
Programming for the Internet of Things Project	4	2	Coursera	Active
Introduction to Internet of Things	12	4	Swayam	Active
Artificial Intelligence (AI)	12	4	Edx	Active
INTRODUCTION TO CYBER SECURITY	12	4	Swayam	Active
Basic Course in Biomedical Research, Cycle 3	12	4	Swayam NPTEL	Active

ACADEMIC COUNCIL

HERITAGE INSTITUTE OF TECHNOLOGY, KOLKATA-700107

MINUTES OF THE FOURTEENTH MEETING OF THE ACADEMIC COUNCIL HELD ON MONDAY, 9th JULY, 2018 AT 11:00 AM AT "A" BUILDING CONFERENCE ROOM

Members Present:

1.	Prof. (Dr.) Pranay Chaudhuri	Chairman
2.	Prof. (Dr.) Madhurima Chattopadhyay, HOD (AEIE)	Member
3.	Prof. (Dr.) Srabanti Basu, HOD (BT)	Member
4.	Prof. (Dr.) Tapas Sadhu, HOD (CE)	Member
5.	Prof. (Dr.) Sulagna Chatterjee, HOD (ChE)	Member
6.	Prof. (Dr.) Jayati Datta, HOD (Chem)	Member
7.	Prof. (Dr.) Subhashis Majumder, HOD (CSE) & Dean (UG)	Member
8.	Prof. (Dr.) Prabir Banerjee, HOD (ECE)	Member
9.	Prof. (Dr.) Saibal Dutta, HOD (EE)	Member
10.	Prof. (Dr.) Suparna Chakraborty, HOD (Hum.)	Member
11.	Prof. (Dr.) Tapan Chakrabarti, HOD (IT)	Member
12.	Prof. (Dr.) Sandip Chatterjee, HOD (Math.)	Member
13.	Prof. (Dr.) Sukanta Sarkar, HOD (ME)	Member
14.	Prof. (Dr.) N P Nayak, HOD (Phy) and Dean (Student Affairs)	Member
15.	Prof. (Dr.) Siuli Roy, HOD (MCA)	Member
16.	Prof. Krishanu Datta, Faculty Representative	Member
17.	Prof. (Dr.) Santanu Ghorai, Faculty Representative	Member
18.	Prof. (Dr.) Nirman Ganguly, Faculty Representative	Member
19.	Prof. Kalarab Ray, Member Secretary and Deputy Controller of Examinations	Member

Leave of Absence Granted:

1. Prof. Chandan Mazumdar, Nominee BOG
2. Prof. (Dr.) Chandan Guha, Nominee BOG
3. Mr. Ivan Saha, Nominee BOG
4. Prof. B B Paira, Nominee BOG
5. Prof. (Dr.) Siddhartha Mukherjee, Representative MAKAUT
6. Prof. Debjani Ganguly, Nominee MAKAUT
7. Prof. (Dr.) Nabendu Chaki, Nominee MAKAUT

Special Invitees Present:

1. Prof. (Dr.) S K Barua, Registrar
2. Prof. B R Saha, Controller of Examinations

After granting leave of absence to members as mentioned above, the meeting started.

Welcome by the Chairman

The Chairman welcomed all members to this Fourteenth Academic Council meeting.

Agenda No. 1: Confirmation of the Minutes of the last Academic Council Meeting held on 09-Feb-2018

The minutes of the thirteenth meeting of the Academic Council held on 09-Feb-2018 were confirmed and adopted.

Agenda No. 2: Action Taken Report for the last meeting held on 09-Feb-2018

a) The proposal for "Providing for Facility for Semester-long Project Work for External Students", introducing a facility for semester-long project work at HIT for external students against (a) submission of a "No Objection Certificate" (in a format specified by HIT) from the parent institute, and (b) payment of a non-refundable fee of Rs. 15,000/- to HIT, has been finalized by the Registrar, by incorporating the necessary few more operational details [reference point-2(a) of Minutes of 13th AC Meeting held on 09-Feb-2018].

b) The name of Mr. Sanjib Mukhopadhyay, Technical Director & Head, Engineering, M N Dastur & Co (P) Ltd, has duly been included as the Industry Representative in BOS of Chemical Engineering Department, in place of Mr. Siddhartha Sengupta (who has resigned from Vikram Solar) [reference point-5(b) of Minutes of 13th AC Meeting held on 09-Feb-2018].

Agenda No. 3: Consideration of a Proposal for providing Facility for Semester-long Project Work for External Students

The finalized proposal was shared with the Council members and was duly approved [reference point-2(a) above].

Agenda No. 4: Consideration of the recommendations of the Boards of Studies (BoS) of the following degree-awarding departments regarding course structures for the various B Tech and M Tech programmes and detailed syllabi for 1st Year: Applied Electronics and Instrumentation Engineering (AEIE), Biotechnology (BT), Civil Engineering (CE), Chemical Engineering (CHE), Computer Science and Engineering (CSE), Electronics and Communication Engineering (ECE), Electrical Engineering (EE), Information Technology (IT), and Mechanical Engineering (ME)

The curricular structures for the various B Tech and M Tech programmes and detailed syllabi for 1st Year of these programmes were discussed by the Council members in light of distribution of Credits across various Course Types for all the above B Tech programmes, in comparison with the suggestions from AICTE.

a) It was decided to include the following table as part of the Course Structure for all B Tech programmes.

Sl. No.	Course Type	AICTE Suggested	AEIE	BIOT	CIVL	CHEN	CSEN	ECEN	ELEC	INFO	MECH
1.	Humanities and Social Sciences including Management Courses	12	12	12	12	12	12	12	12	12	12
2.	Basic Science Courses	25	23	26.5	21	22	23	26	23	23	27
3.	Engineering Science Courses including Workshop, Drawing, Basics of Electrical / Mechanical / Computer, etc.	24	27	27.5	26	27	30	26	29	28	23
4.	Professional Core Courses	48	54	49	57	55	51	52	52	53	51.5
5.	Professional Elective Courses relevant to chosen Specialization / Branch	18	15	16	15	15	15	15	15	15	17.5
6.	Open Subjects – Electives from other Technical and/or Emerging Subjects	18	12	12	12	12	12	12	12	12	12
7.	Project Work, Seminar and Internship in industry or elsewhere	15	17	17	17	17	17	17	17	17	17
8.	Mandatory Courses (Non-credit) [Environmental Sciences, Induction Program, Indian Constitution, Essence of Indian Traditional Knowledge]	0	0	0	0	0	0	0	0	0	0
	Total	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**
9	Honours Courses	20	20	20	20	20	20	20	20	20	20
	Grand Total	**180**	**180**	**180**	**180**	**180**	**180**	**180**	**180**	**180**	**180**

b) It was decided to include, in the Course Structure for every B Tech programme, a Semesterwise Honours Credit Chart, together with a Total Honours Credit (20), as shown below.

Honours Credit Chart

Sl. No.	Semester	Paper Code	Course Title	Contact Hours / Week			Credit Points
				L	T	P	
	1st						
	2nd						
	3rd						
	4th						
	5th						
	6th						
	7th						
	8th						
	Total						20

Definition of Credit (as per AICTE):

- 1 Hour Lecture (L) per Week = 1 Credit
- 1 Hour Tutorial (T) per Week = 1 Credit
- 1 Hour Practical (P) per Week = 0.5 Credits
- 2 Hours Practical (Lab) per Week = 1 Credit

Range of Credits (as per AICTE):

- ✓ A total of 160 credits will be necessary for a student to be eligible to get B Tech degree.
- ✓ A student will be eligible to get B Tech degree with Honours if he/she completes an additional 20 credits. These could be acquired through various Honours Courses offered by the respective departments.
- ✓ A part or all of the above additional credits may also be acquired through MOOCs. Any student completing any course through MOOC will have to submit an appropriate certificate to earn the corresponding credit.
- ✓ For any additional information, the student may contact the concerned HODs.

c) It was decided that:

1) Honours Credits will not be considered for DGPA computation.
2) Only "Pass" or "Fail" will be mentioned in Grade Card for all Mandatory Non-credit Courses as well as for any MOOC.
3) Mandatory Non-credit Courses will be evaluated like all other courses being offered by the respective departments.

After due deliberations, the curricular structures for the various B Tech and M Tech programmes, and the detailed syllabi for 1st Year of these programmes were approved by the Council, subject to a few minor changes (with respect to use of uniform paper codes, rationalised paper names, proper classification / grouping of papers, and inclusion of any missing Course Objectives, and/or Course Outcomes for any paper).

Agenda No. 5: Consideration of the results of Even Semester Examinations 2018 held in May-Jun-2018 for the following: B Tech 2nd Semester, B Tech 8th Semester, and M Tech 4th Semester

The analysis of the results, compiled by the Controller of Examinations (CoE), was presented in PowerPoint form; also a printed booklet, titled "Result of 2nd Semester & 8th Semester B. Tech and 4th Semester M. Tech Examinations, 2018", was distributed to all members for ready reference. After due deliberations, the results for the following programmes were approved by the Council:

- ✓ **B Tech** – for all students of 1st Year (2nd Semester), and 4th Year (8th Semester) for following streams: AEIE, BT, CE, CHE, CSE, ECE, EE, IT, and ME
- ✓ **M Tech** – for all students of 2nd Year (4th Semester) for following streams: AEIE, BT, CSE, ECE, RE (offered by CHE Department), and VLSI (offered by ECE Department)

Agenda No. 6: Miscellaneous

None

There being no other item in the agenda, the meeting ended with a vote of thanks to the Chair.

Prof. (Dr.) Pranay Chaudhuri
Chairman
Academic Council

Prof. Kalarab Ray
Member Secretary
Academic Council

samik chakraborty <samik.chakraborty@heritageit.edu>

Notice regarding Cousera courses

2 messages

pranay chaudhuri <pranay.chaudhuri@heritageit.edu> Thu, Apr 9, 2020 at 5:25 PM
To: hod <hod@heritageit.edu>, dc <dc@heritageit.edu>

Dear HoD/DC,

Attached, please find a notice regarding Coursera courses in which clear guidelines are given for courses in which students can apply for transfer of credit. You are requested to circulate this notice to students through their group email ids. Also, inform students that if they want to register for Coursera courses then they will be required to register with their institutional email ids.

Thanks,
Principal

Notice regarding Coursera Courses.pdf
108K

HERITAGE INSTITUTE OF TECHNOLOGY

Ref: HRIT/0914/3206 Date: 09 March, 2020

Notice regarding courses offered by Coursera

Students interested to complete relevant courses from Coursera, currently offered free of cost, are advised to follow the guidelines mentioned below regarding the transfer of credit:

(I) For students following 2018-2022 curricula:

Any course required for the additional 20 credits as eligibility to get B.Tech. degree with Honours may be replaced with an equivalent course completed from Coursera and the credits may be transferred on submission of completion certificate with a mention of the grade obtained.

A course completed from Coursera will be considered as equivalent to a required Honours course if 80% or more topics in the syllabus of the course offered in Coursera is similar to the topics in the syllabus of the corresponding course offered by the institute. Students are required to take prior approval of the concerned HoD through email by providing the HoD with the syllabus of the course offered in Coursera and the syllabus of the corresponding course offered by the institute.

(II) For students not belonging to category (I):

Any Open/Free Elective course listed in the curricula may be replaced with an equivalent course completed from Coursera and the credits may be transferred on submission of completion certificate with a mention of the grade obtained.

A course completed from Coursera will be considered as equivalent to a Open/Free Elective course if 80% or more topics in the syllabus of the course offered in Coursera is similar to the topics in the syllabus of the corresponding course offered by the institute. Students are required to take prior approval of the concerned HoD through email by providing the HoD with the syllabus of the course offered in Coursera and the syllabus of the corresponding course offered by the institute.

Sd/-
Prof. (Dr.) Pranay Chaudhuri
Principal

Office of the Controller of Examinations

Heritage Institute of Technology

Ref: HRIT/0914/3211 20.05.2020

NOTICE

It is notified for information of all concerned that Students of B.Tech. programmes of Heritage Institute of Technology (HITK), Kolkata will get the opportunity of transfer of credit from the Academic Year 2020-2021 as per recommendations of Academic council of the Institute in accordance with the policy adopted by Maulana Abul Kalam Azad University of Technology (MAKAUT). Students are advised to follow the curriculum and the Credit Transfer Policy of his/her programme available on the website of the Institute for further details.

Dr. N.P.Nayak
Controller of Examinations
Heritage Institute of Technology

Heritage Institute of Technology ★ Kolkata ★ आत्म दीपो भव

Controller of Examinations
Heritage Institute of Technology

Office of the Controller of Examinations

Heritage Institute of Technology

CREDIT TRANSFER POLICY

- Heritage Institute of Technology may deny credit transfer that has not been pre-approved. Students should discuss their course selection with their respective ***Heads of the Departments*** to ensure transferability and applicability toward their degree programme. No student will be allowed to enroll in any course offered by any programme of their parent programme at Heritage Institute of Technology or another institution during the same term/semester without the specific approval of the Board of Studies.
- The Institute encourages students to opt MOOCs courses from SWAYAM-NPTEL.
- For credit transfer, students must obtain at least Grade C or equivalent in the course in which credit transfer is applied for.
- Transferred credit will be calculated as per Examination rule of the Institute.

Controller of Examinations
Heritage Institute of Technology

Heritage Institute of Technology
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Kolkata

Office of the Controller of Examinations

Heritage Institute of Technology

APPLICATION FOR PERMISSION TO TRANSFER OF CREDIT FROM ANOTHER INSTITUTION

(This application must reach to concerned department at least two weeks before the commencement of a semester for necessary approval)

- .Name _____ E-mail :
- Department _____
- Registration no _____ of _____
- Local Address

  _____

  _____

  City: State : Telephone (Res) / Mob. No:
- Name of the course _____ Session_____
- .Expected date of completion of final examination at Heritage Institute of Technology_____

  Class Roll.no _____ Examination Roll No _____
- Petition to register for courses at _____For the Semester/Session with date: From.....to.....
- *Name & Address of the Institution from where the credit to be transferred_____

  _____
- e-mail Address_____ Website _____
- Have you submitted another "Permission to Transfer Credit" form for the same semester? Yes _____ No _____

*** All the relevant papers including the Acceptance/ Approval letter from the Institution must be attached with this application**

Controller of Examinations
Heritage Institute of Technology

Heritage Institute of Technology
आत्म दीपो भव
Kolkata

Office of the Controller of Examinations

Heritage Institute of Technology

To be filled by the student	1	2	3	**To be filled by the department**	1	2	3	4	5
Course(s) Title(s) to be Taken at Other Institution to Transfer to Heritage Institute of Technology	Course Prefix	Course Number	Credit Hours	Equivalent Course(s) Title(s) at Heritage Institute of Technology	Course Code	Course Number	Credit Hours	**ONE/TWO** semesters for which the transfer of Credit required	**Maximum credits may be transferred**

IMPORTANT:

- Approval is granted ONLY for the semester noted above.
- **The student must attach details of Curriculum & Syllabus of the course for which credit transfer is opted.**
- The student must request an official graded transcript to be sent to Heritage Institute of Technology's Controller of Examination's Office within one semester of completing the course(s).

Student's Signature _____

Date _____

Head of the Department's Signature _____

Date _____

APPROVED/ DENIED ☐

Meeting of the Boards of Studies in_____date_____

Item no_____

Forwarded to Controller of Examinations for necessary action :

Signature of Dean, _____ Date_____

(For office use only by COE'S office)

Controller of Examinations
Heritage Institute of Technology

Heritage Institute of Technology Kolkata

Department of Applied Electronics & Instrumentation Engineering

SYLLABUS FOR B.TECH. PROGRAMME

Release date: July, 2018: Ver.1.0
July, 2019: Ver.1.1
July, 2020: Ver.1.2
July, 2021: Ver.1.3

PART-I: COURSE STUCTURE

Heritage Institute of Technology
Department of Applied Electronics & Instrumentation Engineering

B. Tech. in Applied Electronics and Instrumentation Engineering (AEIE)
Course Structure

1st Year 1st Semester Course Structure

Theory

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Basic Science Courses	CHEM1001	Chemistry-I	3	1	0	4	4
2	Basic Science Courses	MATH1101	Mathematics-I	3	1	0	4	4
3	Engg. Science Courses	ELEC1001	Basic Electrical Engineering	3	1	0	4	4
			Total Theory	**9**	**3**	**0**	**12**	**12**

Laboratory

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Basic Science Courses	CHEM1051	Chemistry Lab	0	0	3	3	1.5
2	Engg. Science Courses	ELEC1051	Basic Electrical Engineering Lab	0	0	2	2	1
3	Engg. Science Courses	MECH1052	Engineering Graphics & Design	1	0	4	5	3
			Total Laboratory	**1**	**0**	**9**	**10**	**5.5**
Total of Semester without Honours Course				**10**	**3**	**9**	**22**	**17.5**

Honours

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Honours	HMTS 1011	Communication for Professionals	3	0	0	3	3
		HMTS 1061	Professional Communication Lab	0	0	2	2	1
Total of Semester with Honours Course				**13**	**3**	**11**	**27**	**21.5**

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Heritage Institute of Technology
Department of Applied Electronics & Instrumentation Engineering

1st Year 2nd Semester Course Structure

Theory

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Basic Science Courses	PHYS1001	Physics I	3	1	0	4	4
2	Basic Science Courses	MATH1201	Mathematics-II	3	1	0	4	4
3	Engineering Science Courses	CSEN1001	Programming for Problem Solving	3	0	0	3	3
4	Humanities & Social Sciences including Management courses	HMTS1202	Business English	2	0	0	2	2
			Total Theory	**11**	**2**	**0**	**13**	**13**

Laboratory

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Basic Science Courses	PHYS1051	Physics Lab I	0	0	3	3	1.5
2	Engineering Science Courses	CSEN1051	Programming for Problem Solving Lab	0	0	4	4	2
3	Engineering Science Courses	MECH1051	Workshop /Manufacturing Practices	1	0	4	5	3
4	Humanities & Social Sciences including Management courses	HMTS1252	Language Lab	0	0	2	2	1
			Total Laboratory	**1**	**0**	**13**	**14**	**7.5**
Total of Semester without Honours Course				**12**	**2**	**13**	**27**	**20.5**

Honours

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Honours	ECEN1011	Basic Electronics	3	0	0	3	3
		ECEN1061	Basic Electronics Engineering Lab	0	0	2	2	1
Total of Semester with Honours Course				**15**	**2**	**13**	**32**	**24.5**

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Heritage Institute of Technology
Department of Applied Electronics & Instrumentation Engineering

2nd Year 1st Semester Course Structure

Theory

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Basic Science Courses	MATH2001	Mathematical Methods	3	1	0	4	4
2	Core Subject Courses	AEIE2101	Analog Electronic Circuits	3	0	0	3	3
3	Core Subject Courses	AEIE2102	Sensors and Transducers	4	0	0	4	4
4	Core Subject Courses	AEIE2103	Circuit Theory and Network Analysis	3	0	0	3	3
5	Humanities & Social Sciences including Management courses	HMTS2001	Human Values and Professional Ethics	3	0	0	3	3
			Total Theory	**17**	**0**	**0**	**17**	**17**

Laboratory

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Core Subject Courses	AEIE2151	Analog Electronics Lab	0	0	3	3	1.5
2	Core Subject Courses	AEIE2152	Sensors and Transducers Lab	0	0	2	2	1
3	Core Subject Courses	AEIE2153	Circuits and Networks Lab	0	0	2	2	1
			Total Laboratory	**0**	**0**	**7**	**7**	**3.5**
Total of Semester without Honours Course				**17**	**0**	**7**	**24**	**20.5**

Honours

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Honours	AEIE2111	Material Science and Technology	4	0	0	4	4
Total of Semester with Honours Course				**21**	**2**	**13**	**28**	**24.5**

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Heritage Institute of Technology
Department of Applied Electronics & Instrumentation Engineering

2nd Year 2nd Semester Course Structure

Theory

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Engineering Science Courses	CSEN2004	Data Structure and Basic Algorithms	3	0	0	3	3
2	Core Subject Courses	AEIE2201	Digital Electronics	3	0	0	3	3
3	Core Subject Courses	AEIE2202	Industrial Instrumentation	3	0	0	3	3
4	Core Subject Courses	AEIE2203	Electrical and Electronic Measurements	4	0	0	4	4
5	Core Subject Courses	AEIE2204	Control Systems	3	1	0	4	4
6	Mandatory Courses	EVSC2016	Environmental Sciences	2	0	0	2	-
			Total Theory	**19**	**0**	**0**	**19**	**17**

Laboratory

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Engineering Science Courses	CSEN2054	Data Structure and Basic Algorithms Lab	0	0	3	3	1.5
2	Core Subject Courses	AEIE2251	Digital Electronics Lab	0	0	2	2	1
3	Core Subject Courses	AEIE2252	Industrial Instrumentation Lab	0	0	2	2	1
4	Core Subject Courses	AEIE2253	Electrical and Electronic Measurements Lab	0	0	2	2	1
5	Core Subject Courses	AEIE2254	Control Systems Lab	0	0	2	2	1
			Total Laboratory	**0**	**0**	**11**	**11**	**5.5**
Total of Semester				**19**	**0**	**11**	**30**	**22.5**

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3rd Year 1st Semester Course Structure

Theory

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Core Subject Courses	AEIE3101	Process Control	4	0	0	4	4
2	Core Subject Courses	AEIE3102	Power Electronics & Drives	3	0	0	3	3
3	Core Subject Courses	AEIE3103	Microprocessors & Microcontrollers	4	0	0	4	4
4	Core Subject Courses	AEIE3104	Fundamentals of Digital Signal Processing	3	0	0	3	3
5	Program Electives Courses - I	AEIE3131/ AEIE3132/ AEIE3133	Communication Techniques/ Non Conventional Energy Sources / Advanced Sensors	3	0	0	3	3
			Total Theory	**17**	**0**	**0**	**17**	**17**

Laboratory

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Core Subject Courses	AEIE3151	Process Control Lab	0	0	3	3	1.5
2	Core Subject Courses	AEIE3152	Power Electronics & Drives Lab	0	0	2	2	1
3	Core Subject Courses	AEIE3153	Microprocessors & Microcontrollers Lab	0	0	2	2	1
			Total Laboratory	**0**	**0**	**7**	**7**	**3.5**
Total of Semester without Honours Course				**17**	**0**	**7**	**24**	**20.5**

Honours

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Honours	AEIE3111	Introduction to Mechatronics	4	0	0	4	4
Total of Semester with Honours Course				**21**	**0**	**7**	**28**	**24.5**

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3rd Year 2nd Semester Course Structure

Theory

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Engineering Science Courses	CSEN3206	Basics of RDBMS	3	1	0	4	4
2	Humanities & Social Sciences including Management courses	HMTS3201	Economics for Engineers	3	0	0	3	3
3	Core Subject Courses	AEIE3201	Introduction to Internet of Things	3	0	0	3	3
4	Program Elective Courses - II	AEIE3231/ AEIE3232/ AEIE3233	Embedded Systems/ Opto Electronics and Fibre Optics/ Mobile Communication	3	0	0	3	3
5	Emerging Area/ Open Elective Courses - I		OE-01	3	0	0	3	3
6	Mandatory Courses	INCO3016	Indian Constitution and Civil Society	2	0	0	2	-
			Total Theory	**18**	**0**	**0**	**18**	**16**

Laboratory

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Engineering Science Courses	CSEN3256	Basics of RDBMS Lab	0	0	3	3	1.5
2	Core Subject Courses	AEIE3251	Internet of Things Lab	0	0	2	2	1
			Total Laboratory	**0**	**0**	**5**	**5**	**2.5**

Sessional

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Core Subject Courses	AEIE3295	Mini Project/Electronic Design Workshop	0	0	4	4	2
2	Seminar	AEIE3293	Term Paper and Seminar	0	0	4	4	2
			Total Sessional	**0**	**0**	**8**	**8**	**4**
			Total of Semester	**18**	**0**	**13**	**31**	**22.5**

OPEN ELECTIVES BASKET I FOR AEIE B. TECH STUDENTS:

Open Electives	Semester	Paper Code	Paper Name
Open Electives I	VI	AEIE3223	Industrial Automation
		AEIE3224	Electronic Instrumentation
		ECEN3222	Designing with Processors and Controllers
		INFO3221	Introduction to E-Commerce
		CHEN3221	Water and Liquid Waste Management
		MATH3222	Advanced Probability and Information Theory

Open Electives to be offered by Dept. of AEIE:

Open Electives	Semester	Paper Code	Paper Name
Open Electives I	VI	AEIE3221	Fundamentals of Sensors and Transducers
		AEIE3222	Fundamentals of Electronic Measurements

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4th Year 1st Semester Course Structure

Theory

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Humanities & Social Sciences including Management courses	HMTS4101	Principles of Management	3	0	0	3	3
2	Program Electives Courses - III	AEIE4131/ AEIE4132/ AEIE4133	Analytical Instrumentation/ Soft Computing/ Non Destructive Testing	3	0	0	3	3
3	Open Electives Courses - II		OE-02	3	0	0	3	3
4	Open Electives Courses -III		OE-03	3	0	0	3	3
			Total Theory	**12**	**0**	**0**	**12**	**12**

Sessional

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Industrial Training	AEIE4191	Industrial Training Evaluation	0	0	0	0	2
2	Project Stage I	AEIE4195	Project I	0	0	8	8	4
			Total Sessional	**0**	**0**	**8**	**8**	**6**
			Total of Semester without Honours Course	**12**	**0**	**8**	**20**	**18**

Honours

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Honours	AEIE4111	Introduction to MEMS	4	0	0	4	4
			Total of Semester with Honours Course	**21**	**2**	**13**	**28**	**22**

Open Electives basket II & basket III for AEIE B. Tech students:

Open Electives	Semester	Paper Code	Paper Name
Open Electives II	VII	ECEN4121	Software Defined Radio
		ECEN4123	Error Control Coding for Secure Data Transmission
		BIOT4124	Biosensor
		CSEN4121	Fundamentals of Operating Systems
		MATH4121	Methods in Optimization
Open Electives III	VII	ECEN4125	Ad Hoc Wireless Networks
		INFO4121	Fundamentals of Cloud Computing
		CHEN4123	Industrial Total Quality Management
		MATH4122	Advanced Linear Algebra
		CSEN4126	Intelligent Web and Big Data

Open Electives to be offered by Dept. of AEIE:

Open Electives	Semester	Paper Code	Paper Name
Open Electives II	VII	AEIE4121	Instrumentation and Telemetry
		AEIE4122	Linear Control Systems and Applications
Open Electives III	VII	AEIE4126	Optical Instrumentation
		AEIE4127	Introduction to Embedded Systems

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4th Year 2nd Semester Course Structure

Theory

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Program Electives Courses - IV	AEIE4231/ AEIE4232/ AEIE4233	Power plant Instrumentation/ Digital Control Techniques/ Machine Learning Techniques	3	0	0	3	3
2	Program Electives Courses - V	AEIE4241/ AEIE4242/ AEIE4243	Biomedical Instrumentation/ Digital Image Processing/ Principles of Robotics	3	0	0	3	3
3	Open Electives Courses – IV		OE-04	3	0	0	3	3
Total Theory				**9**	**0**	**0**	**9**	**9**

Sessional

Sl. No	Category	Code	Course Title	Contact hrs/wk				Credit Points
				L	T	P	Total	
1	Grand Viva Voce	AEIE4297	Comprehensive Viva Voce	0	0	0	0	1
2	Project Stage I	AEIE4295	Project II	0	0	16	16	8
Total Sessional				**0**	**0**	**16**	**16**	**9**
Total of Semester				**9**	**0**	**16**	**25**	**18**

Open Electives basket IV for AEIE B. Tech students:

Open Electives	Semester	Paper Code	Paper Name
Open Electives IV	VIII	ECEN4222	Cellular and Mobile communication
		INFO4221	Fundamentals of Cryptography
		CHEN4222	Introduction to Solar and Wind Technology
		BIOT4221	Computational Biology
		BIOT4223	Biology for Engineers
		CSEN4221	Basics of Mobile Computing

Open Electives to be offered by Dept. of AEIE:

Open Electives	Semester	Paper Code	Paper Name
Open Electives IV	VIII	AEIE4221	Process Instrumentation
		AEIE4222	Medical Instrumentation

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Honours Papers:

Sl No.	Semester	Paper Code	Paper Name	Contact hrs/wk				Credit Points
				L	T	P	Total	
01	1st	HMTS 1011	Communication for Professionals	3	0	0	3	3
		HMTS 1061	Professional Communication Lab	0	0	2	2	1
02	2nd	ECEN1011	Basic Electronics	3	0	0	3	3
		ECEN1061	Basic Electronics Engineering Lab	0	0	2	2	1
03	3rd	AEIE2111	Material Science and Technology	4	0	0	4	4
04	5th	AEIE3111	Introduction to Mechatronics	4	0	0	4	4
05	7th	AEIE4111	Introduction to MEMS	4	0	0	4	4
Total				18	0	4	22	**20**

Definition of Credit (as per AICTE):

- 1 Hour Lecture (L) per Week = 1 Credit
- 1 Hour Tutorial (T) per Week = 1 Credit
- 1 Hour Practical (P) per Week = 0.5 Credits
- 2 Hours Practical (Lab) per Week = 1 Credit

RANGE OF CREDITS (AS PER AICTE):

- ❒ A total of 160 credits will be necessary for a student to be eligible to get B Techdegree.
- ❒ A student will be eligible to get B Tech degree with Honours if he/she completes an additional 20 credits. These could be acquired through various Honours Courses offered by the respective departments.
- ❒ A part or all of the above additional credits may also be acquired through MOOCs. Any student completing any course through MOOC will have to submit an appropriate certificate to earn the corresponding credit.
- ❒ For any additional information, the student may contact the concerned HODs.

SWAYAM/MOOCS COURSES RECOMMENDED TO THE STUDENTS OF AEIE DEPT.

Code	Name	Credit Points	Corresponding Online Course	Offered by	Platform
HMTS1011	Communication for Professionals	3	Effective Business Communication & Developing Soft Skills and Personality	IIM Bangalore	Swayam
HMTS1061	Professional Communication Lab	1		IIT Kanpur	Swayam
ECEN1011	Basic Electronics	3	Fundamentals of Semiconductor Devices	IISc Bangalore	NPTEL
ECEN1061	Basic Electronics Lab	1			
AEIE2111	Material Science & Technology	4	Introduction to Materials Science and Engineering	IIT Delhi IIT Madras	NPTEL NPTEL
AEIE3111	Introduction to Mechatronics	4	Mechatronics and Manufacturing Automation	IIT Gwahati	NPTEL
AEIE4111	Introduction to MEMS	4	MEMS and Microsystems	IIT Kharagpur	NPTEL

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BIOTECHNOLOGY

B.TECH. PROGRAMME

With effect from July 2018

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B.Tech. Biotechnology Curriculum

1st Year 1st Semester

A. THEORY							
Sl. No	**Course Code**	**Course Name**	**Contact Hours/ Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	PHYS1001	Physics	3	1	0	4	4
2	MATH1101	Mathematics I	3	1	0	4	4
3	CSEN1001	Programming for Problem Solving	3	0	0	3	3
Total of Theory			**9**	**4**	**0**	**11**	**11**
B. PRACTICAL/ LABORATORY							
1	PHYS1051	Physics Lab	0	0	3	3	1.5
2	CSEN1051	Programming for Problem Solving Lab	0	0	4	4	2
3	MECH1051	Workshop / Manufacturing Practices	1	0	4	5	3
Total of Practical			**1**	**0**	**11**	**12**	**6.5**
Total of Semester without Honours			**10**	**4**	**11**	**23**	**17.5**
C. HONOURS							
1	ECEN1011	Basic Electronics	3	0	0	3	3
2	ECEN1061	Basic Electronics Lab	0	0	2	2	1
Total Honours			**3**	**0**	**2**	**5**	**4**
Total of Semester with Honours			**14**	**0**	**13**	**30**	**21.5**

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1st Year 2nd Semester

A. THEORY							
Sl. No	**Course Code**	**Course Name**	**Contact Hours/ Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	CHEM1001	Chemistry I	3	1	0	4	4
2	MATH1201	Mathematics II	3	1	0	4	4
3	ELEC1001	Basic Electrical Engineering	3	1	0	4	4
4	HMTS1202	Business English	2	0	0	2	2
Total of Theory			**11**	**3**	**0**	**14**	**14**
B. PRACTICAL/ LABORATORY							
1	CHEM1051	Chemistry I Lab	0	0	3	3	1.5
2	ELEC1051	Basic Electrical Engineering Lab	0	0	2	2	1
3	MECH1052	Engineering Graphics and Design	1	0	4	5	3
4	HMTS1252	Language Lab	0	0	2	2	1
Total of Practical			**1**	**0**	**11**	**12**	**6.5**
Total of Semester without Honours			**12**	**3**	**11**	**26**	**20.5**
C. HONOURS							
1	HMTS1011	Communication for Professionals	3	0	0	3	3
2	HMTS1061	Professional Communication Lab	0	0	2	2	1
Total Honours			**3**	**0**	**2**	**5**	**4**
Total of Semester with Honours			**15**	**3**	**13**	**31**	**24.5**

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2nd Year 1st Semester

A. THEORY								
Sl No	**Course Code**	**Field**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	**EVSC2016**	Mandatory	Environmental Sciences	2	0	0	2	0
2	**HMTS2001**	Humanities	Human Values and Professional Ethics	3	0	0	3	3
3	**BIOT2101**	Basic Science	Chemistry of Biomolecules	3	0	0	3	3
4	**BIOT2102**	Prof. Core	Industrial Stoichiometry	3	0	0	3	3
5	**BIOT2103**	Prof. Core	Biochemistry	3	0	0	3	3
6	**BIOT2104**	Prof. Core	Microbiology	3	0	0	3	3
7	**MATH2101**	Basic Science	Mathematical & Statistical Methods	3	0	0	3	3
Total of Theory				**20**	**0**	**0**	**20**	**18**
B. PRACTICAL/ LABORATORY								
1	**BIOT2151**	Basic Science	Biomolecular Chemistry Lab	0	0	3	3	1.5
2	**BIOT2153**	Prof. Core	Biochemistry Lab	0	0	3	3	1.5
3	**BIOT2154**	Prof. Core	Microbiology Lab	0	0	4	4	2
Total of Practical				**0**	**0**	**10**	**10**	**5**
Total of Semester				**20**	**0**	**10**	**30**	**23**

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2nd Year 2nd Semester

A. THEORY								
Sl No	**Course Code**	**Field**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	**BIOT2201**	Basic Science	Thermodynamics & Kinetics	3	0	0	3	3
2	**BIOT2202**	Prof. Core	Transfer Operation-I	3	0	0	3	3
3	**BIOT2203**	Prof. Core	Molecular Biology	3	0	0	3	3
4	**BIOT2204**	Prof. Core	Industrial Microbiology & Enzyme Technology	3	0	0	3	3
5	**CSEN2005**	Engg Science	Data Structure	3	0	0	3	3
Total of Theory				**15**	**0**	**0**	**15**	**15**
B. PRACTICAL/ LABORATORY								
1	**BIOT2252**	Prof. Core	Transfer Operation-I Lab	0	0	3	3	1.5
2	**BIOT2253**	Prof. Core	Molecular Biology Lab	0	0	2	2	1
3	**BIOT2254**	Prof. Core	Enzyme Technology & Fermentation Technology Lab	0	0	2	2	1
4	**CSEN2055**	Engg Science	Data Structure Lab	0	0	3	3	1.5
Total of Practical				**0**	**0**	**10**	**10**	**5**
Total of Semester without Honours				**15**	**0**	**10**	**25**	**20**
C. HONOURS								
1	**BIOT2211**	Honours	Bioseparation Technology	3	1	0	4	4
Total Honours				**3**	**1**	**0**	**4**	**4**
Total of Semester with Honours				**18**	**1**	**10**	**29**	**24**

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3rd Year 1st Semester

A. THEORY								
Sl No	**Course Code**	**Field**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	**INCO3016**	Mandatory	Indian Constitution and Civil Society	2	0	0	2	0
2	**BIOT3101**	Prof. Core	Genetics	3	0	0	3	3
3	**BIOT3102**	Prof. Core	Bioinformatics	3	0	0	3	3
4	**BIOT3103**	Prof. Core	Recombinant DNA Technology	3	0	0	3	3
5	**BIOT3104**	Prof. Core	Transfer Operation-II	3	0	0	3	3
6	**BIOT3131**	Prof. Elective 1	Food Biotechnology	3	0	0	3	3
	BIOT3132		Environmental Biotechnology					
	BIOT3133		Bioprocess & Process Instrumentation					
Total of Theory				**17**	**0**	**0**	**17**	**15**
B. PRACTICAL/ LABORATORY								
7	**BIOT3151**	Prof. Core	Genetics lab	0	0	2	2	1
8	**BIOT3152**	Prof. Core	Bioinformatics lab	0	0	2	2	1
9	**BIOT3153**	Prof. Core	Recombinant DNA Technology lab	0	0	2	2	1
10	**BIOT3154**	Prof. Core	Transfer Operation-II lab	0	0	2	2	1
11	**BIOT3181**	Prof. Elective 1	Food Biotechnology Lab	0	0	2	2	1
	BIOT3182		Environmental Biotechnology Lab					
	BIOT3183		Bioprocess & Process Instrumentation Lab					
Total of Practical				**0**	**0**	**10**	**10**	**5**
Total of Semester				**17**	**0**	**10**	**27**	**20**

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3rd Year 2nd Semester

A. THEORY								
Sl No	**Course Code**	**Field**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	**HMTS3201**	Humanities	Economics for Engineers	3	0	0	3	3
2	**BIOT3201**	Prof. Core	Immunology	3	0	0	3	3
3	**BIOT3202**	Prof. Core	Bioreactor Design and Analysis	3	0	0	3	3
4	**CSEN3207**	Engg Science	RDBMS Concept and Computer Networking	3	0	0	3	3
5	**BIOT3231**	Prof. Elective 2	Molecular Modelling and Drug Designing	3	0	0	3	3
	BIOT3232		Biophysics of Macromolecules					
	BIOT3233		Biosensors and Diagnostics					
6	**BIOT3221**	Emerging Area / Open Elective 1	Medical and Pharmaceutical Biotechnology	3	0	0	3	3
	BIOT3222		Basics of Nanotechnology					
Total of Theory				**18**	**0**	**0**	**18**	**18**
B. PRACTICAL/ LABORATORY								
1	**BIOT3251**	Prof. Core	Immunology lab	0	0	2	2	1
2	**BIOT3252**	Prof. Core	Bioreactor Design lab	0	0	2	2	1
3	**CSEN3257**	Engg Science	RDBMS Concept lab	0	0	2	2	1
4	**BIOT3293**	Seminar	Term paper & Seminar	0	0	4	4	2
Total of Practical				**0**	**0**	**10**	**10**	**5**
Total of Semester without Honours				**18**	**0**	**10**	**28**	**23**
C. HONOURS								
1	**BIOT3211**	Honours	Plant Biotechnology	3	0	0	3	3
2	**BIOT3261**	Honours	Plant Tissue Culture Lab	0	0	2	2	1
Total Honours				**3**	**0**	**2**	**5**	**4**
Total of Semester with Honours				**21**	**0**	**12**	**33**	**27**

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Heritage Institute of Technology

4th Year 1st Semester

A. THEORY								
Sl No	**Course Code**	**Field**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	**HMTS4101**	Humanities	Principles of Management	3	0	0	3	3
2	**BIOT4131**	Prof. Elective 3	Biomaterials	3	0	0	3	3
	BIOT4132		Biofertilizers and Biopesticides					
	BIOT4133		Post-harvest Technology					
	BIOT4134		Biometallurgy					
3	**BIOT4121**	Emerging Area / Open Elective 2	Proteomics and Protein Engineering	3	0	0	3	3
	BIOT4122		Human Genomics					
	BIOT4123		Biomedical Engineering					
4		Open Elective 3*		3	0	0	3	3
Total of Theory				**12**	**0**	**0**	**12**	**12**
B. SESSIONAL								
1	**BIOT4191**	Internship	Industrial Training / Internship	4 to 6 weeks				2
2	**BIOT4195**	Project	Project 1	0	0	8	8	4
Total of Sessional				0	0	8	**8**	**6**
Total of Semester without Honours				**12**	**0**	**8**	**20**	**18**
C. HONOURS								
1	**BIOT4111**	Honours	Animal Cell Culture & Animal biotechnology	4	0	0	4	4
Total Honours				**4**	**0**	**0**	**4**	**4**
Total of Semester with Honours				**16**	**0**	**8**	**24**	**22**

Training in a suitable industry, R&D Organization, Reputed Laboratory or Research Institute for 4 to 6 weeks to be arranged during summer vacation.

**** List enclosed at the end of the curriculum***

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4th Year 2nd Semester

A. THEORY								
Sl No	**Course Code**	**Field**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	**BIOT4231**	Prof. elective 4	Bioethics & IPR	3	0	0	3	3
	BIOT4232		Bio-entrepreneurship and Regulations					
2	**BIOT4241**	Prof. elective 5	Renewable Energy Technology	3	0	0	3	3
	BIOT4242		Tissue Engineering					
	BIOT4243		Metabolic Engineering					
	BIOT4244		Basic Process Equipment Design					
	BIOT4245		Bioprocess Modelling					
3		Open elective 4*		3	0	0	3	3
Total of Theory				**9**	**0**	**0**	**9**	**9**
B. SESSIONAL								
4	**BIOT4295**	Project	Project-II	0	0	16	16	8
5	**BIOT4297**	Viva	Comprehensive Viva Voce	-	-	-	-	1
Total of Sessional				**0**	**0**	**16**	**16**	**9**
Total of Semester				**9**	**0**	**16**	**25**	**18**

*List of Open Electives offered by the Department of Biotechnology

A. THEORY								
Sl No	**Course Code**	**Field**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	**BIOT4124**	Free. Elective 3 for other Departments (in Sem 7)	Biosensor	3	0	0	3	3
	BIOT4125		Biopolymer					
			Total of Theory				**3**	**3**

A. THEORY								
Sl No	**Course Code**	**Field**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	**BIOT4221**	Free. Elective 4 for other Departments (in Sem 8)	Computational Biology	3	0	0	3	3
	BIOT4222		Non-conventional Energy					
	BIOT4223		Biology for Engineers					
			Total of Theory				**3**	**3**

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List of Honours papers (additional 20 credits) for B.Tech. Honours degree

1st yr 1st semester

A. THEORY								
Sl No	**Course Code**	**Field**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	**ECEN1011**	Honours	Basic Electronics	3	0	0	3	3
B. PRACTICAL/ LABORATORY								
2	**ECEN1061**	Honours	Basic Electronics Lab	0	0	2	2	1
			Total of Semester				**5**	**4**

1st yr 2nd semester

A. THEORY								
Sl No	**Course Code**	**Field**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	**HMTS1011**	Honours	Communication for Professionals	3	0	0	3	3
B. PRACTICAL/ LABORATORY								
2	**HMTS1061**	Honours	Professional Communication Lab	0	0	2	2	1
			Total of Semester				**5**	**4**

2nd yr 2nd semester

A. THEORY								
Sl No	**Course Code**	**Field**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	**BIOT2211**	Honours	Bioseparation Technology	3	1	0	4	4
			Total of Semester				**4**	**4**

3rd yr 2nd semester

A. THEORY								
Sl No	**Course Code**	**Field**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	**BIOT3211**	Honours	Plant Biotechnology	3	0	0	3	3
B. PRACTICAL/ LABORATORY								
2	**BIOT3261**	Honours	Plant Tissue Culture Lab	0	0	2	2	1
			Total of Semester				**5**	**4**

4th yr 1st semester

A. THEORY								
Sl No	**Course Code**	**Field**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	**BIOT4111**	Honours	Animal Cell Culture & Animal Biotechnology	4	0	0	4	4
			Total of Semester				**4**	**4**

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Credit Point Summary for B.Tech from 2018-2019

Sl. No.	Course Type	BIOT
1.	Humanities and Social Sciences including Management Courses	12
2.	Basic Science Courses	29.5
3.	Engineering Science Courses including Workshop, Drawing, Basics of Electrical / Mechanical / Computer etc.	24.5
4.	Professional Core Courses	49
5.	Professional Elective Courses relevant to chosen Specialization / Branch	16
6.	Open Subjects – Electives from other Technical and/or Emerging Subjects	12
7.	Project Work, Seminar and Internship in industry or elsewhere	17
8.	Mandatory Courses [Environmental Sciences, Induction Program, Indian Constitution, Essence of Indian Traditional Knowledge]	Non-credit
	Total	**160**
9	Honours Courses	20
	Grand Total	**180**

Definition of Credit (as per AICTE):

- 1 Hour Lecture (L) per Week = 1 Credit
- 1 Hour Tutorial (T) per Week = 1 Credit
- 1 Hour Practical (P) per Week = 0.5 Credits
- 2 Hours Practical (Lab) per Week = 1 Credit

Range of Credits (as per AICTE):

- A total of 160 credits will be necessary for a student to be eligible to get B Tech degree.
- A student will be eligible to get B Tech degree with Honours if he/she completes an additional 20 credits. These could be acquired through various Honours Courses offered by the respective departments.
- A part or all of the above additional credits may also be acquired through MOOCs. Any student completing any course through MOOC will have to submit an appropriate certificate to earn the corresponding credit.
- For any additional information, the student may contact the concerned HODs.

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Swayam/MOOCs courses recommended to the students of Biotechnology department

Code	Name	Credit Points	Corresponding Online Course	Offered by	PLATFORM
ECEN1011	Basic Electronics	3	Fundamentals of Semiconductor Devices	IISc Bangalore	NPTEL
ECEN 1061	Basic Electronics Lab	1			
HMTS1011	Communication for Professionals	3	Effective Business Communication & Developing Soft Skills and Personality	IIM Bangalore	Swayam
HMTS1061	Professional Communication Lab	1		IIT Kanpur	Swayam
BIOT2211	Bioseparation Technology	4	Principles of Downstream Techniques in Bioprocess	IIT Madras	SWAYAM CENTRAL
BIOT3211 &BIOT3261	Plant Biotechnology & Plant Tissue Culture Lab	4	Plant Physiology & Plant Tissue Culture	Devi Ahilya Viswavidyalaya	SWAYAM CENTRAL
BIOT4111	Animal Cell Culture & Animal Biotechnology	4	Cell Culture Technologies	IIT Kanpur	NPTEL

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Civil Engineering Department

B.TECH. PROGRAMME

SYLLABUS

Effective from: July 2018

FIRST YEAR FIRST SEMESTER

A. Theory							
Sl. No	**Code**	**Subject**	**Contacts Hours / Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1.	PHYS 1001	Physics – I	3	1	0	4	4
2.	MATH 1101	Mathematics – I	3	1	0	4	4
3.	CSEN 1001	Programming for Problem Solving	3	0	0	3	3
Total Theory			9	2	0	11	11
B. Laboratory							
1.	PHYS 1051	Physics Lab – I	0	0	3	3	1.5
2.	CSEN 1051	Programming for Problem Solving Lab	0	0	4	4	2
3.	MECH 1051	Workshop / Manufacturing Practices	1	0	4	5	3
Total Practical			1	0	11	12	6.5
Total of Semester without Honours			10	2	11	23	17.5
C. Honours							
1.	ECEN 1011	Basic Electronics	3	0	0	3	3
2.	ECEN 1061	Basic Electronics Lab	0	0	2	2	1
Total Honours			3	0	2	5	4
Total of Semester with Honours			13	2	13	28	21.5

FIRST YEAR SECOND SEMESTER

A. Theory							
Sl. No.	**Code**	**Subject**	**Contacts Hours / Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1.	CHEM 1001	Chemistry – I	3	1	0	4	4
2.	MATH 1201	Mathematics – II	3	1	0	4	4
3.	ELEC 1001	Basic Electrical Engineering	3	1	0	4	4
4.	HMTS 1202	Business English	2	0	0	2	2
Total Theory			11	3	0	14	14
B. Laboratory							
1.	CHEM 1051	Chemistry Lab	0	0	3	3	1.5
2.	ELEC 1051	Basic Electrical Engineering Lab	0	0	2	2	1
3.	MECH 1052	Engineering Graphics & Design	1	0	4	5	3
4.	HMTS 1252	Language Lab	0	0	2	2	1
Total Practical			1	0	11	12	6.5
Total of Semester without Honours			12	3	11	26	20.5
C. Honours							
1.	HMTS 1011	Communication for Professionals	3	0	0	3	3
2.	HMTS 1061	Professional Communication Lab	0	0	2	2	1
Total Honours			3	0	2	5	4
Total of Semester with Honours			15	3	13	31	24.5

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SECOND YEAR THIRD SEMESTER

A. Theory							
Sl. No.	**Code**	**Subject**	**Contacts Hours / Week**			**Total**	**Credit Points**
			L	**T**	**P**		
1.	CIVL 2101	Fundamentals of Strength of Materials	3	1	0	4	4
2.	CIVL 2102	Soil Mechanics – I	3	1	0	4	4
3.	CIVL 2103	Construction Materials and Technology	3	1	0	4	4
4.	BIOT 2105	Biology	2	0	0	2	2
5.	EVSC 2016	Environmental Sciences **(Mandatory Course)**	2	0	0	2	0
Total Theory			13	3	0	16	14
B. Laboratory							
1.	CIVL 2151	Strength of Materials Lab	0	0	2	2	1
2.	CIVL 2152	Soil Mechanics Lab – I	0	0	2	2	1
3.	CIVL 2153	Construction Materials Lab	0	0	2	2	1
4.	CIVL 2154	Building Planning and Drawing	0	0	4	4	2
Total Practical			0	0	10	10	5
Total of Semester without Honours			13	3	10	26	19
C. Honours							
1.	CIVL 2113	Fluid Mechanics	3	0	0	3	3
2.	CIVL 2163	Fluid Mechanics Lab	0	0	2	2	1
Total Honours			3	0	2	5	4
Total of Semester with Honours			16	3	12	31	23

SECOND YEAR FOURTH SEMESTER

A. Theory							
Sl. No.	**Code**	**Subject**	**Contacts Hours / Week**			**Total**	**Credit Points**
			L	**T**	**P**		
1.	MATH 2001	Mathematical Methods	3	1	0	4	4
2.	CIVL 2201	Structural Analysis – I	3	0	0	3	3
3.	CIVL 2202	Soil Mechanics – II	3	0	0	3	3
4.	CIVL 2203	Surveying	3	0	0	3	3
5.	CIVL 2204	Highway and Traffic Engineering	3	0	0	3	3
6.	HMTS 2001	Human Values and Professional Ethics	3	0	0	3	3
Total Theory			18	1	0	19	19
B. Laboratory							
1.	CIVL 2251	Soil Mechanics Lab – II	0	0	2	2	1
2.	CIVL 2252	Surveying Lab	0	0	4	4	2
3.	CIVL 2253	Highway Engineering Lab	0	0	2	2	1
4.	CIVL 2254	Quantity Survey, Specification and Valuation	0	0	2	2	1
Total Practical			0	0	10	10	5
Total of Semester			18	1	10	29	24

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THIRD YEAR FIFTH SEMESTER

A. Theory							
Sl. No.	**Code**	**Subject**	**Contacts Hours / Week**			**Total**	**Credit Points**
			L	**T**	**P**		
1.	CIVL 3101	Structural Analysis – II	3	1	0	4	4
2.	CIVL 3102	Design of RCC Structures	3	1	0	4	4
3.	CIVL 3103	Environmental Engineering	3	1	0	4	4
4.	CSEN 3106	Data Structure & RDBMS	4	0	0	4	4
5.	CIVL 3141 - CIVL 3144	Professional Elective - I	3	0	0	3	3
6.	INCO 3016	Indian Constitution and Civil Society **(Mandatory Course)**	2	0	0	2	0
Total Theory			18	3	0	21	19
B. Laboratory							
1.	CIVL 3152	RCC Design and Detailing Lab	0	0	3	3	1.5
2.	CIVL 3153	Environmental Engineering Lab	0	0	3	3	1.5
3.	CSEN 3156	RDBMS Lab	0	0	3	3	1.5
Total Practical			0	0	9	9	4.5
Total of Semester			18	3	9	30	23.5

THIRD YEAR SIXTH SEMESTER

A. Theory							
Sl. No.	**Code**	**Subject**	**Contacts Hours / Week**			**Total**	**Credit Points**
			L	**T**	**P**		
1.	CIVL 3201	Design of Steel Structures	3	1	0	4	4
2.	HMTS 3201	Economics for Engineers	3	0	0	3	3
3.	CIVL 3241 - CIVL 3244	Professional Elective – II	3	0	0	3	3
4.	CIVL 3221 & CIVL 3222	Open Elective - I	3	0	0	3	3
Total Theory			12	1	0	13	13
B. Laboratory							
1.	CIVL 3251	Industrial Structure Design and Detailing Lab	0	0	3	3	1.5
2.	CIVL 3252	Computer-aided Structural Analysis and Design	1	0	4	5	3
Total Practical			1	0	7	8	4.5
C. Sessional							
1.	CIVL 3293	Term Paper and Seminar	0	0	4	4	2
Total Sessional			0	0	4	4	2
Total of Semester without Honours			13	1	11	25	19.5
D. Honours							
1.	CIVL 3214	Project Planning and Management	3	1	0	4	4
Total Honours			3	1	0	4	4
Total of Semester with Honours			16	2	11	29	23.5

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FOURTH YEAR SEVENTH SEMESTER

A. Theory							
Sl. No.	**Code**	**Subject**	**Contacts Hours / Week**			**Total**	**Credit Points**
			L	**T**	**P**		
1.	HMTS 4101	Principles of Management	3	0	0	3	3
2.	CIVL 4141 - CIVL 4144	Professional Elective - III	3	0	0	3	3
3.	CIVL 4145 - CIVL 4148	Professional Elective - IV	3	0	0	3	3
4.	CIVL 4121 & CIVL 4122	Open Elective – II	3	0	0	3	3
5.	CIVL 4123 & CIVL 4124	Open Elective - III	3	0	0	3	3
Total Theory			15	0	0	15	15
B. Sessional							
1.	CIVL 4191	Industrial Training / Internship	-	-	-	-	2
2.	CIVL 4195	Project – I	0	0	8	8	4
Total Sessional			0	0	8	8	6
Total of Semester without Honours			15	0	8	23	21
C. Honours							
1.	CIVL 4115	Water Resources Engineering	3	1	0	4	4
Total Honours			3	1	0	4	4
Total of Semester with Honours			18	1	8	27	25

FOURTH YEAR EIGHTH SEMESTER

A. Theory							
Sl. No.	**Code**	**Subject**	**Contacts Hours / Week**			**Total**	**Credit Points**
			L	**T**	**P**		
1.	CIVL 4241 - CIVL 4244	Professional Elective – V	3	0	0	3	3
2.	CIVL 4221 & CIVL 4222	Open Elective – IV	3	0	0	3	3
Total Theory			6	0	0	6	6
B. Sessional							
1.	CIVL 4295	Project – II	0	0	16	16	8
2.	CIVL 4297	Comprehensive Viva-voce	-	-	-	-	1
Total Sessional			0	0	16	16	9
Total of Semester			6	0	16	22	15

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PROFESSIONAL ELECTIVE COURSES FOR CIVIL ENGINEERING

Professional Elective - I	CIVL 3141	Foundation Engineering
	CIVL 3142	Rock Mechanics
	CIVL 3143	Offshore Structures
	CIVL 3144	Structural Dynamics and Earthquake Engineering
Professional Elective - II	CIVL 3241	Air and Noise Pollution
	CIVL 3242	Environmental Impact Assessment
	CIVL 3243	Ground Improvement Techniques
	CIVL 3244	Advanced Structural Analysis
Professional Elective - III	CIVL 4141	Prestressed Concrete Structures
	CIVL 4142	Design of Tall Structures
	CIVL 4143	Airport, Railway and Harbour Engineering
	CIVL 4144	Advanced Foundation Engineering
Professional Elective - IV	CIVL 4145	Irrigation Engineering
	CIVL 4146	Advanced Highway and Traffic Engineering
	CIVL 4147	Solid and Hazardous Waste Management
	CIVL 4148	Soil Dynamics and Machine Foundation
Professional Elective - V	CIVL 4241	Hydraulic Structures
	CIVL 4242	Finite Element Analysis
	CIVL 4243	Bridge Engineering
	CIVL 4244	Pavement Design

OPEN ELECTIVE COURSES OFFERED BY CIVIL ENGINEERING DEPARTMENT

Open Elective - I (Emerging Field)	CIVL 3221	Repair & Rehabilitation of Structures
	CIVL 3222	Sustainable Construction Methods
Open Elective - II	CIVL 4121	Project Planning and Management
	CIVL 4122	Introduction to Surveying
Open Elective - III	CIVL 4123	Estimation and Valuation
	CIVL 4124	An Introduction to Concrete Technology
Open Elective - IV	CIVL 4221	Building Materials
	CIVL 4222	Introduction to Finite Element Methods

NOTE:-

Open Elective - I (Emerging Field) - to be offered exclusively for the students of Civil Engineering

Open Elective - II, III and IV – to be offered for the students of other Departments.

Free Electives for Civil Engineering Students (4th Year 7th Semester):

[1] MECH 4127 : Mechanical Handling of Materials
[2] CHEN 4123 : Industrial Total Quality Management
[3] ELEC4126 : Principles of Electrical Machines
[4] BIOT4125 : Bioploymer

Free Electives for Civil Engineering Students (4th Year 8th Semester):

[1] MECH 4221 : Quantitative Decision Making
[2] MECH 4222 : Modern Manufacturing Technology
[3] BIOT 4222 : Non-conventional Energy
[4] CHEN 4222 : Introduction to Solar and Wind Technology

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Honours Credit Chart

Sl. No.	Semester	Paper Code	Course Title	Contacts Hours / Week			Credit Points
				L	T	P	
1	First Year First Semester	ECEN 1011	Basic Electronics	3	0	0	3
2	First Year First Semester	ECEN 1061	Basic Electronics Lab	0	0	2	1
3	First Year Second Semester	HMTS 1011	Communication for Professionals	3	0	0	3
4	First Year Second Semester	HMTS 1061	Professional Communication Lab	0	0	2	1
5	Second Year Third Semester	CIVL 2113	Fluid Mechanics	3	0	0	3
6	Second Year Third Semester	CIVL 2163	Fluid Mechanics Lab	0	0	2	1
7	Third Year Sixth Semester	CIVL 3214	Project Planning and Management	3	1	0	4
8	Fourth Year Seventh Semester	CIVL 4115	Water Resources Engineering	3	1	0	4
	Total			15	2	6	20

Definition of Credit (as per AICTE):

- 1 Hour Lecture (L) per week = 1 Credit
- 1 Hour Tutorial (T) per week = 1 Credit
- 1 Hour Practical (P) per week = 0.5 Credit
- 2 Hours Practical (P) per week = 1 Credit

Range of Credits (as per AICTE):

- A total of 160 credits will be necessary for a student to be eligible to get B. Tech. degree.
- A student will be eligible to get B. Tech. degree with Honours if he/she completes an additional 20 credits. This could be acquired through various Honours courses offered by the respective departments.
- A part or all of the above additional credits may also be acquired through MOOCs. Any student completing any course through MOOC will have to submit an appropriate certificate to earn the corresponding credit.
- For any additional information, the student may contact the concerned HODs.

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Online Courses Recommended For Civil Engineering Students

Code	Name	Credit Points	Corresponding Online Course	Offered by	Platform
ECEN 1011	Basic Electronics	3	Fundamentals of Semiconductor Devices	IISc Bangalore	NPTEL
ECEN 1061	Basic Electronics Lab	1			
HMTS 1011	Communication for Professionals	3	Effective Business Communication	IIM Bangalore	Swayam
			AND		
HMTS 1061	Professional Communication Lab	1	Developing Soft Skills and Personality	IIT Kanpur	Swayam
CIVL 2113 & CIVL 2163	Fluid Mechanics & Fluid Mechanics Lab	3 + 1	Concepts of Thermodynamics	IIT Kharagpur	Swayam
			OR		
			Fluid Machines	IIT Kharagpur	Swayam
			OR		
			Advanced Concepts in Fluid Mechanics	IIT Kharagpur	Swayam
			OR		
			Fluid Mechanics	IIT Guwahati	Swayam
CIVL 3214	Project Planning and Management	4	Project Planning and Control	IIT Madras	NPTEL
CIVL 4115	Water Resources Engineering	4	Irrigation and Drainage	IIT Kharagpur	Swayam
			OR		
			Remote Sensing and GIS	IIT Guwahati	Swayam
			OR		
			Remote Sensing and Digital Image Processing of Satellite Data	IIT Roorkee	Swayam

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Credit Summary for B. Tech. in Civil Engineering Programme with effect from 2018-2019

Sl. No.	Course Type	Credit	AICTE suggested
1.	Humanities and Social Sciences including Management Courses	12	12
2.	Basic Science courses	21	25
3.	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	26	24
4.	Professional core courses	57	48
5.	Professional Elective courses relevant to chosen specialization/branch	15	18
6.	Open subjects – Electives from other technical and /or emerging subjects	12	18
7.	Project work, seminar and internship in industry or elsewhere	17	15
8.	Mandatory Courses [Induction Program, Indian Constitution, Essence of Indian Traditional Knowledge, Organizational Behavior]	Non-credit	0
	Total	160	160
9.	Honours Courses	20	20
	Grand Total	180	180

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DEPARTMENT OF CHEMICAL ENGINEERING

B. TECH. PROGRAMME IN

CHEMICAL ENGINEERING

July, 2021

CURRICULUM

1st Year 1st Semester (Semester 1)

THEORY							
Sl. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	PHYS 1001	Physics I	3	1	0	4	4
02	MATH 1101	Mathematics - I	3	1	0	4	4
03	CSEN 1001	Programming for Problem Solving	3	0	0	3	3
	Total Theory						**11**
LABORATORY							
Sl. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	PHYS 1051	Physics I Laboratory	0	0	3	3	1.5
02	MECH 1051	Workshop/Manufacturing Practices	1	0	4	5	3
03	CSEN 1051	Programming for Problem Solving Laboratory	0	0	4	4	2
	Total Practical						**6.5**
	Semester Total						**17.5**
HONOURS							
01	ECEN 1011	Basic Electronics	3	0	0	3	3
02	ECEN 1061	Basic Electronics Engineering Laboratory	0	0	2	2	1
	Honours Total						**4**

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1st Year 2nd Semester (Semester 2)

THEORY							
Sl. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	MATH 1201	Mathematics-II	3	1	0	4	4
02	CHEM 1001	Chemistry - I	3	1	0	4	4
03	ELEC 1001	Basic Electrical Engineering	3	1	0	4	4
04	HMTS 1202	Business English	2	0	0	2	2
	Total Theory						**14**
LABORATORY / SESSIONAL							
Sl. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	CHEM 1051	Chemistry Laboratory	0	0	3	3	1.5
02	HMTS 1252	Language Laboratory	0	0	2	2	1
03	MECH 1052	Engineering Drawing & Design	1	0	4	5	3
04	ELEC 1051	Basic Electrical Engineering Laboratory	0	0	2	2	1
	Total Practical						**6.5**
	Semester Total						**20.5**
HONOURS							
01	HMTS1011	Communication for Professionals	3	0	0	3	3
02	HMTS1061	Professional Communication Laboratory	0	0	2	2	1
	Honours Total						**4**

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2nd Year 1st Semester (Semester 3)

THEORY							
Sl. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	CHEN 2101	Particle & Fluid Particle Processing	3	0	0	3	3
02	CHEN 2102	Chemical Engineering Fluid Mechanics	3	0	0	3	3
03	CHEN 2103	Basics of Material & Energy Balance	3	0	0	3	3
04	MECH 2106	Mechanics for Engineers	3	0	0	3	3
05	CHEN 2104	Thermodynamics - I	3	0	0	3	3
06	BIOT 2105	Biology	2	0	0	2	2
	Total Theory						**17**
LABORATORY / SESSIONAL							
Sl. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	CHEN 2151	Fluid Mechanics (ChE) Laboratory	0	0	3	3	1.5
02	CHEN 2152	Particle & Fluid Particle Processing Laboratory	0	0	2	2	1
03	CHEN 2153	Instrumental Methods of Analysis Laboratory	0	0	3	3	1.5
	Total Practical						**4**
	Semester Total						**21**
HONOURS							
01	PHYS2111	Physics II	3	1	0	4	4
	Honours Total						**4**

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2nd Year 2nd Semester (Semester 4)

THEORY							
Sl. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	CHEN 2201	Heat Transfer	3	0	0	3	3
02	CHEN 2202	Transport Phenomena	3	0	0	3	3
03	CHEN 2203	Thermodynamics II	3	0	0	3	3
04	CHEM 2201	Chemistry II	3	0	0	3	3
05	CHEN 2204	Material Science	3	0	0	3	3
06	HMTS-2001	Human Values And Professional Ethics	3	0	0	3	3
07	EVSC 2016	Environmental Science	2	0	0	2	0
	Total Theory						**18**
LABORATORY / SESSIONAL							
Sl. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	CHEN 2251	Heat Transfer Laboratory	0	0	3	3	1.5
02	CHEN 2252	Programming Basics for Numerical Computation	0	0	3	3	1.5
03	CHEN 2253	Engineering Drawing Laboratory	0	0	2	2	1
	Total Practical						**4**
	Semester Total						**22**

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3rd Year 1st Semester (Semester 5)

THEORY							
Sl. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	CHEN 3101	Chemical Process Technology	3	0	0	3	3
02	CHEN 3102	Chemical Reaction Engineering - I	3	0	0	3	3
03	CHEN 3103	Mass Transfer I	3	0	0	3	3
04	CHEN 3104	Numerical Methods in Chemical Engineering	3	0	0	3	3
05	CHEN 3131- 3133	Professional Elective-I	3	0	0	3	3
06	CHEN 3141- 3143	Professional Elective-II	3	0	0	3	3
	Total Theory						**18**
LABORATORY / SESSIONAL							
Sl. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	CHEN 3151	Numerical Computation Laboratory	0	0	3	3	1.5
02	CHEN 3152	Chemical Reaction Engineering Laboratory	0	0	3	3	1.5
03	CHEN 3153	Energy Laboratory: Theory and Practice	0	0	2	2	1
	Total Practical						**4**
	Semester Total						**22**
HONOURS							
01	CHEN 3111	Chemical Reaction Engineering II	3	1	0	4	4
	Honours Total						**4**

Professional Elective- I	**CHEN 3131**	**CHEN 3132**
Subject name	Petrochemical Technology	Energy Engineering
Professional Elective –II	**CHEN 3141**	**CHEN 3142**
Subject name	Bioprocess Engineering	Industrial Safety and Hazards Analysis

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3rd Year 2nd Semester (Semester 6)

THEORY							
Sl. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	CHEN 3201	Process Control and Instrumentation	3	0	0	3	3
02	CHEN 3202	Mass Transfer II	3	0	0	3	3
03	CHEN 3231- 3233	Professional Elective-III	3	0	0	3	3
04		Open Elective I	3	0	0	3	3
05	HMTS 3201	Economics for Engineers	3	0	0	3	3
06	INCO 3016	Indian Constitution and Civil Society	2	0	0	2	0
	Total Theory						**15**
LABORATORY / SESSIONAL							
Sl. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	CHEN 3251	Process Control Laboratory	0	0	2	2	1
02	CHEN 3252	Mass Transfer Laboratory	0	0	3	3	1.5
03	CHEN 3253	Process Equipment Design & Drawing Laboratory	0	0	3	3	1.5
04	CHEN 3293	Term Paper & Technical Seminar	0	0	4	4	2
	Total Practical						**6**
	Semester Total						**21**

Professional Elective – III	**CHEN 3231**	**CHEN 3232**	**CHEN 3233**
Subject name	Computational Fluid Dynamics	Novel Separation Processes	Nanotechnology

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4th Year 1st Semester (Semester 7)

THEORY							
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	CHEN 4131- 4133	Professional Elective IV	3	0	0	3	3
02	HMTS 4101	Principles of Management	3	0	0	3	3
03		Open Elective-II	3	0	0	3	3
04		Open Elective-III	3	0	0	3	3
	Total Theory						**12**
LABORATORY / SESSIONAL							
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	CHEN 4151	Design & Simulation Laboratory I	0	0	3	3	1.5
02	CHEN 4195	Project –I	0	0	0	7	3.5
03	CHEN 4191	Industrial Training					2
	Total Practical						**7**
	Semester Total						**19**
HONOURS							
01	CHEN4111	Industrial Process Control & Instrumentation	3	1	0	4	4
	Honours Total						**4**

Professional Elective – IV	**CHEN 4131**	**CHEN 4132**	**CHEN 4133**
Subject name	Modern Instrumental Methods of Analysis	Petroleum Refinery Engineering	Environmental Engineering

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4th Year 2nd Semester (Semester 8)

THEORY							
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	CHEN 4231-4233	Professional Elective V	3	0	0	3	3
02		Open Elective-IV	3	0	0	3	3
	Total Theory						**6**
LABORATORY / SESSIONAL							
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	CHEN 4295	Project –II	0	0	0	17	8.5
02	CHEN 4251	Design & Simulation Laboratory II	0	0	3	3	1.5
03	CHEN 4297	Grand Viva					1
	Total Practical						**11**
	Semester Total						**17**

Professional Elective – V	**CHEN 4231**	**CHEN 4232**
Subject name	Project Engineering	Process Integration

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Open Electives to be offered by Chemical Engineering Department for Non-departmental Students		
Semester VI Open Elective I	Water and Liquid Waste Management (CHEN 3221)	Industrial Safety and Hazards (CHEN 3222)
Semester VII Open Elective II	Thin Film based Microstructure Fabrication (CHEN 4121)	Particle Characterization (CHEN 4122)
Semester VII Open Elective III	Industrial Total Quality Management (CHEN 4123)	Soft Methods in Microstructure Fabrication (CHEN 4124)
Semester VIII Open Elective IV	Fuel Cell Technology(CHEN 4221)	Introduction to Solar and Wind Technology(CHEN 4222)

Honours Courses for B. Tech Chemical Engineering Students			**Contact Hours / Week**			
Sem. No.	**Code**	**Course Title**	**L**	**T**	**P**	**Credit**
1st	ECEN 1011	Basic Electronics	3	0	0	3
	ECEN 1061	Basic Electronics Engineering Laboratory	0	0	2	1
2nd	HMTS 1011	Communication For Professionals	3	0	0	3
	HMTS 1061	Professional Communication Laboratory	0	0	2	1
3rd	PHYS 2111	Physics II	3	1	0	4
5th	CHEN 3111	Chemical Reaction Engineering II	3	1	0	4
7th	CHEN 4111	Industrial Process Control & Instrumentation	3	1	0	4
Total Honors Credit						20

Division of Credits according to Categories	**AICTE Recommended**	**HIT CHE Credit**
Basic Sciences	27	24
Engineering Sciences	27	25
Humanities	12	12
Professional Core	55	55
Professional Elective	12	15
Open Elective	12	12
Seminar, Project, Internship etc.	12	17
Total	**157**	**160**

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Division of Credits according to Categories from 3rd semester – 8th semester	**HIT CHE Credit**
Basic Sciences	5
Engineering Sciences	9
Humanities	9
Professional Core	55
Professional Elective	15
Open Elective	12
Seminar, Project, Internship etc.	17
Total	**122**

Swayam / MOOCs courses recommended to the students of CHE Dept.					
Code	**Name**	**Credit Points**	**Corresponding Online Course**	**Offered by**	**Platform**
ECEN1011	Basic Electronics	3	Fundamentals of Semiconductor Devices	IISc Bangalore	NPTEL
ECEN1061	Basic Electronics Lab	1			
HMTS1011	Communication for Professionals	3	Effective Business Communication **AND**	IIM Bangalore	Swayam
HMTS1061	Professional Communication Lab	1	Developing Soft Skills and Personality	IIT Kanpur	Swayam
CHEN3111	Chemical Reaction Engineering II	4	Chemical Reaction Engineering II	IIT Bombay	NPTEL
CHEN4111	Industrial Process Control and Instrumentation	4	Process Control and Instrumentation	IIT Kharagpur	NPTEL

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Definition of Credit (as per AICTE):

- 1 Hour Lecture (L) per Week = 1Credit
- 1 Hour Tutorial (T) per Week = 1Credit
- 1 Hour Practical (P) per Week = 0.5Credits
- 2 Hours Practical (Lab) per Week = 1Credit

Range of Credits (as per AICTE): -

- A total of 160 credits will be necessary for a student to be eligible to get B. Tech. degree.
- A student will be eligible to get B Tech degree with Honours if he/she completes an additional 20 credits. These could be acquired through various Honours Courses offered by the respective departments.
- A part or all of the above additional credits may also be acquired through MOOCs. Any student completing any course through MOOCs will have to submit an appropriate certificate to earn the corresponding credit.
- For any additional information, the student may contact the concerned HODs.

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HERITAGE INSTITUTE OF TECHNOLOGY

(An Autonomous Institute Under MAKAUT)

DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING

B.Tech Course Structure

June 2021

PART I: COURSE STRUCTURE

FIRST YEAR
FIRST SEMESTER

Sl.	Code	Subject	Contacts Periods/ Week				Credit Points
			L	T	P	Total	
A. Theory							
1	CHEM1001	Chemistry-I	3	1	0	4	4
2	MATH1101	Mathematics-I	3	1	0	4	4
3	ELEC1001	Basic Electrical Engineering	3	1	0	4	4
Total Theory			**9**	**3**	**0**	**12**	**12**
B. Practical							
1	CHEM1051	Chemistry I Lab	0	0	3	3	1.5
2	ELEC1051	Basic Electrical Engineering Lab	0	0	2	2	1
3	MECH1052	Engineering Graphics & Design	1	0	4	5	3
Total Practical			**1**	**0**	**9**	**10**	**5.5**
Total of Semester without Honors			**10**	**3**	**9**	**22**	**17.5**
C. Honors							
1	HMTS1011	Communication for Professionals	3	0	0	3	3
2.	HMTS1061	Professional Communication Lab	0	0	2	2	1
Total Honors			**3**	**0**	**2**	**5**	**4**
Total of Semester with Honors			**13**	**3**	**11**	**27**	**21.5**

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FIRST YEAR
SECOND SEMESTER

Sl.	Code	Subject	Contacts Periods/ Week				Credit Points
			L	T	P	Total	
A. Theory							
1	PHYS1001	Physics I	3	1	0	4	4
2	MATH1201	Mathematics II	3	1	0	4	4
3	CSEN1001	Programming for Problem Solving	3	0	0	3	3
4	HMTS1202	Business English	2	0	0	2	2
Total Theory			**11**	**2**	**0**	**13**	**13**
B. Practical							
1	PHYS1051	Physics I Lab	0	0	3	3	1.5
2	CSEN1051	Programming for Problem Solving Lab	0	0	4	4	2
3	MECH1051	Workshop / Manufacturing Practice	1	0	4	5	3
4	HMTS1252	Language Lab	0	0	2	2	1
Total Practical			**1**	**0**	**13**	**14**	**7.5**
Total of Semester without Honors			**12**	**2**	**13**	**27**	**20.5**
C. Honors							
1	ECEN1011	Basic Electronics	3	0	0	3	3
2	ECEN1061	Basic Electronics Lab	0	0	2	2	1
Total Honors			**3**	**0**	**2**	**5**	**4**
Total of Semester with Honors			**15**	**2**	**15**	**32**	**24.5**

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SECOND YEAR
THIRD SEMESTER

Sl.	Code	Subject	Contacts Periods/ Week				Credit Points
			L	T	P	Total	
A. Theory							
1	CSEN2101	Data Structures and Algorithms	4	0	0	4	4
2	CSEN2102	Discrete Mathematics	4	0	0	4	4
3	ECEN2101	Analog Circuits	3	0	0	3	3
4	ECEN2104	Digital Logic	3	0	0	3	3
5	HMTS2001	Human Values and Professional Ethics	3	0	0	3	3
Total Theory			**17**	**0**	**0**	**17**	**17**
B. Practical							
1	CSEN2151	Data Structures and Algorithms Lab	0	0	3	3	1.5
2	CSEN2152	Software Tools Lab	0	0	3	3	1.5
3	ECEN2154	Digital Logic Lab	0	0	2	2	1
Total Practical			**0**	**0**	**8**	**8**	**4**
Total of Semester without Honors			**17**	**0**	**8**	**25**	**21**
C. Honors							
1	MATH2111	Probability and Statistical Methods	4	0	0	4	4
Total Honors			**4**	**0**	**0**	**4**	**4**
Total of Semester with Honors			**21**	**0**	**8**	**29**	**25**

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SECOND YEAR
FOURTH SEMESTER

Sl.	Code	Subject	Contacts Periods/ Week				Credit Points
			L	T	P	Total	
A. Theory							
1	CSEN2201	Design & Analysis of Algorithms	4	0	0	4	4
2	CSEN2202	Computer Organization and Architecture	4	0	0	4	4
3	CSEN2203	Operating Systems	3	0	0	3	3
4	MATH2201	Mathematics-III Algebraic Structures	4	0	0	4	4
5	AEIE2205	Microprocessors and Microcontroller	2	0	0	2	2
6	EVSC2016	Environmental Sciences (Mandatory)	2	0	0	2	0
Total Theory			**19**	**0**	**0**	**19**	**17**
B. Practical							
1	CSEN2251	Design & Analysis of Algorithms Lab	0	0	3	3	1.5
2	CSEN2252	Computer Architecture Lab	0	0	2	2	1
3	CSEN2253	Operating Systems Lab	0	0	3	3	1.5
4	AEIE2255	Microprocessors & Microcontroller Lab	0	0	2	2	1
Total Practical			**0**	**0**	**10**	**10**	**5**
Total of Semester			**19**	**0**	**10**	**29**	**22**

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THIRD YEAR
FIFTH SEMESTER

Sl.	Code	Subject	Contacts Periods/ Week				Credit Points
			L	T	P	Total	
A. Theory							
1	CSEN3101	Database Management Systems	4	0	0	4	4
2	CSEN3102	Formal Language & Automata Theory	4	0	0	4	4
3	CSEN3103	Object Oriented Programming	4	0	0	4	4
4	ECEN3106	Electronic Design Automation	2	0	0	2	2
5	CSEN3131- CSEN3140	Professional Elective-I	3	0	0	3	3
	CSEN3131 CSEN3132 CSEN3133 CSEN3134 CSEN3135	Computer Graphics & Multimedia Data Mining & Knowledge Discovery Web Technologies Graph Algorithms Introduction to Data Analysis with Python and R					
Total Theory			**17**	**0**	**0**	**17**	**17**
B. Practical							
1	CSEN3151	Database Management Systems Lab	0	0	3	3	1.5
2	CSEN3153	Object Oriented Programming Lab	0	0	3	3	1.5
3	ECEN3156	Electronic Design Automation Lab	0	0	2	2	1
Total Practical			**0**	**0**	**8**	**8**	**4**
Total of Semester without Honors			**17**	**0**	**8**	**25**	**21**
C. Honors							
1	CSEN3111	Artificial Intelligence	3	0	0	3	3
2	CSEN3161	Artificial Intelligence Lab	0	0	2	2	1
Total Honors			**3**	**0**	**2**	**5**	**4**
Total of Semester with Honors			**20**	**0**	**10**	**30**	**25**

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THIRD YEAR
SIXTH SEMESTER

Sl.	Code	Subject	Contacts Periods/ Week				Credit Points
			L	T	P	Total	
A. Theory							
1	CSEN3201	Software Engineering	4	0	0	4	4
2	CSEN3202	Computer Networks	4	0	0	4	4
3	HMTS3201	Economics for Engineers	3	0	0	3	3
4	CSEN3231 - CSEN3240	Professional Elective-II	3	0	0	3	3
	CSEN3231 CSEN3232 CSEN3233 CSEN3234 CSEN3235 CSEN3236	Advanced Operating System Enterprise Application in Java EE Machine Learning Computational Geometry Cloud Computing Big Data					
5		Open Elective-I	3	0	0	3	3
	AEIE3221 ECEN3222 ECEN3223 MATH3221 MATH3223	Fundamentals of Sensors and Transducers Designing with Processors and Controllers Analog and Digital Communication Computational Mathematics Scientific Computing					
6	INCO3016	Indian Constitution and Civil Society (Mandatory)	2	0	0	2	0
Total Theory			**19**	**0**	**0**	**19**	**17**
B. Practical							
1	CSEN3251	Software Engineering Lab	0	0	3	3	1.5
2	CSEN3252	Computer Networks Lab	0	0	3	3	1.5
Total Practical			**0**	**0**	**6**	**6**	**3**
C. Sessional							
1	CSEN3293	Term Paper and Seminar	0	0	4	4	2
Total Sessional			**0**	**0**	**4**	**4**	**2**
Total of Semester			**19**	**0**	**10**	**29**	**22**

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FOURTH YEAR
SEVENTH SEMESTER

Sl.	Code	Subject	Contacts Periods/ Week				Credit Points
			L	T	P	Total	
A. Theory							
1	HMTS4101	Principles of Management	3	0	0	3	3
2	CSEN4131-CSEN4140	Professional Elective-III	3	0	0	3	3
	CSEN4131	Soft Computing					
	CSEN4132	Cryptography & Network Security					
	CSEN4133	Image Processing					
	CSEN4134	Approximation Algorithms					
	CSEN4135	Information Retrieval					
3		Open Elective-II	3	0	0	3	3
	AEIE4121	Instrumentation and Telemetry					
	AEIE4122	Linear Control Systems and Applications					
	CHEN4121	Industrial Total Quality Management					
	CHEN4122	Industrial Pollution Control					
	ECEN4121	Software Defined Radio					
	ECEN4122	Error Control Coding					
	BIOT4026	Biology for Engineers					
	MATH4121	Methods in Optimization					
4		Open Elective-III	3	0	0	3	3
	AEIE4127	Introduction to Embedded System					
	MATH4122	Advanced Linear Algebra					
	BIOT4123	Biosensor					
	CHEN4123	Statistical Methods in Design of Experiments					
	ECEN4126	Ad Hoc Networks and Security Challenges					
	ECEN4127	Introduction to VLSI Design					
Total Theory			**12**	**0**	**0**	**12**	**12**
B. Sessional							
1	CSEN4191	Industrial Training / Internship	-	-	-	-	2
2	CSEN4195	Project-I	0	0	8	8	4
Total Sessional			**0**	**0**	**8**	**8**	**6**
Total of Semester without Honors			**12**	**0**	**8**	**20**	**18**
C. Honors							
1	CSEN4111	Compiler Design	3	0	0	3	3
2	CSEN4161	Compiler Design Lab	0	0	2	2	1
Total Honors			**3**	**0**	**2**	**5**	**4**
Total of Semester with Honors			**15**	**0**	**10**	**25**	**22**

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FOURTH YEAR
EIGHTH SEMESTER

Sl.	Code	Subject	Contacts Periods/ Week				Credit Points
			L	T	P	Total	
A. Theory							
1	CSEN4231-CSEN4240	Professional Elective-IV	3	0	0	3	3
	CSEN4231 CSEN4232 CSEN4233 CSEN4234 CSEN4235 CSEN4236	Distributed Algorithms Mobile Computing Pattern Recognition Computational Complexity Social Network Analysis Computer Vision					
2	CSEN4241-CSEN4250	Professional Elective-V	3	0	0	3	3
	CSEN4241 CSEN4242 CSEN4243 CSEN4244 CSEN4245 CSEN4246	Distributed Databases Natural Language Processing Parallel Algorithms Real Time & Embedded System Quantum Computing Robotics					
3		Open Elective-IV	3	0	0	3	3
	AEIE4221 AEIE4222 BIOT4221 BIOT4222 CHEN4221 CHEN4222 ECEN4222 PHYS4121	Process Instrumentation Medical Instrumentation Computational Biology Non-conventional Energy Nanotechnology Introduction to Solar and Wind Technology Optical Fiber Communication Quantum Physics					
Total Theory			**9**	**0**	**0**	**9**	**9**
B. Sessional							
1	CSEN4295	Project-II	0	0	16	16	8
2	CSEN4297	Comprehensive Viva-voce	-	-	-	-	1
Total Sessional			**0**	**0**	**16**	**16**	**9**
Total of Semester			**9**	**0**	**16**	**25**	**18**

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Open Electives to be offered by Computer Science and Engineering department for Non-departmental students

Sl.	Semester	Paper Code	Course Title	Contact Hours / Week				Credit Points
				L	T	P	Total	
1	6th	CSEN3221	Fundamentals of RDBMS	3	0	0	3	3
2	7th	CSEN4121	Fundamentals of Operating Systems	3	0	0	3	3
3	7th	CSEN4126	Intelligent Web and Big Data	3	0	0	3	3
4	8th	CSEN4221	Basics of Mobile Computing	3	0	0	3	3

Credit Summary for B Tech Programme with effect from 2018-2019

Sl.	Course Type	Credit Points
1	Humanities and Social Sciences including Management Courses	12
2	Basic Science Courses	23
3	Engineering Science Courses including Workshop, Drawing, Basics of Electrical / Mechanical / Computer, etc.	29
4	Professional Core Courses	52
5	Professional Elective Courses relevant to chosen Specialization / Branch	15
6	Open Subjects – Electives from other Technical and/or Emerging Subjects	12
7	Project Work, Seminar and Internship in industry or elsewhere	17
8	Mandatory Courses (Non-credit) [Environmental Sciences, Induction Program, Indian Constitution, Essence of Indian Traditional Knowledge]	0
Total		**160**
9	Honors Courses	20
Grand Total		**180**

Honors Course for B. Tech Computer Science & Engineering Students

Sl.	Semester	Paper Code	Course Title	Contact Hours / Week			Credit Points
				L	T	P	
1	1st	HMTS1011	Communication for Professionals	3	0	0	3
2		HMTS1061	Professional Communication Lab	0	0	2	1
3	2nd	ECEN1011	Basic Electronics	3	0	0	3
4		ECEN1061	Basic Electronics Lab	0	0	2	1
5	3rd	MATH2111	Probability and Statistical Methods	4	0	0	4
6	5th	CSEN3111	Artificial Intelligence	3	0	0	3
7		CSEN3161	Artificial Intelligence Lab	0	0	2	1
8	7th	CSEN4111	Compiler Design	3	0	0	3
9		CSEN4161	Compiler Design Lab	0	0	2	1
Total							**20**

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Definition of Credit (as per AICTE):

- 1 Hour Lecture (L) per Week = 1 Credit
- 1 Hour Tutorial (T) per Week = 1 Credit
- 1 Hour Practical (P) per Week = 0.5 Credits
- 2 Hours Practical (Lab) per Week = 1 Credit

Range of Credits (as per AICTE):

- A total of 160 credits will be necessary for a student to be eligible to get B Tech degree.
- A student will be eligible to get B Tech degree with Honors if he/she completes an additional 20 credits. These could be acquired through various Honors Courses offered by the respective departments.
- A part or all of the above additional credits may also be acquired through MOOCs. Any student completing any course through MOOC will have to submit an appropriate certificate to earn the corresponding credit.
- For any additional information, the student may contact the concerned HODs.

Swayam/MOOCs Courses recommended to the students of CSE department

Sl.	Code	Name	Credit Points	Corresponding Online Course	Offered by	Platform
1	ECEN1011	Basic Electronics	3	Fundamentals of Semiconductor Devices	IISc Bangalore	NPTEL
2	ECEN1061	Basic Electronics Lab	1			
3	HMTS1011	Communication for Professionals	3	Effective Business Communication **AND** Developing Soft Skills and Personality	IIM Bangalore	Swayam
4	HMTS1061	Professional Communication Lab	1		IIT Kanpur	Swayam
5	MATH2111	Probability and Statistical Methods	4	Stochastic Processes	IIT Delhi	Swayam
6	CSEN3111	Artificial Intelligence	4	Artificial Intelligence Search Methods for Problem Solving	IIT Madras	NPTEL

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Electronics and Communication Engineering (ECE) Department

B.TECH. PROGRAMME

CURRICULUM STRUCTURE

RELEASE DATE:

July, 2018:Ver1.0

May, 2019: Ver: 1.1

July, 2020: Ver : 1.2

April. 2021 : Ver :1.3

1st Year 1st Semester Syllabus:

A. Theory								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Basic Science course	**CHEM1001**	Chemistry I	3	1	0	4	4
2	Basic Science course	**MATH1101**	Mathematics I	3	1	0	4	4
3	Engg. Science course	**ELEC1001**	Basic Electrical Engg.	3	1	0	4	4
Total Theory				9	3	0	12	**12**

B. Practical								
1	Basic Science course	**CHEM1051**	Chemistry I Laboratory	0	0	3	3	1.5
2	Engg.Science Course	**ELEC1051**	Basic Electrical Engg. Laboratory	0	0	2	2	1
3	Engg.Science Course	**MECH1052**	Engg. Graphics & Design	1	0	4	5	3
Total Practical				0	0	9	**10**	**5.5**
Total of Semester without Honours				10	3	9	**22**	**17.5**

C. Honours								
1	**Honours**	**HMTS1011**	Communication for Professionals	3	0	0	3	3
		HMTS1061	Professional Communication Laboratory	0	0	2	2	1
Total Honours				3	0	2	5	4
Total of Semester with Honours				**13**	**3**	**11**	**27**	**21.5**

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1st Year 2nd Semester Syllabus:

A. Theory								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Tota l**	
1	Basic Science course	**PHYS1001**	Physics I	3	1	0	4	4
2	Basic Science course	**MATH1201**	Mathematics II	3	1	0	4	4
3	Engg. Science course	**CSEN1001**	Programming for Problem Solving	3	0	0	3	3
4	Humanities	**HMTS1201**	Business English	2	0	0	2	2
			TOTAL	11	2	0	13	13

B. Practical								
1	Basic Science Course	**PHYS1051**	Physics I Laboratory	0	0	3	3	1.5
2	Engg.Science Course	**CSEN1051**	Programming for Problem Solving Laboratory	0	0	4	4	2
3	Engg.Science Course	**MECH1051**	Workshop/ Manufactu-ring Practices	1	0	4	5	3
4	Humanities	**HMTS1251**	Language Laboratory	0	0	2	2	1
Total Practical				11	2	13	**14**	**7.5**
Total of Semester without Honours				12	2	13	**27**	**20.5**

C. Honours								
1	**Honours**	**ECEN1011**	Basic Electronics	3	0	0	3	3
		ECEN1061	Basic Electronics Laboratory	0	0	2	2	1
Total Honours				3	0	2	5	4
Total of Semester with Honours				**15**	**2**	**15**	**32**	**24.5**

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2nd Year 1st Semester:

A. Theory								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Professional Core Course	**ECEN2101**	Analog Circuits	3	0	0	3	3
2	Professional Core Course	**ECEN2102**	Circuit and Network Theory	3	0	0	3	3
3	Professional Core Course	**ECEN2103**	Signals and Systems	3	0	0	3	3
4	BasicScience course	**MATH2001**	Mathematical Methods	3	0	0	3	3
5	Engg.Science courses	**CSEN2004**	Data Structure and Basic Algorithms	4	0	0	4	4
6	Humanities	**HMTS2001**	Human Values and Professional Ethics	3	0	0	3	3
Total Theory				19	0	0	**19**	**19**

B. Practical								
1	Professional Core Course	**ECEN2151**	Analog Circuits Laboratory	0	0	2	2	1
2	Professional Core Course	**ECEN2152**	Circuit and Network Theory Laboratory	0	0	3	3	1.5
3	Professional Core Course	**ECEN2153**	Signals and Systems Laboratory	0	0	2	2	1
4	Engg.Sciencecourses	**CSEN2054**	Data Structure and Basic Algorithms Laboratory	0	0	3	3	1.5
Total Practical				0	0	10	**10**	**5**
Total of Semester							**29**	**24**

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2nd Year 2nd Semester:

A. Theory								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Professional Core Course	**ECEN2201**	Analog Communication	3	0	0	3	3
2	Professional Core Course	**ECEN2202**	Digital Systems Design	3	0	0	3	3
3	Professional Core Course	**ECEN2203**	EM Theory & Transmission Lines	3	0	0	3	3
4	Professional Core Course	**ECEN2204**	Electronic Devices	3	0	0	3	3
5	Basic Science Course	**MATH2202**	Advanced Numerical Methods	3	0	0	3	3
Total Theory				15	0	0	**15**	**15**

B. Practical								
1	Professional Core Course	**ECEN2251**	Analog Communication Laboratory	0	0	2	2	1
2	Professional Core Course	**ECEN2252**	Digital Systems Design Laboratory	0	0	2	2	1
3	Professional Core Course	**ECEN2253**	EM Theory & Transmission Lines Laboratory	0	0	2	2	1
4	Basic Science courses	**MATH2253**	Advanced Numerical Methods Laboratory	0	0	2	2	1
Total Practical				0	0	8	**8**	**4**

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C. Mandatory Course(non-credit)								
1	Mandatory	**EVSC2016**	Environmental Sciences	2	0	0	2	0
Total of Semester without Honours				**17**	**0**	**8**	**25**	**19**

C. Honours								
1	**Honours**	**ECEN2211**	Control Systems	3	0	0	3	3
		ECEN2261	Control Systems Laboratory	0	0	2	2	1
Total Honours				3	0	2	5	4
Total of Semester with Honours				**20**	**0**	**10**	**30**	**23**

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3rd. Year, 1st. Semester

A. Theory								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Professional Core Course	**ECEN3101**	Digital Communication	3	0	0	3	3
2	Professional Core Course	**ECEN3102**	Digital Signal Processing	3	0	0	3	3
3	Professional Core Course	**ECEN3103**	Microwave Engineering	3	0	0	3	3
4	Professional Core Course	**ECEN3104**	Microprocessors and Microcontrollers	3	0	0	3	3
5	Professional Core Course	**ECEN3105**	Information Theory and Coding	3	0	0	3	3
6	Professional Elective-1	**ECEN3131**	Telecommunication Systems	3	0	0	3	3
		ECEN3132	Computer Networks					
		ECEN3133	Speech and Audio Processing					
Total Theory				18	0	0	18	**18**

B. Practical								
1	Professional Core Courses	**ECEN3151**	Digital Communication Laboratory	0	0	2	2	1
2	Professional Core Courses	**ECEN3152**	Digital Signal Processing Laboratory	0	0	2	2	1
3	Professional Core Course	**ECEN3153**	Microwave Engineering Laboratory	0	0	2	2	1
4	Professional Core Course	**ECEN3154**	Microprocessors and Microcontrollers Laboratory	0	0	2	2	1
Total Practical				0	0	8	**8**	**4**
Total of Semester							**26**	**22**

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3rd Year 2nd Semester:

A. Theory								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Professional Core Courses	**ECEN3201**	Digital VLSI Design	3	0	0	3	3
2	Engineering Science Course	**CSEN3208**	Object Oriented Programming Concept by using C++	3	0	0	3	3
3	HU	**HMTS3201**	Economics for Engineers	3	0	0	3	3
4	Professional Elective-2	**ECEN3231**	Digital Image Processing & Pattern recognition	3	0	0	3	3
		ECEN3232	IoT for Communication					
		ECEN3233	Power Electronics					
		ECEN 3234	Network Security					
		ECEN 3235	Advanced Digital Communication					
5	Open Elective - 1	**ECEN3221**	Artificial Intelligence in Radio Communication	3	0	0	3	3
		AEIE3221	Fundamentals Of Sensors And Transducers					
		CSEN3221	Fundamentals of RDBMS					
		MATH3221	Computational Mathematics					
		MATH3222	Advanced Probability and Information Theory					
		MATH3223	Scientific Computing					
Total Theory				15	0	0	**15**	**15**

B. Practical								
1	Professional Core Course	**ECEN3251**	Digital VLSI Design Laboratory	0	0	2	2	1
2	Engineering Science Course	**CSEN3258**	Object Oriented Programming Concept by using C++ Laboratory	0	0	3	3	1.5
Total Practical				0	0	5	**5**	**2.5**

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C. Sessional								
1	Professional Core Courses	**ECEN3252**	Mini Project/Electronic Design workshop	0	0	3	3	1.5
2	Project Work ,Seminar, Internship etc	**ECEN3293**	Term paper with Seminar	0	0	4	4	2
Total Sessional				0	0	7	**7**	**3.5**

D. Mandatory Course(non-credit)								
1	Mandatory	**INCO3016**	Indian Constitution and Civil Society	2	0	0	2	0
Total of Semester without Honours				**17**	**0**	**12**	**29**	**21**

E. Honours								
1	**Honours**	**ECEN3211**	Wireless and Cellular Communication	3	0	0	3	3
		ECEN3261	Wireless and Cellular Communication Laboratory	0	0	2	2	1
Total Honours				3	0	2	5	4
Total of Semester with Honours				**20**	**0**	**14**	**34**	**25**

Open Elective -1	**i) ECEN3221** **ii) ECEN3222** **iii) ECEN3223**	i) Artificial Intelligence in Radio Communication ii) Designing with Processors and Controllers iii) Analog and Digital Communication

Open Elective -1 (to be offered by ECE Department)

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4th Year 1st Semester:

A. Theory								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Professional Elective-3	**i) ECEN4141**	i) Adaptive Signal Processing	3	0	0	3	3
		ii)ECEN4142	ii)Fiber Optic Communication					
		iii)ECEN4143	iii) Electromagnetic Interference and Compatibility					
		iv)ECEN4144	iv) Ad Hoc networks and security					
2	Open Elective-2	**i) INFO4121**	i) Fundamentals of Cloud Computing	3	0	0	3	3
		ii)ECEN4121	ii) Software Defined Radio					
		iii)AEIE4122	iii)Linear Control Systems and Applications					
		iv)CSEN4121	iv)Fundamentals of Operating Systems					
		v)MATH4121	v)Methods in Optimization					
		vi)MATH4122	vi)Advanced Linear Algebra					
3	Open Elective- 3	**i)AEIE4126**	i)Optical Instrumentation	3	0	0	3	3
		ii)AEIE4127	ii) Introduction to Embedded System					
		iii)CSEN4126	iii) Intelligent Web and Big Data					
		iv)BIOT4124	iv) Biosensor					
		v) CHEN4123	v)Industrial Total Quality Management					
		vi) ECEN4124	vi)Principles of Radar					
4	HU	**HMTS4101**	Principles of Management	3	0	0	3	3
Total Theory				12	0	0	**12**	**12**

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B. Sessional								
5	Project Work.	**ECEN4195**	Project Stage – I	0	0	8	8	4
6	Industrial Training/ Internship	**ECEN4191**	Industrial Training/Internship	-	-	-	-	2
Total Sessional				0	0	8	**8**	**6**
Total of Semester without Honours				12	0	8	**20**	**18**

C. Honours								
1	**Honours**	**ECEN4111**	Microelectronics and Analog VLSI design	3	0	0	3	3
		ECEN4161	Microelectronics and Analog VLSI design Laboratory	0	0	2	2	1
Total Honours				3	0	2	5	4
Total of Semester with Honours				**15**	**0**	**10**	**25**	**22**

Open Elective -2	**i)ECEN4121** **ii) ECEN4122** **iii) ECEN4123**	i) Software Defined Radio ii)Introduction to Machine Learning iii) Error Control Coding for Secure Data Transmission

Table 2: Open Elective 2 (to be offered by ECE department)

Open Elective -3	**i)ECEN4124** **ii)ECEN4125** **iii) ECEN4126**	i) Principles of Radar ii) Ad Hoc Wireless Networks iii)Introduction to VLSI Design

Table 3: Open Elective 3 (to be offered by ECE department)

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4th Year 2nd Semester:

A. Theory								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Professional Elective - 4	**i)ECEN4241**	i) Introduction to MEMS	3	0	0	3	3
		ii)ECEN4242	ii) Satellite Communication & Remote Sensing					
		iii)ECEN4243	iii) Digital Beam forming Techniques					
		iv) ECEN 4244	iv)Nanoelectronics & Nanophotonics					
		v) ECEN 4245	v) Cognitive Radio - Deployment Strategy & Applications					
2	Professional Elective-5	i)**ECEN4246**	i) Wireless Sensor Networks	3	0	0	3	3
		ii)ECEN4247	ii) Mobile Communication – 3G and above					
		iii)ECEN4248	iii) Machine Intelligence and Introduction to Python					
3	Open Elective -4	**i) INFO4221**	i) Fundamentals of Cryptography	3	0	0	3	3
		ii)AEIE4221	ii) Process Instrumentation					
		iii)ELEC4221	iii)Applied Illumination Engineering					
		iv) BIOT4222	iv) Non-conventional Energy					
		v)BIOT 4223	v) Biology for Engineers					
		vi)ECEN 4221	vi) Low Power High Performance Digital VLSI Circuit Design					
Total Theory				9	0	0	**9**	**9**

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B. Sessional								
4	Project Work	**ECEN4295**	Project Work II & Dissertation	0	0	16	16	8
5	Viva Voce.	**ECEN4297**	Comprehensive Viva Voce	-	-	-	-	1
Total Sessional				0	0	16	**16**	**9**
Total of Semester							**25**	**18**

Open Elective -4	i)**ECEN4221** **ii)ECEN4222** **iii) ECEN 4223**	i) Low Power High Performance Digital VLSI Circuit Design ii) Cellular and Mobile communication ii) Optical Fiber Communication

Table 4: Open Elective 4 (to be offered by ECE Department)

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Honours Courses

Honours Credit Chart (ECE)

Sl. No.	Semester	Paper Code	Course Title	Contact Hours / Week			Credit Points
				L	T	P	
1	1st	HMTS1011	Communication for Professionals	3	0	0	3
		HMTS1061	Professional Communication Laboratory	0	0	2	1
2	2nd	ECEN1011	Basic Electronics	3	0	0	3
		ECEN1061	Basic Electronics Laboratory	0	0	2	1
3	4th	ECEN2211	Control Systems	3	0	0	3
		ECEN2261	Control Systems Laboratory	0	0	2	1
4	6th	ECEN3211	Wireless and Cellular Communication	3	0	0	3
		ECEN3261	Wireless and CellularCommunication Laboratory	0	0	2	1
5	7th	ECEN4111	Microelectronics andAnalog VLSI design	3	0	0	3
		ECEN4161	Microelectronics andAnalog VLSI design Laboratory	0	0	2	1
Grand Total							20

Definition of Credit (as per AICTE):

- 1 Hour Lecture (L) per Week = 1 Credit
- 1 Hour Tutorial (T) per Week = 1 Credit
- 1 Hour Practical (P) per Week = 0.5 Credits
- 2 Hours Practical (Lab) per Week = 1 Credit

Range of Credits (as per AICTE):

- ✓ A total of 160 credits will be necessary for a student to be eligible to get B Tech degree.
- ✓ A student will be eligible to get B Tech degree with Honours if he/she completes an additional 20 credits. These could be acquired through various Honours Courses offered by the respective departments.
- ✓ A part or all of the above additional credits may also be acquired through MOOCs. Any student completing any course through MOOC will have to submit an appropriate certificate to earn the corresponding credit.
- ✓ For any additional information, the student may contact the concerned HODs.

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On line courses recommended to the students of ECE Department

Code	Name	Credit Points	Corresponding Online Course	Offered by	Platform	Comment
ECEN1011	Basic Electronics	3	Fundamentals of Semiconductor Devices	IISc Bangalore	NPTEL	
ECEN 1061	Basic Electronics Lab	1				
HMTS1011	Communication for Professionals	3	Effective Business Communication	IIM Bangalore	Swayam	**Both online courses need to be done**
HMTS1061	Professional Communication Lab	1	Developing Soft Skills and Personality	IIT Kanpur	Swayam	
ECEN2211	Control Systems	3	Control Systems	IIT Madras	NPTEL	
ECEN2261	Control Systems Lab	1				
ECEN3211	Wireless and Cellular Communication	3	Introduction to Wireless and Cellular Communication	IIT Madras	NPTEL	
ECEN3261	Wireless and Cellular Communication Lab	1				
ECEN4111	Microelectronics and Analog VLSI Design	3	Analog IC Design	IIT Madras	NPTEL	
ECEN4161	Microelectronics and Analog VLSI Design Lab	1				

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Heritage Institute of Technology, Kolkata (HIT-K) – Credit Summary for B Tech Programmes with effect from 2018-2019

Sl. No.	Course Type	AICTE Suggested	AEIE	BIOT	CIVL	CHEN	CSEN	ECEN	ELEC	INFO	MECH
1.	Humanities and Social Sciences including Management Courses	12	12	12	12	12	12	12	12	12	12
2.	Basic Science Courses	25	23	26.5	21	22	23	26	23	23	27
3.	Engineering Science Courses including Workshop, Drawing, Basics of Electrical / Mechanical / Computer, etc.	24	27	27.5	26	27	30	26	28	28	23
4.	Professional Core Courses	48	54	49	57	55	51	52	53	53	51.5
5.	Professional Elective Courses relevant to chosen Specialization / Branch	18	15	16	15	15	15	15	15	15	17.5
6.	Open Subjects – Electives from other Technical and/or Emerging Subjects	18	12	12	12	12	12	12	12	12	12
7.	Project Work, Seminar and Internship in industry or elsewhere	15	17	17	17	17	17	17	17	17	17
8.	Mandatory Courses (Non-credit) [Environmental Sciences, Induction Program, Indian Constitution, Essence of Indian Traditional Knowledge]	0	0	0	0	0	0	0	0	0	0
	Total	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**

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Sl. No.	Course Type	AICTE Suggested	AEIE	BIOT	CIVL	CHEN	CSEN	ECEN	ELEC	INFO	MECH
9	Honours Courses	20	20	20	20	20	20	20	20	20	20
	Grand Total	**180**	**180**	**180**	**180**	**180**	**180**	**180**	**180**	**180**	**180**

Definition of Credit (as per AICTE):

- 1 Hour Lecture (L) per Week = 1 Credit
- 1 Hour Tutorial (T) per Week = 1 Credit
- 1 Hour Practical (P) per Week = 0.5 Credits
- 2 Hours Practical (Lab) per Week = 1 Credit

Range of Credits (as per AICTE):

- ✓ A total of 160 credits will be necessary for a student to be eligible to get B Tech degree.
- ✓ A student will be eligible to get B Tech degree with Honours if he/she completes an additional 20 credits. These could be acquired through various Honours Courses offered by the respective departments.
- ✓ A part or all of the above additional credits may also be acquired through MOOCs. Any student completing any course through MOOC will have to submit an appropriate certificate to earn the corresponding credit.
- ✓ For any additional information, the student may contact the concerned HODs.

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ELECTRICAL ENGINEERING DEPARTMENT

B.TECH. PROGRAMME

Release Month & Year: April 2021

Heritage Institute of Technology

Electrical Engineering Department

B.Tech. in Electrical Engineering

1st Year 1st Semester Course Structure

Theory:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	MATH1101	Mathematics I	3	1	0	4	4
2.	PHYS1001	Physics	3	1	0	4	4
3.	CSEN1001	Programming for Problem Solving	3	0	0	3	3
		Total Theory	**9**	**2**	**0**	**11**	**11**

Practical/Sessional:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	PHYS1051	Physics Laboratory	0	0	3	3	1.5
2.	MECH1051	Workshop/Manufacturing Practices	1	0	4	5	3
3.	CSEN1051	Programming for Problem Solving Lab	0	0	4	4	2
		Total Laboratory	**1**	**0**	**11**	**12**	**6.5**
		TOTAL OF SEMESTER WITHOUT HONOURS COURSE				**23**	**17.5**

Honours:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	ECEN1011	Basic Electronics	3	0	0	3	3
2.	ECEN1061	Basic Electronics Lab	0	0	2	2	1
		Total Honours	**3**	**0**	**2**	**5**	**4**
		TOTAL OF SEMESTER WITH HONOURS COURSE				**28**	**21.5**

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Electrical Engineering Department

1st Year 2nd Semester Course Structure

Theory:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	HMTS1202	Business English	2	0	0	2	2
2.	CHEM1001	Chemistry	3	1	0	4	4
3.	MATH1201	Mathematics II	3	1	0	4	4
4.	ELEC1001	Basic Electrical Engineering	3	1	0	4	4
		Total Theory	**11**	**3**	**0**	**14**	**14**

Practical/Sessional

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	HMTS1252	Language Lab	0	0	2	2	1
2.	CHEM1051	Chemistry Lab	0	0	3	3	1.5
3.	ELEC1051	Basic Electrical Engineering Lab	0	0	2	2	1
4.	MECH1052	Engineering Graphics	1	0	4	5	3
		Total Laboratory	**1**	**0**	**11**	**12**	**6.5**
		TOTAL OF SEMESTER WITHOUT HONOURS COURSE				**26**	**20.5**

Honours:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	HMTS1011	Communication for Professionals	3	0	0	3	3
2.	HMTS1061	Professional Communication Lab	0	0	2	2	1
		Total Honours	**3**	**0**	**2**	**5**	**4**
		TOTAL OF SEMESTER WITH HONOURS COURSE				**31**	**24.5**

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Electrical Engineering Department

2nd Year 1st Semester Course Structure

Theory:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	ELEC2101	Circuit Theory	3	1	0	4	4
2.	ELEC2102	Analog & Digital Electronics	4	0	0	4	4
3.	ELEC2103	Electrical & Electronic Measurement	3	0	0	3	3
4.	MECH2106	Mechanics for Engineers	3	0	0	3	3
5.	HMTS2001	Human Values and Professional Ethics	3	0	0	3	3
6.	BIOT2105	Biology	2	0	0	2	2
Total Theory			**18**	**1**	**0**	**19**	**19**

Practical/Sessional:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	ELEC2151	Circuit Theory Lab	0	0	2	2	1
2.	ELEC2152	Analog & Digital Electronics Lab	0	0	2	2	1
3.	ELEC2153	Electrical & Electronic Measurement Lab	0	0	2	2	1
Total Laboratory			**0**	**0**	**6**	**6**	**3**
TOTAL OF SEMESTER						**25**	**22**

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Electrical Engineering Department

2nd Year 2nd Semester Course Structure

Theory:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	MATH2001	Mathematical Methods	3	1	0	4	4
2.	ELEC2201	Electrical Machines-I	3	1	0	4	4
3.	ELEC2202	Signals & Systems	3	0	0	3	3
4.	ELEC2203	Basic Thermal Power Engineering	4	0	0	4	4
5.	ELEC2204	Field Theory	3	0	0	3	3
Mandatory Course							
6.	EVSC2016	Environmental Science	2	0	0	2	0
		Total Theory	**18**	**2**	**0**	**20**	**18**

Practical/Sessional:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	ELEC2251	Electrical Machines-I Lab	0	0	2	2	1
2.	ELEC2252	Signals & Systems Lab	0	0	2	2	1
3.	ELEC2253	Basic Thermal Power Engineering Lab	0	0	2	2	1
		Total Laboratory	**0**	**0**	**6**	**6**	**3**
		TOTAL OF SEMESTER WITHOUT HONOURS COURSE				**26**	**21**

Honours:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	PHYS2211	Physics (EE)-II	4	0	0	4	4
		Total Honours	**4**	**0**	**0**	**4**	**4**
		TOTAL OF SEMESTER WITH HONOURS COURSE				**30**	**25**

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3rd Year 1st Semester Course Structure

Theory:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	ELEC3101	Electrical Machines-II	3	1	0	4	4
2.	ELEC3102	Power System-I	3	1	0	4	4
3.	ELEC3103	Control System	3	1	0	4	4
4.	ELEC3104	Power Electronics	3	0	0	3	3
5.	Professional Elective-I		3	0	0	3	3
Mandatory Course							
6.	INCO3016	Indian Constitution and Civil Society	2	0	0	2	0
		Total Theory	**17**	**3**	**0**	**20**	**18**

Practical/Sessional:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	ELEC3151	Electrical Machines-II Lab	0	0	2	2	1
2.	ELEC3152	Power System-I Lab	0	0	2	2	1
3.	ELEC3153	Control System Lab	0	0	2	2	1
4.	ELEC3154	Power Electronics Lab	0	0	2	2	1
		Total Laboratory	**0**	**0**	**8**	**8**	**4**
		TOTAL OF SEMESTER				**28**	**22**

Professional Elective-I Paper (any one)

5(a). ELEC3141 Digital Signal Processing
5(b). ELEC3142 Computational Electromagnetics

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3rd Year 2nd Semester Course Structure

Theory:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	ELEC3201	Power System-II	3	1	0	4	4
2.	ELEC3202	Microprocessor & Microcontroller	3	0	0	3	3
3.	HMTS3201	Economics for Engineers	3	0	0	3	3
4.	Professional Elective-II		3	0	0	3	3
5.	Open Elective-I		3	0	0	3	3
		Total Theory	**15**	**1**	**0**	**16**	**16**

Practical/Sessional:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	ELEC3251	Power System-II Lab	0	0	2	2	1
2.	ELEC3252	Microprocessor & Microcontroller Lab	0	0	2	2	1
3.	ELEC3260	Electrical Machine Design	0	0	2	2	1
4.	ELEC3293	Term Paper and Seminar	0	0	4	4	2
		Total Laboratory/Sessional	**0**	**0**	**10**	**10**	**5**
		TOTAL OF SEMESTER WITHOUT HONOURS COURSE				**26**	**21**

Honours:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	ELEC3211	Electric Drives	3	0	0	3	3
2.	ELEC3261	Electric Drives Lab.	0	0	2	2	1
		Total Honours	**3**	**0**	**2**	**5**	**4**
		TOTAL OF SEMESTER WITH HONOURS COURSE				**31**	**25**

Professional Elective-II Paper (any one)

4(a). ELEC3241 Illumination Engineering
4(b). ELEC3242 Electrical Machine Dynamics

Open Electives-I Paper (any one)

5(a).CSEN3221 Fundamentals of RDBMS
5(b).ECEN3222 Designing with Processors and Controllers
5(c).ECEN3223 Analog and Digital Communication
5(d).CHEN3221 Materials for Engineering Applications
5(e).CHEN3222 Industrial Safety and Hazards
5(f).CIVL3221 Project Planning and Management
5(g).AEIE3222 Fundamentals of Electronic Measurements

Open Elective-I Paper to be offered by Dept. of EE

ELEC3221 Fundamentals of Circuit Theory

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4th Year 1st Semester Course Structure

Theory:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	HMTS4101	Principles of Management	3	0	0	3	3
2.	Professional Elective-III		3	0	0	3	3
3.	Open Elective-II		3	0	0	3	3
4.	Open Elective-III		3	0	0	3	3
		Total Theory	**12**	**0**	**0**	**12**	**12**

Practical/ Sessional:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	ELEC4191	Industrial Training Evaluation	0	0	0	0	2
2.	ELEC4195	Project Stage-I	0	0	8	8	4
		Total Practical	**0**	**0**	**8**	**8**	**6**
TOTAL OF SEMESTER WITHOUT HONOURS COURSE						**20**	**18**

Honours:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	ELEC4111	Transducers & Sensors	4	0	0	4	4
		Total Honours	**4**	**0**	**0**	**4**	**4**
TOTAL OF SEMESTER WITH HONOURS COURSE						**24**	**22**

Professional Elective-III Paper (any one)

2(a). ELEC4131 Advanced Power System
2(b).ELEC4132 Advanced Control System

Open Elective-II Paper (any one)

3(a). AEIE4121 Instrumentation and Telemetry
3(b). INFO4121 Fundamentals of Cloud Computing
3(c). ECEN4121 Software Defined Radio
3(d). ECEN4122 Error Control Coding
3(e).CHEN4121 Industrial Total Quality Management
3(f).CSEN4121 Fundamentals of Operating Systems

Open Elective-III Paper (any one)

4(a). CHEN4123 Statistical Methods in Design of Experiments
4(b). AEIE4126 Optical Instrumentation
4(c). AEIE4127 Introduction to Embedded System
4(d).CIVL4123 Estimation and Valuation
4(e).CSEN4126 Intelligent Web and Big Data
4(f).ECEN4127 Introduction to VLSI Design

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Open Elective-II Paper to be offered by Dept. of EE

ELEC4121 Automatic Control System

Open Elective-III Paper to be offered by Dept. of EE

ELEC4126 Principles of Electrical Machines

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4th Year 2nd Semester Course Structure

Theory:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	Professional Elective-IV		3	0	0	3	3
2.	Professional Elective-V		3	0	0	3	3
3.	Open Elective-IV		3	0	0	3	3
		Total Theory	**9**	**0**	**0**	**9**	**9**

Practical/ Sessional:

Sl. No.	Code	Paper	Contact periods per week			Total Contact Hrs	Credits
			L	T	P		
1.	ELEC4295	Project Stage-II	0	0	16	16	8
2.	ELEC4297	Comprehensive Viva Voce	0	0	0	0	1
		Total Sessional	**0**	**0**	**16**	**16**	**9**
		TOTAL OF SEMESTER:				**25**	**18**

Professional Elective-IV Paper (any one)

1(a). ELEC4231 High Voltage Engineering
1(b).ELEC4232 Process Control

Professional Elective-V Paper (any one)

2(a). ELEC4241 Electronic Instrumentation
2(b). ELEC4242 Control System Design

Open Elective-IV Paper (any one)

3(a).CHEN 4221 Nanotechnology
3(b).CHEN 4222 Introduction to Solar and Wind Technology
3(c).ECEN4221 Cellular and Mobile communication
3(d).ECEN4222 Optical Fiber Communication
3(e).MECH 4221 Quantitative Decision Making
3(f).BIOT4221 Computational Biology
3(g).BIOT4222 Non-conventional Energy
3(h).AEIE4221 Process Instrumentation
3(i).AEIE4222 Medical Instrumentation
3(j).CSEN4221 Basics of Mobile Computing
3(k).CIVL 4222 Introduction to Finite Element Methods

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Open Elective-IV Paper to be offered by Dept. of EE

ELEC4221 Applied Illumination Engineering

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Breakup of Credits

Sl. No.	Category	AICTE Suggested	EE Department HITK
1	Humanities and Social Sciences including Management courses	**12**	**12**
2.	Basic Science courses	**25**	**25**
3.	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	**24**	**29**
4.	Professional core courses	**48**	**50**
5.	Professional Elective courses relevant to chosen specialization/branch	**18**	**15**
6.	Open subjects – Electives from other technical and /or emerging subjects	**18**	**12**
7.	Project work, seminar and internship in industry or elsewhere	**15**	**17**
8.	Mandatory Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Traditional Knowledge]	**0**	**0**
	Total	**160**	**160**

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Honours Credit Chart

Sl No.	Semester	Paper Code	Paper Name	Contact hrs/wk				Credit Points
				L	T	P	Total	
01.	1st	ECEN1011	Basic Electronics	3	0	0	3	3
		ECEN 1061	Basic Electronics Lab	0	0	2	2	1
02.	2nd	HMTS 1011	Communication for Professionals	3	0	0	3	3
		HMTS1061	Professional Communication Lab	0	0	2	2	1
03.	4th	PHYS2211	Physics (EE)-II	4	0	0	4	4
04.	6th	ELEC3211	Electric Drives	3	0	0	3	3
		ELEC3261	Electric Drives Lab.	0	0	2	2	1
05.	7th	ELEC4111	Transducers & Sensors	4	0	0	4	4
							Total	**20**

Definition of Credit (as per AICTE):

- 1 Hour Lecture (L) per Week = 1 Credit
- 1 Hour Tutorial (T) per Week = 1 Credit
- 1 Hour Practical (P) per Week = 0.5 Credits
- 2 Hours Practical (Lab) per Week = 1 Credit

Range of Credits (as per AICTE):

✓ A total of 160 credits will be necessary for a student to be eligible to get B Tech degree.

✓ A student will be eligible to get B Tech degree with Honours if he/she completes an additional 20 credits. These could be acquired through various Honours Courses offered by the respective departments.

✓ A part or all of the above additional credits may also be acquired through MOOCs. Any student completing any course through MOOCs will have to submit an appropriate certificate to earn the corresponding credit.

✓ For any additional information, the student may contact the concerned HODs.

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Electrical Engineering Department

Swayam/MOOCs courses recommended to the students of EE Dept.

Code	Name	Credit Points	Corresponding Online Course	Offered by	PLATFORM
ECEN1011	Basic Electronics	3	Fundamentals of Semiconductor Devices	IISc, Bangalore	NPTEL
ECEN1061	Basic Electronics Lab	1			
HMTS1011	Communication for Professionals	3	Effective Business Communication **AND**	IIM Bangalore	Swayam
HMTS1061	Professional Communication Lab	1	Developing Soft Skills and Personality	IIT, Kanpur	Swayam
ELEC3211	Electric Drives	3	Fundamental of Electric Drives	IIT, Kanpur	NPTEL
ELEC3261	Electric Drives Lab.	1			
ELEC4111	Transducers & Sensors	4	Sensors And Actuators	IISC, Bangalore	NPTEL

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Anandapur, Kolkata – 700107

Department of Information Technology

B. Tech.

Document Release Month & Year: April, 2021

PART- I

Structures of Syllabus

1st Year

1st Semester Syllabus:

Theory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	CHEM1001	Chemistry – I	3	1	0	4	4	Basic Science course
2	MATH1101	Mathematics – I	3	1	0	4	4	Basic Science course
3	ELEC1001	Basic Electrical Engineering	3	1	0	4	4	Engineering Science Course
Total Theory			**9**	**3**	**0**	**12**	**12**	

Laboratory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	CHEM1051	Chemistry – I Lab	0	0	3	3	1.5	Basic Science course
2	ELEC1051	Basic Electrical Engineering Lab	0	0	2	2	1	Engineering Science Course
3	MECH1052	Engineering Graphics & Design Lab	1	0	4	5	3	Engineering Science Course
Total Laboratory			**1**	**0**	**9**	**10**	**5.5**	
Total of Semester without Honours			**10**	**3**	**9**	**22**	**17.5**	
1	HMTS1011	Communication for Professionals	3	0	0	3	3	Honours Course
2	HMTS1061	Professional Communication Lab	0	0	2	2	1	Honours Course
Total of Semester with Honours			**13**	**3**	**11**	**27**	**21.5**	

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2nd Semester Syllabus:

Theory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	MATH1201	Mathematics – II	3	1	0	4	4	Basic Science course
2	PHYS1001	Physics – I	3	1	0	4	4	Basic Science course
3	CSEN1001	Programming for Problem Solving	3	0	0	3	3	Engineering Science Course
4	HMTS1202	Business English	2	0	0	2	2	Humanities & Social Sciences including Management
Total Theory			**11**	**2**	**0**	**13**	**13**	

Laboratory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	PHYS1051	Physics – I Lab	0	0	3	3	1.5	Basic Science course
2	CSEN1051	Programming for Problem Solving Lab	0	0	4	4	2	Engineering Science Course
3	MECH1051	Workshop/ Manufacturing Practices Lab	1	0	4	5	3	Engineering Science Course
4	HMTS1252	Language Lab	0	0	2	2	1	Humanities & Social Sciences including Management
Total Laboratory			**1**	**0**	**13**	**14**	**7.5**	
Total of Semester without Honours			**12**	**2**	**13**	**27**	**20.5**	
1	ECEN1011	Basic Electronics	3	0	0	3	3	Honours Course
2	ECEN1061	Basic Electronics Lab	0	0	2	2	1	Honours Course
Total of Semester with Honours			**15**	**2**	**15**	**32**	**24.5**	

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2nd Year

3rd Semester Syllabus:

Theory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	CSEN2102	Discrete Mathematics	4	0	0	4	4	Engineering Science Course
2	ECEN2101	Analog Circuits	3	0	0	3	3	Engineering Science Course
3	ECEN2002	Digital Systems Design	3	0	0	3	3	Engineering Science Course
4	HMTS2001	Human Values And Professional Ethics	3	0	0	3	3	Humanities & Social Sciences including Management Courses
5	INFO2101	Fundamentals of Data Structure & Algorithms	3	1	0	4	4	Professional Core Courses
6	EVSC2016	Environmental Sciences	2	0	0	2	0	Mandatory Courses
Total Theory			**18**	**1**	**0**	**19**	**17**	

Laboratory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	ECEN2151	Analog Circuits Lab	0	0	2	2	1	Engineering Science Course
2	ECEN2052	Digital Systems Design Lab	0	0	2	2	1	Engineering Science Course
3	INFO2151	Fundamentals of Data structure & Algorithms Lab	0	0	3	3	1.5	Professional Core Courses
Total Laboratory			**0**	**0**	**7**	**7**	**3.5**	
Total of Semester without Honours			**18**	**1**	**7**	**26**	**20.5**	
1	INFO2111	Information Theory & Coding	4	0	0	4	4	Honours Course
Total of Semester with Honours			**22**	**1**	**7**	**30**	**24.5**	

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4th Semester Syllabus:

Theory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	MATH2201	Algebraic Structures	3	1	0	4	4	Basic Science course
2	INFO2201	Formal Language & Automata Theory	3	0	0	3	3	Professional Core Courses
3	INFO2202	Object Oriented Programming	3	0	0	3	3	Professional Core Courses
4	INFO2203	Computer Organization and Architecture	4	0	0	4	4	Professional Core Courses
5	INFO2204	Database Management Systems	4	0	0	4	4	Professional Core Courses
Total Theory			**17**	**1**	**0**	**18**	**18**	

Laboratory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	INFO2252	Object Oriented Programming Lab	0	0	3	3	1.5	Professional Core Courses
2	INFO2253	Computer Organization & Architecture Lab	0	0	3	3	1.5	Professional Core Courses
3	INFO2254	Database Management Systems Lab	0	0	3	3	1.5	Professional Core Courses
Total Laboratory			**0**	**0**	**9**	**9**	**4.5**	
Total of Semester			**17**	**1**	**9**	**27**	**22.5**	

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3rd Year

5th Semester Syllabus:

Theory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	INFO3101	Advanced Java & Web Technology	3	0	0	3	3	Professional Core Courses
2	INFO3102	Operating Systems	3	0	0	3	3	Professional Core Courses
3	INFO3103	Design & Analysis of Algorithms	4	0	0	4	4	Professional Core Courses
4	INFO3104	Software Engineering	3	0	0	3	3	Professional Core Courses
5	INFO3131/ INFO3132/ INFO3133	Elective I	3	0	0	3	3	Professional Elective Courses
6	INCO3016	Indian Constitution And Civil Society	2	0	0	2	0	Mandatory Courses
Total Theory			**18**	**0**	**0**	**18**	**16**	

Laboratory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	INFO3151	Advanced Java & Web Technology Lab	0	0	4	4	2	Professional Core Courses
2	INFO3152	Operating Systems Lab	0	0	3	3	1.5	Professional Core Courses
3	INFO3153	Design & Analysis of Algorithms Lab	0	0	4	4	2	Professional Core Courses
4	INFO3154	Software Engineering Lab	0	0	3	3	1.5	Professional Core Courses
Total Laboratory			**0**	**0**	**14**	**14**	**7**	
Total of Semester			**18**	**0**	**14**	**32**	**23**	

Elective I (5th Sem)

1. INFO3131 - Computer Graphics
2. INFO3132 - Distributed Database Management Systems
3. INFO3133 - Compiler Design

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6th Semester Syllabus:

Theory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	HMTS3201	Economics For Engineers	3	0	0	3	3	Humanities & Social Sciences including Management Courses
2	INFO3201	Computer Networks	3	0	0	3	3	Professional Core Courses
	INFO3202	Data Analytics	3	0	0	3	3	Professional Core Courses
3	INFO3231/ INFO3232/ INFO3233	Elective II	3	0	0	3	3	Professional Elective courses
4	MATH3223/ ELEC3221/ ECEN3222	Open Elective I	3	0	0	3	3	Open Elective courses
Total Theory			**15**	**0**	**0**	**15**	**15**	

Laboratory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	INFO3251	Computer Networks Lab	0	0	3	3	1.5	Professional Core Courses
2	INFO3252	Data Analytics Lab	0	0	3	3	1.5	Professional Core Courses
Total Laboratory			**0**	**0**	**6**	**6**	**3**	

Sessional								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	INFO3293	Term paper and Seminar	0	0	4	4	2	Seminar
Total Sessional			**0**	**0**	**4**	**4**	**2**	
Total of Semester without Honours			**15**	**0**	**10**	**25**	**20**	
1	INFO3211	Digital Image Processing	3	0	0	3	3	Honours Course
2	INF03261	Digital Image Processing Lab	0	0	2	2	1	Honours Course
Total of Semester with Honours			**18**	**0**	**12**	**30**	**24**	

Elective II(6th Sem)	**Open Elective I(6th Sem)**
1. INFO3231 – Multimedia Technology & Applications 2. INFO3232 – E-Commerce & ERP 3. INFO3233 – Cryptography & Network Security	1. MATH3223 – Scientific Computing 2. ELEC3221 – Fundamentals of Circuit Theory 3. ECEN3222 – Designing with Processors and Controllers

** Open Elective I offered by IT Department is: **Introduction to E-Commerce(INFO3221)**

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4th Year

7th Semester Syllabus:

Theory								
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	Type of Paper
			L	T	P	Total		
1	HMTS4101	Principles of Management	3	0	0	3	3	Humanities & Social Sciences including Management Courses
2	INFO4131/ INFO4132/ INFO4133/	Elective III	3	0	0	3	3	Professional Elective Courses
3	MATH4121/ AEIE4122/ ELEC4121/ ELEC4126/ ECEN4121/ ECEN4122/ ECEN4123	Open Elective II	3	0	0	3	3	Open Elective Courses
4	ECEN4124/ ECEN4125/ AEIE4127/ BIOT4124/ BIOT4125/ MATH4122	Open Elective III	3	0	0	3	3	Open Elective Courses
Total Theory			**12**	**0**	**0**	**12**	**12**	

Sessional								
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	Type of Paper
			L	T	P	Total		
1	INFO4191	Industrial Training/ Internship	-	-	-	-	2	Internship in industry or Elsewhere
2	INFO4195	Project I	0	0	8	8	4	Project work, internship in industry or Elsewhere
Total Sessional			**0**	**0**	**8**	**8**	**6**	
Total of Semester without Honours			**12**	**0**	**8**	**20**	**18**	
1	INFO4111	Artificial Intelligence	4	0	0	4	4	Honours Course
Total of Semester with Honours			**16**	**0**	**8**	**24**	**22**	

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Elective III(7th Sem) 1. INFO4131 – Introduction to Internet of Things 2. INFO4132 – Mobile Computing 3. INFO4133 – Real Time Systems	**Open Elective II(7th Sem)** 1. MATH4121 – Methods in Optimization 2. AEIE4122 - Linear Control Systems and Applications 3. ELEC4121 – Automatic Control System 4. ELEC4126 - Principles of Electrical Machines 5. ECEN4121- Software Defined Radio 6. ECEN4122 - Introduction to Machine Learning 7. ECEN4123 - Error Control Coding for Secure Data Transmission
	Open Elective III(7th Sem) 1. ECEN4124 – Principles of Radar 2. ECEN4125 - Ad Hoc Wireless Networks 3. AEIE4127 – Introduction to Embedded System 4. BIOT4124 - Bio Sensor 5. BIOT4125 - Bioploymer 6. MATH4122 - Advanced Linear Algebra

** Open Elective III offered by IT Department is: **Fundamentals of Cloud Computing (INFO4121)**

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8th Semester Syllabus:

Theory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	INFO4231/ INFO4232/ INFO4233	Elective IV	3	0	0	3	3	Professional Elective courses
2	INFO4241/ INFO4242/ INFO4243	Elective V	3	0	0	3	3	Professional Elective courses
3	AEIE4222/ ELEC4221/ ECEN4221/ ECEN4222/ ECEN4223/ BIOT4221/ BIOT4222/ BIOT4223	Open Elective IV	3	0	0	3	3	Open Elective Courses
Total Theory			**9**	**0**	**0**	**9**	**9**	

Sessional								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	INFO4295	Project II	0	0	16	16	8	Project work, internship in industry or Elsewhere
2	INFO4297	Comprehensive Viva Voce	-	-	-	-	1	
Total Sessional			**0**	**0**	**16**	**16**	**9**	
Total of Semester			**9**	**0**	**16**	**25**	**18**	

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Elective IV(8th Sem) 1. INFO4231 – Fundamentals of Blockchain Technology. 2. INFO4232 –Internet Technology 3. INFO4233 –Distributed Computing	**Open Elective IV(8th Sem)** 1. AEIE4222 – Medical Instrumentation 2. ELEC4221– Applied Illumination Engineering 3. ECEN4221– Low Power High Performance Digital Vlsi Circuit Design 4. ECEN4222 – Cellular and Mobile Communication 5. ECEN4223 – Optical Fiber Communication 6. BIOT4221– Computational Biology 7. BIOT4222– Non-conventional Energy 8. BIOT4223 – Biology for Engineers
Elective V(8th Sem) 1. INFO4241 – Soft Computing 2. INFO4242 – Cloud Computing 3. INFO4243 – Pattern Recognition	

** Open Elective IV offered by IT Department is: **Fundamentals of Cryptography (INFO4221)**

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Credit points distribution

Sl. No	Category	As per AICTE	**IT**
1	Humanities and Social Sciences including Management courses	12*	**12**
2	Basic Science courses	25*	**23**
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	24*	**28.5**
4	Professional core courses	48*	**52.5**
5	Professional Elective courses relevant to chosen specialization/branch	18*	**15**
6	Open subjects – Electives from other technical and /or emerging subjects	18*	**12**
7	Project work, seminar and internship in industry or Elsewhere	15*	**17**
8	Honours Course	-	**20**
9	Mandatory Courses [Environmental Sciences, Induction Program, Indian Constitution, Essence of Indian Traditional Knowledge]	(non-credit)	**2 non credit subjects**
	Total	160	**180**

*Minor variation is allowed as per need of the respective disciplines.

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Honours Credit Chart

Sl. No.	Semester	Paper Code	Course Title	Contact Hours / Week			Credit Points
				L	T	P	
1.	1st	HMTS1011	Communication for Professionals	3	0	0	3
2.		HMTS1061	Professional Communication Lab	0	0	2	1
3.	2nd	ECEN1011	Basic Electronics	3	0	0	3
4.		ECEN1061	Basic Electronics Lab	0	0	2	1
5.	3rd	INFO2111	Information Theory & Coding	4	0	0	4
6.	4th						
7.	5th						
8.	6th	INFO3211	Digital Image Processing	3	0	0	3
9.	6th	INFO3261	Digital Image Processing Lab	0	0	2	1
10.	7th	INFO4111	Artificial Intelligence	4	0	0	4
	Total						20

Definition of Credit (as per AICTE):

- 1 Hour Lecture (L) per Week = 1 Credit
- 1 Hour Tutorial (T) per Week = 1 Credit
- 1 Hour Practical (P) per Week = 0.5 Credits
- 2 Hours Practical (Lab) per Week = 1 Credit

Range of Credits (as per AICTE):

- ✓ A total of 160 credits will be necessary for a student to be eligible to get B Tech degree.
- ✓ A student will be eligible to get B Tech degree with Honours if he/she completes an additional 20 credits. These could be acquired through various Honours Courses offered by the respective departments.
- ✓ A part or all of the above additional credits may also be acquired through MOOCs. Any student completing any course through MOOC will have to submit an appropriate certificate to earn the corresponding credit.
- ✓ For any additional information, the student may contact the concerned HODs.

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Swayam/MOOCs courses recommended to the students of IT Department

Code	Name	Credit Points	Corresponding Online Course	Offered by	PLATFORM
ECEN1011	Basic Electronics	3	Fundamentals of Semiconductor Devices	IISc Bangalore	NPTEL
ECEN 1061	Basic Electronics Lab	1			
HMTS1011	Communication for Professionals	3	Effective Business Communication	IIM Bangalore	Swayam
HMTS1061	Professional Communication Lab	1	Developing Soft Skills and Personality	IIT Kanpur	Swayam
INFO2111	Information Theory And Coding	4	Information Theory	IISC Bangalore	Swayam
INFO3211	Digital Image Processing	3	Digital Image Processing	IIT Kharagpur	NPTEL
INFO3261	Digital Image Processing Lab	1	Digital Image Processing Lab		
INFO4111	Artificial Intelligence	4	Fundamentals of Artificial Intelligence	IIT Guwahati	NPTEL

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MECHANICAL ENGINEERING

B. TECH PROGRAMME

JULY 2021

Part-I

Course Structure

AS PER NEW AICTE MODEL CURRICULUM
Department of Mechanical Engineering

1st Year 1st Semester Curriculum:

Theory								
Sl. No	**Category**	**Course Code**	**Course Title**	**Contact Hrs per Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Basic Science Courses	PHYS1001	Physics-I	3	1	0	4	4
2	Basic Science Courses	MATH 1101	Mathematics-I	3	1	0	4	4
3	Engineering Science Courses	CSEN 1001	Programming for Problem Solving	3	0	0	3	3
Total Theory				**9**	**2**	**0**	**11**	**11**

Laboratory/Practical								
				L	**T**	**P**	**Total**	
1	Basic Science Courses	PHYS 1051	Physics-I Lab	0	0	3	3	1.5
2	Engineering Science Courses	CSEN 1051	Programming for Problem Solving Lab	0	0	4	4	2
3	Engineering Science Courses	MECH 1051	Workshop/Manufacturing Practices	1	0	4	5	3
Total Practical				**1**	**0**	**11**	**12**	**6.5**
Total Semester				**10**	**2**	**11**	**23**	**17.5**

Honours Course								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Engineering Science Courses	ECEN 1011	Basic Electronics	3	0	0	3	3
2	Engineering Science Courses	ECEN 1061	Basic Electronics Lab	0	0	2	2	1
Total Semester with Honours				**13**	**2**	**13**	**28**	**21.5**

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1st Year 2nd Semester Curriculum:

Theory								
Sl. No	**Category**	**Course Code**	**Course Title**	**Contact Hrs per Week**				**Credit Point**
				L	**T**	**P**	**Total**	
1	Humanities	HMTS 1202	Business English	2	0	0	2	2
2	Basic Science Courses	CHEM 1001	Chemistry-I	3	1	0	4	4
3	Basic Science Courses	MATH 1201	Mathematics-II	3	1	0	4	4
4	Engineering Science Courses	ELEC 1001	Basic Electrical Engineering	3	1	0	4	4
Total Theory				**11**	**3**	**0**	**14**	**14**

Laboratory/Practical								
1	Humanities	HMTS 1252	Language Lab	0	0	2	2	1
2	Basic Science Courses	CHEM 1051	Chemistry-I Lab	0	0	3	3	1.5
3	Engineering Science Courses	ELEC 1051	Basic Electrical Engineering Lab	0	0	2	2	1
4	Engineering Science Courses	MECH 1052	Engineering Graphics & Design	1	0	4	5	3
Total Practical				**1**	**0**	**11**	**12**	**6.5**
Total Semester				**12**	**3**	**11**	**26**	**20.5**

Honours Course								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Humanities	HMTS 1011	Communication for Professionals	3	0	0	3	3
2	Humanities	HMTS 1061	Professional Communication Lab	0	0	2	2	1
Total Semester with Honours				**15**	**3**	**13**	**31**	**24.5**

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2nd Year 1st Semester Curriculum:

Theory								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Basic Science Courses	PHYS 2101	Physics – II	3	1	0	4	4
2	Basic Science Courses	MATH 2001	Mathematical Methods	3	1	0	4	4
3	Engineering Science Courses	BIOT 2105	Biology	2	0	0	2	2
4	Engineering Science Courses	MECH 2101	Engineering Mechanics	3	0	0	3	3
5	Professional Core Courses	MECH 2102	Fluid Mechanics& Hydraulics	3	0	0	3	3
6	Humanities	HMTS 2001	Human Values & Professional Ethics	3	0	0	3	3
7	Mandatory Course	EVSC 2016	Environmental Science	2	0	0	2	0
Total Theory				**19**	**2**	**0**	**21**	**19**

Laboratory/Practical								
1	Professional Core Courses	MECH 2156	Machine Drawing-I	0	0	3	3	1.5
2	Professional Core Courses	MECH 2157	Workshop Practice-II	0	0	3	3	1.5
Total Practical				**0**	**0**	**6**	**6**	**3**
Total Semester				**19**	**2**	**6**	**27**	**22**

List of Paper offered by ME Department for other departments(EE & CHE):

1. MECH 2106 : Mechanics for Engineers

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2nd Year 2nd Semester Curriculum:

Theory								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Professional Core Courses	MECH 2201	Strength of Materials	3	1	0	4	4
2	Professional Core Courses	MECH 2202	Fluid Machinery	3	0	0	3	3
3	Engineering Science Courses	MECH 2203	Engineering Thermodynamics	3	1	0	4	4
4	Professional Core Courses	MECH 2204	Manufacturing Processes	3	0	0	3	3
5	Professional Core Courses	MECH 2205	Kinematics of Machines	3	0	0	3	3
Total Theory				**15**	**2**	**0**	**17**	**17**
Laboratory/Practical								
1	Professional Core Courses	MECH 2251	Applied Mechanics Lab	0	0	2	2	1
2	Professional Core Courses	MECH 2252	Fluid Mechanics & Hydraulic Machines Lab	0	0	3	3	1.5
3	Professional Core Courses	MECH 2256	Machine Drawing-II	0	0	3	3	1.5
Total Practical				**0**	**0**	**8**	**8**	**4**
Total of Semester				**15**	**2**	**8**	**25**	**21**

Honours Course								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Professional Core Courses	MECH 2211	Mechanical Measurement and Instrumentation	3	0	0	3	3
2	Professional Core Courses	MECH 2261	Mechanical Measurement andInstrumentation Lab	0	0	2	2	1
Total Semester with Honours				**18**	**2**	**10**	**30**	**25**

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3rd Year 1st Semester Curriculum:

Theory								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Professional Core Courses	MECH 3101	Machine Design-I	3	0	0	3	3
2	Professional Core Courses	MECH 3102	Heat Transfer	4	0	0	4	4
3	Professional Core Courses	MECH 3103	Engineering Materials	3	0	0	3	3
4	Professional Core Courses	MECH 3104	Machining & Machine Tools	3	0	0	3	3
5	Professional Core Courses	MECH 3105	Dynamics of Machines	3	0	0	3	3
6	Professional Elective Courses	MECH 3131-3134	Professional Elective - I	3	0	0	3	3
7	Mandatory Courses	INCO 3016	Indian Constitution and Civil Society	2	-	-	2	0
Total Theory				**21**	**0**	**0**	**21**	**19**
Laboratory/ Practical								
1	Professional Core Courses	MECH 3152	Applied Thermodynamics & Heat Transfer Lab	0	0	3	3	1.5
2	Professional Core Courses	MECH 3155	Dynamics of Machines Lab	0	0	3	3	1.5
3	Professional Elective Courses	MECH 3181-3184	Professional Elective - I Lab	0	0	3	3	1.5
Total Practical				**0**	**0**	**9**	**9**	**4.5**
Total of Semester				**21**	**0**	**9**	**30**	**23.5**

List of Professional Elective I:

1. MECH 3131 : Fluid Power Control
2. MECH 3132 : Refrigeration & Air Conditioning
3. MECH 3133 : Electrical Machines
4. MECH 3134 : Data Structure & RDBMS

List of Professional Elective I Lab:

1. MECH 3181 : Fluid Power Control Lab
2. MECH 3182 : Refrigeration & Air Conditioning Lab
3. MECH 3183 : Electrical Machines Lab
4. MECH 3184 : RDBMS Lab

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3rd Year 2nd Semester Curriculum:

Theory								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Humanities	HMTS 3201	Economics for Engineers	3	0	0	3	3
2	Professional Core Courses	MECH 3201	Machine Design- II	3	0	0	3	3
3	Professional Elective Courses	MECH 3231-3233	Professional Elective - II	3	0	0	3	3
4	Professional Elective Courses	MECH 3236-3239	Professional Elective - III	3	0	0	3	3
5	Open Elective Courses		Open Elective-I	3	0	0	3	3
Total Theory				**15**	**0**	**0**	**15**	**15**
Laboratory/ Practical								
1	Professional Core Courses	MECH 3256	Machining & Machine Tools Lab	0	0	3	3	1.5
2	Professional Elective Courses	MECH 3281-3283	Professional Elective –II Lab	0	0	2	2	1
3	Seminar	MECH 3293	Seminar & Term Thesis	0	0	4	4	2
Total Practical				**0**	**0**	**9**	**9**	**4.5**
Total of Semester				**15**	**0**	**9**	**24**	**19.5**
Honours Course								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Professional Core Courses	MECH 3211	IC Engine	3	0	0	3	3
2	Professional Core Courses	MECH 3261	IC Engine Lab	0	0	2	2	1
Total Semester with Honours				**18**	**0**	**11**	**29**	**23.5**

List of Professional Elective – II			List of Professional Elective Lab – II		
Sl.No.	**Paper Code**	**Paper Name**	**Sl.No.**	**Paper Code**	**Paper Name**
1	MECH 3231	Finite Element Method	**1**	MECH 3281	Finite Element Method Lab
2	MECH 3232	Mechatronics & Control systems	**2**	MECH 3282	Mechatronics & Control systems Lab
3	MECH 3233	Advanced Fluid Mechanics	**3**	MECH 3283	Advanced Fluid Mechanics Lab

List of Professional Elective – III		
Sl.No.	**Paper Code**	**Paper Name**
1	MECH 3236	Total Quality Management (TQM)
2	MECH 3237	Turbo Machinery
3	MECH 3238	Aerodynamics
4	MECH 3239	Tool Engineering

List of Open Elective I (Emerging Field**)**
MECH 3221: Computational Fluid Dynamics
MECH 3222: Advanced Welding Technology
MECH 3223: New Product Development
MECH 3224: Industrial Engineering

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4th Year 1st Semester Curriculum:

Theory								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hrs/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Humanities	HMTS 4101	Principles of Management	3	0	0	3	3
2	Professional Elective Courses	MECH 4141-4144	Professional Elective – IV	3	0	0	3	3
3	Open Elective Courses		Open Elective-II (Emerging Field)	3	0	0	3	3
4	Open Elective Courses		Open Elective-III (Emerging Field)	3	0	0	3	3
Total Theory				**12**	**0**	**0**	**12**	**12**
Sessional								
1	Project/ Summer internship	MECH 4191	Industrial Training /Summer internship	-	-	-	-	2
2	Project	MECH 4195	Project - I	0	0	8	8	4
Total Sessional				**0**	**0**	**8**	**8**	**6**
Total of Semester				**12**	**0**	**8**	**20**	**18**

Honours Course								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Professional Core Courses	MECH 4111	Advanced Manufacturing and Automation	3	0	0	3	3
2	Professional Core Courses	MECH 4161	Advanced Manufacturing and Automation Lab	0	0	2	2	1
Total Semester with Honours				**15**	**0**	**10**	**25**	**22**

List of Professional Elective – IV

1. MECH 4141 : Maintenance Engineering
2. MECH 4142 : Materials Handling
3. MECH 4143 : Operations Research
4. MECH 4144 : Automobile Engineering

List of Open Elective- II :Emerging Field (Mech) or other departmental subjects

1. MECH 4121 : CAD/CAM
2. MECH 4122 : Micro and Nano Manufacturing
3. CIVL 4121 : Project Planning and Management
4. AEIE 4121 : Instrumentation and Telemetry

List of Open Elective- III :Emerging Field (Mech) or other departmental subjects

1. MECH 4124 : Renewable Energy Systems
2. MECH 4125 : Industrial Robotics
3. MECH 4126 : Computational Methods in Engineering

List of Free Electives offered by ME Department for other departments:

1. MECH 4127 : Mechanical Handling of Materials
2. MECH 4128 : Engineering Computational Techniques
3. MECH 4129 : Quality Control & Management
4. MECH 4130 : Ecology and Environmental Engineering

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4th Year 2nd Semester Curriculum:

Theory								
Sl. No.	**Category**	**Course Code**	**Course Title**	**Contact Hours/Week**				**Credit Points**
				L	**T**	**P**	**Total**	
1	Professional Elective Courses	MECH 4241-4244	Professional Elective - V	3	0	0	3	3
2	Open Elective Courses		Open Elective-IV (Other departments)	3	0	0	3	3
Total Theory				**6**	**0**	**0**	**6**	**6**
Laboratory/ Practical								
1	Professional Core Courses	MECH 4251	Advanced Manufacturing Lab	0	0	2	2	1
Total Practical				**0**	**0**	**2**	**2**	**1**
Sessional								
1	Professional Core Courses	MECH 4256	Design of an Industrial Product	0	0	4	4	2
2	Project	MECH 4295	Project - II	0	0	16	16	8
3	Comprehensive Viva	MECH 4297	Comprehensive Viva-voce	-	-	-	-	1
Total Sessional				**0**	**0**	**20**	**20**	**11**
Total of Semester				**6**	**0**	**22**	**28**	**18**

List of Professional Elective – V

1. MECH 4241 : Quantity Production Method
2. MECH 4242 : Power Plant Engineering
3. MECH 4243 : Gas Dynamics and Jet Propulsion

List of Open Elective- IV (Other Departments)

1. CIVL 4221 : Building Materials
2. HMTS 4221 : Introduction to Industrial Sociology
3. HMTS 4222 : Elementary Spanish for Beginners
4. AEIE 4221 : Process Instrumentation

List of Free Electives offered by ME Department for other departments:

1. MECH 4221 : Quantitative Decision Making
2. MECH 4222 : Modern Manufacturing Technology

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DISTRIBUTION OF COURSE CREDIT

Honours Papers:

Sl. No.	Semester	Paper Code	Paper Name	Contact hours/week				Credit Points
				L	T	P	Total	
01	1st	ECEN 1011	Basic Electronics	3	0	0	3	3
02	1st	ECEN 1061	Basic Electronics Lab	0	0	2	2	1
03	2nd	HMTS 1011	Communication for Professionals	3	0	0	3	3
04	2nd	HMTS 1061	Professional Communication Lab	0	0	2	2	1
05	4th	MECH 2211	Mechanical Measurement and Instrumentation	3	0	0	3	3
06	4th	MECH 2261	Mechanical Measurement and Instrumentation Lab	0	0	2	2	1
07	6th	MECH 3211	IC Engine	3	0	0	3	3
08	6th	MECH 3261	IC Engine Lab	0	0	2	2	1
09	7th	MECH 4111	Advanced Manufacturing and Automation	3	0	0	3	3
10	7th	MECH 4161	Advanced Manufacturing and Automation Lab	0	0	2	2	1
			Total	**15**	**0**	**10**	**25**	**20**

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Swayam/MOOCs courses recommended to the students of ME Dept.

Sl. No.	Paper Code	Paper Name	Credit Points	Corresponding Online Course	Offered by	Platform
1	ECEN1011	Basic Electronics	3	Fundamentals of Semiconductor Devices	IISc Bangalore	NPTEL
2	ECEN 1061	Basic Electronics Lab	1			
3	HMTS1011	Communication for Professionals	3	Effective Business Communication	IIM Bangalore	Swayam
4	HMTS1061	Professional Communication Lab	1	Developing Soft Skills and Personality	IIT Kanpur	Swayam
5	MECH2211	Mechanical Measurement and Instrumentation	3	Engineering Metrology	IIT Kanpur	Swayam
6	MECH2261	Mechanical Measurement and Instrumentation Lab	1			
7	MECH3211	IC Engines	3	IC Engines and Gas Turbines	IIT Guwahati	NPTEL
8	MECH3261	IC Engines Lab	1			
9	MECH4111	Advanced Manufacturing and Automation	3	Manufacturing Automation	IIT Kanpur	NPTEL
10	MECH4161	Advanced Manufacturing and Automation Lab	1			

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Semester wise Credit Point and contact hours:

Semester	Credit (AICTE)	Credit for Hons	Contact hour	Total Contact hour
1st semester	17.5	4	23	23+5=28
2nd semester	20.5	4	26	26+5=31
3rd semester	22	0	27	27
4th semester	21	4	25	25+5=30
5th semester	23.5	0	30	30
6th semester	19.5	4	24	24+5=29
7th semester	18	4	20	20+5=25
8th semester	18	0	28	28
TOTAL	**160**	**20**	**203**	**228**

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Category of Course Distribution of Credit Points

Sl. No.	Categories	Semesters								Total	Total as per AICTE
		1st	2nd	3rd	4th	5th	6th	7th	8th		
1.	Basic Science Courses	9.5	9.5	8						**27**	**25**
2.	Engineering Science Courses	8	8	5	4					**25**	**24**
3.	Humanities		3	3			3	3		**12**	**12**
4.	Mandatory Courses			0		0				**0**	**0**
5.	Professional Core Courses			6	17	19	4.5		3	**49.5**	**48**
6.	Open Elective Courses						3	6	3	**12**	**18**
7.	Professional Elective Courses					4.5	7	3	3	**17.5**	**18**
8.	Internship/Seminar/Projects/Grand Viva						2	6	9	**17**	**15**
	Total	17.5	20.5	22	21	23.5	19.5	18	18	**160**	**160**
9	Honours Course	4	4		4		4	4		**20**	**As per MAKAUT**
10	Grand Total with Honours	21.5	24.5	22	25	23.5	23.5	22	18	**180**	

Definition of Credit (as per AICTE):

- 1 Hour Lecture (L) per Week = 1 Credit; 1 Hour Tutorial (T) per Week = 1 Credit
- 1 Hour Practical (P) per Week = 0.5 Credit ; 2 Hours Practical (Lab) per Week = 1 Credit

Range of Credit (as per AICTE):

- A total of 160 credits will be necessary for a student to be eligible to get B. Tech. degree.
- A student will be eligible to get B. Tech. degree with Honours if he/she completes an additional 20 credits. These could be acquired through various Honours Course offered by the department.
- A part or all of the above additional credits may also be acquired through MOOCs. Any student completing any course through MOOC will have to submit an appropriate certificate to earn the corresponding credit.
- For any additional information, the student may contact the concerned HOD.

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Department of Computer Applications

3 YEARS MCA PROGRAMME

Document Release Month & Year: May, 2021

PART - I

COURSE STRUCTURE

FIRST YEAR
FIRST SEMESTER

A. Theory							
Sl.	**Code**	**Subject**	**Contacts Periods/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	MCAP1101	Introduction to Programming	3	1	0	4	4
2	MCAP1102	Mathematical Foundations	3	1	0	4	4
3	MCAP1103	Numerical Analysis	3	1	0	4	4
4	HMTS1101	Accounting and Management Control	3	0	0	3	3
5	HMTS1102	Oral and Written Communications	3	0	0	3	3
Total Theory						**18**	**18**
B. Laboratory							
6	MCAP1111	Programming Lab	0	0	4	4	3
7	HMTS1112	Communications Lab	0	0	4	4	3
Total Practical						**8**	**6**
Total of Semester						**26**	**24**

SECONDSEMESTER

A. Theory							
Sl.	**Code**	**Subject**	**Contacts Periods/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	MCAP1201	Computer Organization and Architecture	3	1	0	4	4
2	MCAP1202	Data Structures	3	1	0	4	4
3	MCAP1203	Database Management Systems I	3	1	0	4	4
4	MCAP1204	Information System Analysis Design and Implementation	3	1	0	4	4
5	MCAP1205	Probability and Statistical Computing	3	1	0	4	4
Total Theory						**20**	**20**
B. Laboratory							
6	MCAP1211	Digital Logic and Computer Architecture Lab	0	0	4	4	3
7	MCAP1212	Data Structures Lab	0	0	4	4	3
8	MCAP1213	DBMS I Lab	0	0	4	4	3
Total Practical						**12**	**9**
Total of Semester						**32**	**29**

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SECOND YEAR

THIRD SEMESTER

A. Theory							
Sl.	**Code**	**Subject**	**Contacts Periods/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	MCAP2101	Object Oriented Programming with Java	3	1	0	4	4
2	MCAP2102	Database Management Systems II	3	1	0	4	4
3	MCAP2103	Operating Systems	3	1	0	4	4
4	MCAP2104	Design and Analysis of Algorithms	3	1	0	4	4
5	MCAP2105	Optimization Techniques	3	1	0	4	4
		Total Theory				**20**	**20**
B. Laboratory							
6	MCAP2111	Object Oriented Programming Lab	0	0	4	4	3
7	MCAP2112	DBMS II Lab	0	0	4	4	3
		Total Practical				**8**	**6**
		Total of Semester				**28**	**26**

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FOURTH SEMESTER

A. Theory							
Sl.	**Code**	**Subject**	**Contacts Periods/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	MCAP2201	Computer Communication Networks	3	1	0	4	4
2	MCAP2202	Web Technology	3	1	0	4	4
3	MCAP2203	Artificial Intelligence and Applications	3	1	0	4	4
4	MCAP2250-MCAP2253	Elective I	3	1	0	4	4
	MCAP2250 MCAP2251 MCAP2252 MCAP2253	Soft Computing Mobile Computing Compiler Design Management Support System					
5	MCAP2260-MCAP2264	Elective II	3	1	0	4	4
	MCAP2260 MCAP2261 MCAP2262 MCAP2263 MCAP2264	Advanced UNIX Programming Cloud Computing Cryptography and Network Security Ecommerce and ERP Foundations of Decision Processes					
		Total Theory				**20**	**20**
B. Laboratory							
6	MCAP2211	Computer Network Lab	0	0	4	4	3
7	MCAP2212	Web Technology Lab	0	0	4	4	3
		Total Practical				**8**	**6**
C. Sessional							
8	HMTS2221	Career Development and Management	0	0	3	3	2
		Total Sessional				**3**	**2**
		Total of Semester				**31**	**28**

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THIRD YEAR
FIFTH SEMESTER

A. Theory							
Sl.	**Code**	**Subject**	**Contacts Periods/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	MCAP3101	Software Engineering	3	1	0	4	4
2	MCAP3102	Computer Graphics and Multimedia	3	1	0	4	4
3	MCAP3150-MCAP3153	Elective III	3	0	0	4	4
	MCAP3150 MCAP3151 MCAP3152 MCAP3153	Distributed Database Management Machine Learning Management of Software Projects Blockchain Technology & Applications					
4	MCAP3160-MCAP3163	Elective IV	3	0	0	4	4
	MCAP3160 MCAP3161 MCAP3162 MCAP3163	Image Processing Data Mining & Data Warehousing Managerial Economics Internet of Things					
		Total Theory				**16**	**16**
B. Laboratory							
5	MCAP3111	CASE Tools Lab	0	0	4	4	3
		Total Practical				**4**	**3**
C. Sessional							
6	MCAP3195	Minor Project and Seminar	0	0	12	12	9
		Total Sessional				**12**	**9**
		Total of Semester				**32**	**28**

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SIXTH SEMESTER

A. Sessional							
Sl.	**Code**	**Subject**	**Contacts Periods/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	MCAP3295	Major Project & Seminar	0	0	29	29	24
2	MCAP3296	Comprehensive Viva	0	0	0	0	4
Total Sessional						**0**	**28**
Total Semester						**29**	**28**

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Department of Computer Applications

2 YEARS MCA PROGRAMME

Document Release Month & Year: May, 2021

PART I
COURSE STRUCTURE

BRIDGE COURSE

A. Theory							
Sl.	**Code**	**Subject**	**Contacts Periods/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	MCAP0001	Introduction to Programming	6	0	0	6	0
2	MCAP0002	Digital Logic and Computer Organization	6	0	0	6	0
3	MCAP0003	Fundamentals of Database Systems	6	0	0	6	0
Total Theory						**18**	**0**
B. Laboratory							
4	MCAP0011	Programming Lab	0	0	8	8	0
5	MCAP0012	Digital Logic Lab	0	0	8	8	0
Total Practical						**16**	**0**
Total of Semester						**34**	**0**

Bridge course will be of three weeks duration, to be offered prior to the commencement of 1st semester classes.

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FIRST YEAR

FIRST SEMESTER

A. Theory							
Sl.	**Code**	**Subject**	**Contacts Periods/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	MCAP1101	Object Oriented Programming with Java	3	1	0	4	4
2	MCAP1102	Programming with Python	3	1	0	4	4
3	MCAP1103	Artificial Intelligence	3	0	0	3	3
4	MATH1102	Mathematical Foundations	3	0	0	3	3
5	HMTS1102	Oral andWrittenCommunication	3	0	0	3	3
		Total Theory				**17**	**17**
B. Laboratory							
6	MCAP1111	Java Programming Lab	0	0	4	4	3
7	MCAP1112	Python Programming Lab	0	0	4	4	3
8	HMTS1112	Communication Lab	0	0	4	4	3
		Total Practical				**12**	**9**
		Total of Semester				**29**	**26**

SECOND SEMESTER

A. Theory							
Sl.	**Code**	**Subject**	**Contacts Periods/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	MCAP1201	Data StructuresandAlgorithms	3	1	0	4	4
2	MCAP1202	Computer Communication Networks	3	1	0	4	4
3	MCAP1203	Soft Computing	3	0	0	3	3
4	MCAP1204	Operating Systems	3	0	0	3	3
5	MCAP1205	Information System Analysis andDesign	3	0	0	3	3
		Total Theory				**17**	**17**
B. Laboratory							
6	MCAP1211	Data Structures and Algorithms Lab	0	0	4	4	3
7	MCAP1212	Computer Network Lab	0	0	4	4	3
		Total Practical				**8**	**6**
C. Sessional							
8	HMTS1221	Career Development and Management	0	0	3	3	2
		Total Sessional				**3**	**2**
		Total of Semester				**28**	**25**

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SECOND YEAR

THIRD SEMESTER

A. Theory								
Sl.	**Code**	**Subject**	**Contacts Periods/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	MCAP2101	Database Management Systems	3	1	0	4	4
2	MCAP2102	Web Technology	3	1	0	4	4
3	MATH2102	Introduction to Optimization	3	0	0	3	3
4	MCAP2150-MCAP2153	Elective I	3	0	0	3	3
	MCAP2150 MCAP2151 MCAP2152 MCAP2153	Machine Learning Mobile Computing Ecommerce and ERP Cloud Computing					
5	MCAP2160-MCAP2162, HMTS2163	Elective II	3	0	0	3	3
	MCAP2160 MCAP2161 MCAP2162 HMTS2163	Cryptography and Network Security Automata Theory and Compiler Design Natural Language Processing Managerial Economics					
		Total Theory				**17**	**17**
B. Laboratory							
6	MCAP2111	DBMS Lab	0	0	4	4	3
7	MCAP2112	Web Technology Lab	0	0	4	4	3
		Total Practical				**8**	**6**
C. Sessional							
8	MCAP2195	Minor Project and Seminar	0	0	4	4	3
		Total Sessional				**4**	**3**
		Total of Semester				**29**	**26**

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FOURTH SEMESTER

A. Theory							
Sl.	**Code**	**Subject**	**Contacts Periods/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	MCAP2201	Software Engineering	3	1	0	4	4
2	MCAP2202	Mobile Application Development and Implementation	3	0	0	3	3
3	MCAP2250-MCAP2254	Elective III	3	0	0	3	3
	MCAP2250 MCAP2251 MCAP2252 MCAP2253 MCAP2254	Advanced Database Management Data Mining & KnowledgeDiscovery Secure Software Design and Enterprise Computing Internet of Things Blockchain Technology & Applications					
4	MCAP2260-MCAP2263, MATH2261	Elective IV	3	0	0	3	3
	MCAP2260 MCAP2261 MCAP2262 MCAP2263 MATH 2261	Image Processing Computer Graphics andMultimedia Data Science Software Project Management Probability, Statistics and Queuing Theory					
					Total Theory	**13**	**13**
B. Laboratory							
5	MCAP2211	Software Engineering Lab	0	0	4	4	3
					Total Practical	**4**	**3**
C. Sessional							
6	MCAP2295	Major Project and Seminar	0	0	12	12	9
					Total Sessional	**12**	**9**
					Total of Semester	**29**	**25**

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Heritage Institute of Technology

Applied Electronics & Instrumentation Engineering Department

SYLLABUS FOR M.TECH. PROGRAMME

Release date: June, 2019

PART-I: COURSE STUCTURE

Release date: June, 2019

Heritage Institute of Technology
Department of Applied Electronics & Instrumentation Engineering

M. Tech. in Applied Electronics and Instrumentation Engineering (AEIE)
Course Structure

1st Year 1st Semester Syllabus:

Course Type	Course Code	Course Name	Contact Hrs Per Week				Credit Points
			L	T	P	Total	
Core 1	AEIE5101	Advanced Digital Signals and Systems	3	0	0	3	3
Core 2	AEIE5102	Programming Language for Embedded IOT Systems	3	0	0	3	3
	AEIE5103	Research Methodology and IPR	2	0	0	2	2
Prog. Specific Elective	AEIE5131/ AEIE5132/ AEIE5133	**Elective-I** (1) Micro-Electronic Devices and Circuits (2) Medical Instrumentation (3) Instrumentation and Industrial Automation	3	0	0	3	3
Prog. Specific Elective	AEIE5141/ AEIE5142/ AEIE5143	**Elective-II** (1) Mechatronics (2) Advanced Digital Control System (3) Advanced Optical Instrumentation	3	0	0	3	3
LAB	AEIE5151	Digital Signal Processing LAB	0	0	4	4	2
	AEIE5152	Programming Language LAB	0	0	4	4	2
Aud 1* - Any one subject from the course list	DIMA5116	Disaster Management	2	0	0	2	0
	INCO5117	Constitution of India					
	PDLS5118	Personality Development through Life Enlightenment Skills					
	YOGA5119	Stress Management by Yoga					
	SANS5120	Sanskrit for Technical Knowledge					
		Total	**16**	**0**	**8**	**24**	**18**

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Heritage Institute of Technology
Department of Applied Electronics & Instrumentation Engineering

M. Tech. in Applied Electronics and Instrumentation Engineering (AEIE)
Course Structure

1st Year 2nd Semester Syllabus:

Course Type	Course Code	Course Name	Contact Hrs Per Week				Credit Points
			L	T	P	Total	
Core 3	AEIE5201	Embedded Systems	3	0	0	3	3
Core 4	AEIE5202	Process Control System Design	3	0	0	3	3
Prog. Specific Elective	AEIE5231/ AEIE5232/ AEIE5233/	**Elective-III** (1) Micro Sensor Science and Technology (2) Advanced Power Electronics (3) Instrumental Methods of Analysis	3	0	0	3	3
Prog. Specific Elective	AEIE5241/ AEIE5242/ AEIE5243/	**Elective-IV** (1) Digital Image Processing (2) Statistical and Bio-signal Processing (3) Industrial Internet of Things	3	0	0	3	3
LAB	AEIE5251	Embedded Systems LAB	0	0	4	4	2
	AEIE5252	Process Control System Design LAB	0	0	4	4	2
	AEIE5293	Term Paper and Seminar	0	0	4	4	2
Aud 2		**Audit course 2:** **Any one subject from Elective III or Elective IV**	2	0	0	2	0
		Total	**16**	**0**	**8**	**26**	**18**

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Heritage Institute of Technology
Department of Applied Electronics & Instrumentation Engineering

M. Tech. in Applied Electronics and Instrumentation Engineering (AEIE)
Course Structure

2nd Year 1st Semester Syllabus:

Course Type	Course Code	Course Name	Contact Hrs Per Week				Credit Points
			L	T	P	Total	
Prog. Specific Elective	AEIE6131/ AEIE6132/ AEIE6133 AEIE6134	**Elective-V** (1) Micro-Electromechanical System Design (2) VLSI Technology (3) Robotics Engineering (4) Remote Sensing	3	0	0	3	3
Open Elective* (Any one subject from the course list)	AEIE6121/ AEIE6122/ CSEN6121/ CSEN6122/ MATH6121	**Elective-VI** (1) Biosignal and Biomedical Image Processing (2) Intelligent Control (3) Business Analytics (4) Advanced Artificial Intelligence (5) Optimization Techniques	3	0	0	3	3
Major Project	AEIE6195	Dissertation Phase I	0	0	20	20	10
		Total	**6**	**0**	**20**	**26**	**16**

2nd Year 2nd Semester Syllabus:

Course Type	Course Code	Course Name	Contact Hrs Per Week				Credit Points
			L	T	P	Total	
Major Project	AEIE6295	Dissertation Phase II	-	-	28	28	14
	AEIE6297	Comprehensive Viva-Voce	-	-	-	-	2
Total			**-**	**-**	**28**	**28**	**16**

Total Course Credit = 68

*The detail syllabus of Open Elective subjects are available from Open Electives Link

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BIOTECHNOLOGY

M.TECH. PROGRAMME

With effect from July 2018

M.Tech. Biotechnology Curriculum

1st yr 1st semester

Code	Field	Course Title	Scheme of studies per week			Credits
			L	T	P	
A		**Theory**				
BIOT5101	Prof. Core	Advanced Genetic Engineering	3	0	0	3
BIOT5102	Prof. Core	Physicochemical Techniques in Biotechnology	3	0	0	3
BIOT5103		Research Methodology, Bioethics and IPR	2	0	0	2
BIOT5131	Prof. Elective 1	Advanced Enzyme Technology	3	0	0	3
BIOT5132		Nanotechnology				
BIOT5141	Prof. Elective 2	Agricultural Biotechnology	3	0	0	3
BIOT5142		Advanced Environmental Biotechnology				
DIMA5116	Audit Course-1	Disaster Management	2	0	0	0
INCO5117		Constitution of India				
PDLS5118		Personality Development through Life Enlightenment Skills				
YOGA5119		Stress Management by Yoga				
		Total Theory	**16**	**0**	**0**	**14**
B		**Practical**				
BIOT5151	Prof. Core	Advanced Genetic Engineering Lab	0	0	4	2
BIOT5152	Prof. Core	Physicochemical Techniques Lab	0	0	4	2
		Total Practical	**0**	**0**	**8**	**4**
		SEMESTER TOTAL	**16**	**0**	**8**	**18**

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1st yr 2nd semester

Code	Field	Course Title	Scheme of studies per week			Credits
			L	T	P	
A		**Theory**				
BIOT5201	Prof. Core	Advanced Bioinformatics	3	0	0	3
BIOT5202	Prof. Core	Advances in Bioreactor Design, Development and Scale Up	3	0	0	3
BIOT5231	Prof. Elective 3	Advanced Cell biology and Immunotechnology	3	0	0	3
BIOT5232		Genomics and Proteomics				
BIOT5241	Prof. Elective 4	Bioprocess Technology	3	0	0	3
BIOT5242		Advanced Food Biotechnology				
	Audit Course-2	Any one subject from Prof. Elective 3 or Prof. Elective 4 bucket*	3	0	0	0
		Total Theory	**15**	**0**	**0**	**12**
B		**Practical**	**15**	**0**	**0**	**12**
BIOT5251	Prof. Core	Advanced Bioinformatics Lab	0	0	4	2
BIOT5252	Prof. Core	Bioreactor Design and Scale Up Lab	0	0	4	2
		Total Practical	**0**	**0**	**8**	**4**
C		**Sessional**				4
BIOT5293	Seminar	Term Paper and Seminar	0	0	4	2
		Total Sessional	**0**	**0**	**4**	**2**
		SEMESTER TOTAL	**15**	**0**	**12**	**18**

*** Total 3 electives have to be taken with at least one from each bucket; one of them will be treated as the non-credit mandatory course**

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2nd yr 1st semester

Course Code	Field	Course Title	Scheme of studies per week			Credits
			L	T	P	
A		**Theory**				
BIOT6131	Prof. Elective 5	Modelling and Simulation in Bioprocess	3	0	0	3
BIOT6132		Biopharmaceuticals				
BIOT6133		Downstream Processing				
BIOT6121	Open Elective*	Engineering Mathematics and Biostatistics	3	0	0	3
AEIE6122		Intelligent Control				
CSEN6121		Business Analytics				
MATH6121		Optimization Techniques				
REEN6122		Safety and Hazards in Energy Industry				
		Total Theory	**6**	**0**	**0**	**6**
B		**Sessional**				
BIOT6195	Project	Dissertation-I /Industrial Project	0	0	20	10
		Total Sessional	**0**	**0**	**20**	**10**
		SEMESTER TOTAL	**0**	**0**	**20**	**16**

*For detailed syllabus please refer to M. Tech. 3rd Sem Open Electives document

2nd yr 2nd semester

Course Code	Field	Course Title	Scheme of studies per week			Credits
			L	T	P	
A		**Sessional**				
BIOT6295	Project	Dissertation II	0	0	28	14
BIOT6297	Viva	Comprehensive viva voce	0	0	0	2
		Total Sessional	**0**	**0**	**28**	**16**
		SEMESTER TOTAL	**0**	**0**	**28**	**16**

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Computer Science and Engineering

M. Tech Course

July, 2018

(Last updated: June 2019)

PART I: COURSE STRUCTURE

First Year
Semester I

A. Theory

Sl.	Course Number	Subject	Scheme Of Studies Per Week			Total	Credits
			L	T	P		
1	CSEN5101	Advanced Data Structures	3	0	0	3	3
2	CSEN5102	Research Methodology and IPR	2	0	0	2	2
3	MATH5101	Advanced Discrete Mathematics and Statistical Methods	3	0	0	3	3
4	CSEN5131 – CSEN5140	Professional Elective I	3	0	0	3	3
	CSEN5131 CSEN5132 CSEN5133 CSEN5134 CSEN5135	Machine Learning Advanced Wireless and Mobile Networks Introduction to Intelligent Systems GPU Computing Image Processing					
5	CSEN5141 – CSEN5150	Professional Elective II	3	0	0	3	3
	CSEN5141 CSEN5142 CSEN5143 CSEN5144 CSEN5145	Data Science Distributed Systems Wireless Sensor Networks Digital Forensics Computational Biology					
6	Audit Course DIMA5116 INCO5117 PDLS5118 YOGA5119 SANS5120	 Disaster Management Constitution of India Personality Development through Life Enlightenment Skills Stress Management by Yoga Sanskrit for Technical Knowledge	2	0	0	2	0
Total Theory			**16**	**0**	**0**	**16**	**14**
Practical							
1	CSEN5151	Advanced Data Structures Lab	0	0	4	4	2
2	CSEN5181 - CSEN5190	Professional Elective-I Lab	0	0	4	4	2
	CSEN5181 CSEN5182 CSEN5183 CSEN5184 CSEN5185	Machine Learning Lab Advanced Wireless and Mobile Networks Lab Introduction to Intelligent Systems Lab GPU Computing Lab Image Processing Lab					
Total Practical			**0**	**0**	**8**	**8**	**4**
Total Semester			**16**	**0**	**8**	**24**	**18**

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First Year
Semester II

A. Theory							
Sl.	Course Number	Subject	Scheme Of Studies Per Week			Total	Credits
			L	T	P		
1	CSEN5201	Advanced Algorithms	3	0	0	3	3
2	CSEN5202	Soft Computing	3	0	0	3	3
3	CSEN5231 – CSEN5240	Professional Elective III	3	0	0	3	3
	CSEN5231 CSEN5232 CSEN5233 CSEN5234 CSEN5235	Data Preprocessing and Analysis Secure Software Design and Enterprise Computing Computer Vision Theory of Computation Computational Geometry					
4	CSEN5241 – CSEN5250	Professional Elective IV	3	0	0	3	3
	CSEN5241 CSEN5242 CSEN5243 CSEN5244 CSEN5245	Human and Computer Interaction Graph Algorithms Cloud Computing Algorithms for VLSI CAD Spatial Informatics and GIS					
5	CSEN5231 - CSEN5250	Audit Course – any one subject from Elective III or Elective IV bucket	3	0	0	3	0
Total Theory			**15**	**0**	**0**	**15**	**12**
Practical							
1	CSEN5251	Advanced Algorithms Lab	0	0	4	4	2
2	CSEN5252	Soft Computing Lab	0	0	4	4	2
Total Practical			**0**	**0**	**8**	**8**	**4**
C. Sessional							
1	CSEN5293	Term Paper and Seminar	0	0	4	4	2
Total Semester			**15**	**0**	**12**	**27**	**18**

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Second Year
Semester III

A. Theory							
Sl.	Course Number	Subject	Scheme Of Studies Per Week			Total	Credits
			L	T	P		
1	CSEN6131 - CSEN6139	Professional Elective V	3	0	0	3	3
	CSEN6131 CSEN6132 CSEN6133 CSEN6134 CSEN6135 CSEN6136 CSEN6137 CSEN6138 CSEN6139	Mobile Applications and Services Compiler for HPC Computational Complexity Fault Tolerant Computing Approximation Algorithms Randomized Algorithms Information Retrieval Social Network Analysis Quantum Computing					
2		Open Elective	3	0	0	3	3
	CSEN6121 ECEN6122 INFO6123 ECEN6124 MATH6121 AEIE6122	Business Analytics Design of Embedded Systems Information Theory and Coding Automation in VLSI Design Optimization Techniques Intelligent Control					
Total Theory			**6**	**0**	**0**	**6**	**6**
B. Sessional							
1	CSEN6195	Dissertation – Phase I	0	0	20	20	10
Total Semester			**6**	**0**	**20**	**26**	**16**

Second Year
Semester IV

A. Sessional							
Sl.	Course Number	Subject	Scheme Of Studies Per Week			Total	Credits
			L	T	P		
1	CSEN6295	Dissertation – Phase II	0	0	28	28	14
2	CSEN6297	Comprehensive Viva-voce	0	0	0	0	2
Total Semester			**0**	**0**	**28**	**28**	**16**

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M.Tech. – Electronics and Communication Engineering

CURRICULUM STRUCTURE

RELEASE DATE: July, 2018 : Ver1.0

May, 2019 : Ver1.1

April, 2021 : Ver. 1.2

1st. Year, Semester I

A. Theory								
Sl No	**Course Type**	**Code**	**Course Title**	**Contact Hrs/Week**				**Credits**
				L	T	P	Total	
1	Professional Core 1	**ECEN5101**	Antenna and Radiating Systems	3	0	0	3	3
2	Professional Core 2	**ECEN5102**	Wireless and Mobile Communication	3	0	0	3	3
3	Professional Elective I (Prog. Specific Professional Elective)	**ECEN5131**	Wireless Ad Hoc and Sensor Networks	3	0	0	3	3
		ECEN5132	Photonics and Optical Communication Networks					
		ECEN5133	Statistical Process in Communication					
4	Professional Elective II (Prog. Specific Professional Elective)	**ECEN5141**	Satellite Communication and applications	3	0	0	3	3
		ECEN5142	Multimedia Communication					
		ECEN5143	Cryptography and Network Security					
5	Mgt. Group	**ECEN5103**	Research Methodology and IPR	2	0	0	2	2
6	Audit 1	**DIMA5116**	Disaster Management	2	0	0	2	0
		INCO5117	Constitution of India					
		PDLS5118	Personality Development					
		YOGA5119	Stress Management by Yoga					
		SANS5120	Sanskrit for Technical Knowledge					
Total Theory				16	0	0	16	14

B. Practical								
1	Professional lab1	**ECEN5151**	Antenna and Radiating Systems lab	0	0	4	4	2
2	Professional lab2	**ECEN5152**	Wireless and Mobile Communication lab	0	0	4	4	2
Total Practical				**0**	**0**	8	8	**4**
Total for Semester				**16**	**0**	**8**	**24**	**18**

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1st. Year, Semester II

A. Theory								
Sl No	**Course Type**	**Code**	**Course Title**	**Contact Hrs/Week**				**Credits**
				L	T	P	Total	
1	Professional Core 3	**ECEN5201**	Advanced Digital Communication Techniques	3	0	0	3	3
2	Professional Core 4	**ECEN5202**	Advanced DSP and applications	3	0	0	3	3
3	Professional Elective III (Prog. Specific Professional Elective)	**ECEN5231**	Telecommunication Systems and Engineering	3	0	0	3	3
		ECEN5232	Image Processing and Pattern Recognition					
4	Professional Elective IV (Prog. Specific Professional Elective)	**ECEN5241**	Cognitive Radios and networks	3	0	0	3	3
		ECEN5242	Microwave Measurement and Instrumentation					
		ECEN5243	Design of Communication Equipments and Systems					
5		**ECEN5293**	Term Paper and Seminar	0	0	4	4	2
6	Aud 2	**Any course from Professional Elective III or Professional Elective IV buckets**	Audit Course 2	2	0	0	2	0
Total Theory				**14**	**0**	**4**	**18**	**14**

B. Practical								
1	Professional lab 3	**ECEN5252**	Advanced DSP and applications lab	0	0	4	4	2
2	Professional lab 4	**ECEN5253**	Design and Simulation lab	0	0	4	4	2
Total Practical				**0**	**0**	8	**8**	**4**
Total for Semester				**14**	**0**	**12**	**26**	**18**

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2nd. Year, Semester I

A. Theory								
Sl No	**Course Type**	**Code**	**Course Title**	**Contact Hrs/Week**				**Credits**
				L	T	P	Total	
1	Professional Elective V (Prog. Specific Professional Elective)	**ECEN6131**	Remote Sensing and applications	3	0	0	3	3
		ECEN6132	Internet of Things (IoT) and applications					
		ECEN6133	MIMO Systems					
2	Open Elective	**MATH6121**	Optimization Techniques	3	0	0	3	3
		CSEN6121	Business Analytics					
		ECEN 6125	Design and Technology for Photonic Integrated Circuit					
		AEIE6123	Intelligent Control					
Total of Theory				**6**	**0**	**0**	**6**	**6**

B. Sessional								
1	Dissertation	**ECEN6195**	Dissertation Phase I	0	0	20	20	10
Total of Semester				**6**	**0**	**20**	**26**	**16**

OPEN ELECTIVES TO BE OFFERED BY ECE DEPARTMENT (3rd. Semester):

Course Type	**Code**	**Course Title**	**Contact Hours/Week**				**Credits**
			L	**T**	**P**	**Total**	
Open Elective	**ECEN6121**	AD HOC Networks and Uses	3	0	0	3	3
	ECEN6122	Embedded Systems					
	ECEN6123	Cognitive Radios					
	ECEN6124	Automation in VLSI Design					

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2nd. Year, Semester II

Sl No	Course Type/Code	Code	Course Title	Contact Hrs/Week				Credits
				L	T	P	Total	
1	Dissertation	**ECEN6295**	Dissertation Phase II	0	0	32	32	14
2	Viva Voce	**ECEN6297**	Comprehensive Viva Voce	-	-	-	-	2
Total of Semester						**32**	**32**	**16**

Total Credits: 68

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M.Tech. in VLSI

(A PROGRAMME UNDER ECE DEPARTMENT)

Curriculum Structure

Release Date: July, 2018:Ver1.0

May, 2019: Ver. 1.1

April, 2021:Ver. 1.2

COURSE STRUCTURE IN

M.Tech. **VLSI**

1st. Year, Semester I

A. Theory								
Sl. No.	**Course Type**	**Code**	**Course Title**	**Contact Hours/Week**				**Credits**
				L	**T**	**P**	**Total**	
1	Professional core 1	**VLSI5101**	Digital VLSI IC Design	3	0	0	3	3
2	Professional core 2	**VLSI5102**	Embedded Systems Design	3	0	0	3	3
3	Professional Elective PE-1	**VLSI5131**	DSP For VLSI System	3	0	0	3	3
		VLSI5132	VLSI IC Fabrication					
4	Professional Elective PE-2	**VLSI5141**	CAD of Digital System	3	0	0	3	3
		VLSI5142	Modelling of VLSI Device					
5	Mgt. Group	**ECEN5103**	Research Methodology and IPR	2	0	0	2	2
6	Audit 1	**DIMA5116**	Disaster Management	2	0	0	2	0
		INCO5117	Constitution of India					
		PDLS5118	Personality Development					
		YOGA5119	Stress Management by Yoga					
		SANS5120	Sanskrit for Technical Knowledge					
Total of Theory				**16**	**0**	**0**	**16**	**14**

B. Practical								
1	Professional Core Lab1	**VLSI5151**	Digital VLSI IC Design Lab	0	0	4	4	2
2	Professional Core Lab2	**VLSI5152**	Embedded Systems Design Lab	0	0	4	4	2
Total of Practical				0	0	8	8	4
Total of Semester				**16**	**0**	**8**	**24**	**18**

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1st. Year, Semester II

Sl. No.	Course Type	Code	Course Title	Contact Hours/Week				Credits
				L	T	P	Total	
1	Professional core 3	**VLSI5201**	Analog VLSI IC Design	3	0	0	3	3
2	Professional core 4	**VLSI5202**	VLSI Design, Testing and Verification	3	0	0	3	3
3	Professional Elective PE-3	**VLSI5231**	Memory Technologies	3	0	0	3	3
		VLSI5232	Low Power VLSI Design					
4	Professional Elective PE-4	**VLSI5241**	Advanced VLSI Processor	3	0	0	3	3
		VLSI5242	Advanced Nano Devices					
5		**VLSI5293**	Term Paper and Seminar	0	0	4	4	2
6	Aud 2	Any one subject from Elective3 or Elective4 buckets	Audit Course – 2	2	0	0	2	0
Total of Theory				**14**	**0**	**4**	**18**	**14**

B. Practical								
1	Professional Core Lab3	**VLSI5251**	Analog VLSI IC Design Lab	0	0	4	4	2
2	Professional Core Lab4	**VLSI5252**	VLSI Design, Testing and Verification Lab	0	0	4	4	2
Total of Practical				0	0	8	8	4
Total of Semester				**14**	**0**	**12**	**26**	**18**

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2nd. Year, Semester I

A. Theory								
Sl. No.	**Course Type**	**Code**	**Course Title**	**Contact Hours/Week**				**Credits**
				L	**T**	**P**	**Total**	
1	Professional Elective PE-5	**VLSI6131**	Nano materials and Nano Technology	3	0	0	3	3
		VLSI6132	RF IC Design and MEMS					
2	Open Elective	**MATH6121**	Optimization Techniques	3	0	0	3	3
		CSEN6121	Business Analytics					
		ECEN 6125	Design and Technology for Photonic Integrated Circuit					
		AEIE6123	Intelligent Control					
Total of Theory				**6**	**0**	**0**	**6**	**6**

B. Sessional								
1	Dissertation	**VLSI6195**	Dissertation Phase I	0	0	20	20	10
Total of Semester				**6**	**0**	**20**	**26**	**16**

OPEN ELECTIVES TO BE OFFERED BY ECE DEPARTMENT (3rd. Semester):

Open Elective	**ECEN6121**	Ad Hoc Networks and Uses	3	0	0	3	3
	ECEN6122	Embedded Systems					
	ECEN6123	Cognitive Radios					
	ECEN6124	Automation in VLSI Design					

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2nd. Year, Semester II

Sl. No.	Course Type	Code	Course Title	Contact Hours/Week				Credits
				L	T	P	Total	
1	Dissertation	**VLSI6295**	Dissertation Phase-II	0	0	32	32	14
2	Grand Viva	**VLSI6297**	Comprehensive Viva Voce	-	-	-	-	2
Total of Semester				**0**	**0**	**32**	**32**	**16**

Total Credit Points = 68

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DEPARTMENT OF CHEMICAL ENGINEERING
M.TECH. PROGRAMME

IN RENEWABLE ENERGY

Curriculum and Syllabus, July 2020

PART I: COURSE CURRICULUM

M.TECH. IN RENEWABLE ENERGY

1stYear 1stSemester (Semester 1)

THEORY

Sl. No	Code	Course Title	L	T	P	H	Credit
01	REEN 5101	Renewable Energy Resource and Characteristics	3	0	0	3	3
02	REEN 5102	Non-Solar Renewable Energy	3	0	0	3	3
03	REEN 5103	Research Methodology and IPR	2	0	0	2	2
04	REEN 5141 - 5142	Professional Elective I	3	0	0	3	3
05	REEN 5144-5145	Professional Elective II	3	0	0	3	3
06	DIMA 5116	Disaster Management	2	0	0	0	0
	PDLS 5118	Personality Development through Life Enlightenment Skills					
	YOGA 5119	Stress Management by Yoga					
	SANS 5120	Sanskrit for Technical Knowledge					
	INCO 5177	Constitution of India					
	Total Theory						**14**

LABORATORY

Sl. No	Code	Course Title	L	T	P	H	Credit
01	REEN 5151	Measurement Analysis Laboratory	0	0	4	4	2
02	REEN 5152	Power Laboratory	0	0	4	4	2
	Total Practical						**4**
	Semester Total						**18**

Professional Elective I	**REEN 5141**	**REEN 5142**
Subject name	Material for Renewable Energy Application	Bio Energy
Professional Elective II	**REEN 5144**	**REEN 5145**
Subject name	Thermal and Electrical Energy Fundamentals	Modeling and Analysis of Renewable Energy System

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1stYear 2ndSemester (Semester 2)

THEORY							
Sl. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	REEN 5201	Solar Energy Engineering	3	0	0	3	3
02	REEN 5202	Technology of Renewable Power Generation	3	0	0	3	3
03	REEN 5241-5242	Professional Elective III	3	0	0	3	3
04	REEN 5244-5246	Professional Elective IV	3	0	0	3	3
05		Audit Course – any one subject from Elective III or Elective IV bucket	3	0	0	0	0
	Total Theory						**12**
LABORATORY/SESSIONAL							
Sl. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	REEN 5251	Non-Solar Renewable Energy Laboratory	0	0	4	4	2
02	REEN 5252	Solar Energy Laboratory	0	0	4	4	2
03	REEN 5221	Term Paper and Seminar	0	0	4	4	2
	Total Practical						**6**
	Semester Total						**18**

Professional Elective III	**REEN 5241**	**REEN 5242**	**REEN 5243**
Subject name	Hydrogen and Fuel Cell Technology	Sustainable Application in Renewable Energy	Industrial Energy Analysis

Professional Elective IV	**REEN 5244**	**REEN 5245**	**REEN 5246**
Subject name	Solar Photovoltaic System Design	Sustainable Energy Conversion and Storage	Waste Management With Renewable Energy Systems

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2nd Year 1st Semester (Semester 3)

THEORY							
Sl. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	REEN 6141-6143	Professional Elective V	3	0	0	3	3
02	REEN 6121	Composite Materials	3	0	0	3	3
	REEN 6122	Safety and Hazards in Energy Industry					
	BIOT 6121	Engineering Mathematics and Biostatistics					
	CSEN 6121	Business Analytics					
	Total Theory						**6**
LABORATORY/SESSIONAL							
Sl. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	REEN 6195	Dissertation / Industrial Project – Phase I	0	0	20	20	10
	Total Practical						**10**
	Semester Total						**16**

Professional Elective V	**REEN 6141**	**REEN 6142**	**REEN 6143**
Subject name	Energy Management	Renewable Energy Policy and Regulation	Environment Impact Assessment

Open Elective – I	
REEN 6121	Composite Materials
REEN 6122	Safety and Hazards in Energy Industry
BIOT 6121	Engineering Mathematics and Biostatistics
CSEN 6121	Business Analytics

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2nd Year 2nd Semester (Semester 4)							
LABORATORY/SESSIONAL							
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**H**	**Credit**
01	REEN 6295	Dissertation / Industrial Project - Phase II	0	0	28	28	14
02	REEN 6297	Grand Viva	0	0	0	0	2
	Semester Total						**16**

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