

Heritage Institute of Technology
Kolkata

Percentage of programmes where syllabus revision was carried out during the last five years

Programme Code	Programme name	Year of Introduction	Status of implementation of CBCS / ECS (Yes/No)	Year of implementation of CBCS / ECS	Year of revision (if any)	If revision has been carried out in the syllabus during last 5 years, Percentage of content added or replaced	Link to the relevant document
1	B.Tech in Computer Science & Engineering	2001	Yes	2016	2014	100%	https://www.heritageit.edu/CSE.aspx
2	B.Tech in Information Technology	2001	Yes	2016	2014	100%	https://www.heritageit.edu/IT.aspx
3	B.Tech in Electronics & Communication Engineering	2001	Yes	2016	2014	100%	https://www.heritageit.edu/ECE.aspx
4	B.Tech in Biotechnology	2002	Yes	2016	2014	100%	https://www.heritageit.edu/BT.aspx
5	B.Tech in Applied Electronics & Instrumentation Engineering	2001	Yes	2016	2014	100%	https://www.heritageit.edu/AEIE.aspx
6	B.Tech in Chemical Engineering	2002	Yes	2016	2014	100%	https://www.heritageit.edu/ChemEngg.aspx
7	B.Tech in Mechanical Engineering	2011	Yes	2016	2014	100%	https://www.heritageit.edu/ME.aspx
13	B.Tech in Civil Engineering	2011	Yes	2016	2014	100%	https://www.heritageit.edu/CE.aspx
16	B.Tech in Electrical Engineering	2012	Yes	2016	2014	100%	https://www.heritageit.edu/EE.aspx
311	B.Tech in Computer Science & Business Systems	2020	Yes	2020	2020	NA	https://www.heritageit.edu/CSBS.aspx
112	M.Tech in Computer Science & Engineering	2006	Yes	2014	2014	100%	https://www.heritageit.edu/CSE.aspx
104	M.Tech. in VLSI	2011	Yes	2014	2014	100%	https://www.heritageit.edu/ECE.aspx
105	M.Tech in Electronics & Communication Engineering	2009	Yes	2014	2014	100%	https://www.heritageit.edu/ECE.aspx
100	M.Tech in Biotechnology	2007	Yes	2014	2014	100%	https://www.heritageit.edu/BT.aspx
103	M.Tech in Applied Electronics & Instrumentation Engineering	2006	Yes	2014	2014	100%	https://www.heritageit.edu/AEIE.aspx
999	M.Tech. in Renewable Energy	2016	Yes	2016	2019	100%	https://www.heritageit.edu/ChemEngg.aspx
710	Masters in Computer Applications	2003	Yes	2018	2019	100%	https://www.heritageit.edu/MCA1.aspx

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Department of Applied Electronics & Instrumentation Engineering

SYLLABUS FOR B.TECH. PROGRAMME

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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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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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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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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 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.

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	NPTEL
				IIT Madras	NPTEL
AEIE3111	Introduction to Mechatronics	4	Mechatronics and Manufacturing Automation	IIT Gwahati	NPTEL
AEIE4111	Introduction to MEMS	4	MEMS and Microsystems	IIT Kharagpur	NPTEL

BIOTECHNOLOGY

B.TECH. PROGRAMME

With effect from July 2018



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

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

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

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

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

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

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

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

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

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.

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

Heritage Institute of Technology

(A Kalyan Bharti Trust Initiative)

**(An Autonomous Institute under
MAKAUT)**



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



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



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



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



PROFESSIONAL ELECTIVE COURSES FOR CIVIL ENGINEERING

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

OPEN ELECTIVE COURSES OFFERED BY CIVIL ENGINEERING DEPARTMENT

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

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



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.



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



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

Heritage Institute of Technology



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

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

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

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

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

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

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

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

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			Credit
Sem. No.	Code	Course Title	L	T	P	
1 st	ECEN 1011	Basic Electronics	3	0	0	3
	ECEN 1061	Basic Electronics Engineering Laboratory	0	0	2	1
2 nd	HMTS 1011	Communication For Professionals	3	0	0	3
	HMTS 1061	Professional Communication Laboratory	0	0	2	1
3 rd	PHYS 2111	Physics II	3	1	0	4
5 th	CHEN 3111	Chemical Reaction Engineering II	3	1	0	4
7 th	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

B.TECH. IN CHEMICAL ENGINEERING

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

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.



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

**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

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

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

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	Computer Graphics & Multimedia					
	CSEN3132	Data Mining & Knowledge Discovery					
	CSEN3133	Web Technologies					
	CSEN3134	Graph Algorithms					
	CSEN3135	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

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

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 CSEN4132 CSEN4133 CSEN4134 CSEN4135	Soft Computing Cryptography & Network Security Image Processing Approximation Algorithms Information Retrieval					
3		Open Elective-II	3	0	0	3	3
	AEIE4121 AEIE4122 CHEN4121 CHEN4122 ECEN4121 ECEN4122 BIOT4026 MATH4121	Instrumentation and Telemetry Linear Control Systems and Applications Industrial Total Quality Management Industrial Pollution Control Software Defined Radio Error Control Coding Biology for Engineers Methods in Optimization					
4		Open Elective-III	3	0	0	3	3
	AEIE4127 MATH4122 BIOT4123 CHEN4123 ECEN4126 ECEN4127	Introduction to Embedded System Advanced Linear Algebra Biosensor Statistical Methods in Design of Experiments Ad Hoc Networks and Security Challenges 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

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

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	6 th	CSEN3221	Fundamentals of RDBMS	3	0	0	3	3
2	7 th	CSEN4121	Fundamentals of Operating Systems	3	0	0	3	3
3	7 th	CSEN4126	Intelligent Web and Big Data	3	0	0	3	3
4	8 th	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	1 st	HMTS1011	Communication for Professionals	3	0	0	3
2		HMTS1061	Professional Communication Lab	0	0	2	1
3	2 nd	ECEN1011	Basic Electronics	3	0	0	3
4		ECEN1061	Basic Electronics Lab	0	0	2	1
5	3 rd	MATH2111	Probability and Statistical Methods	4	0	0	4
6	5 th	CSEN3111	Artificial Intelligence	3	0	0	3
7		CSEN3161	Artificial Intelligence Lab	0	0	2	1
8	7 th	CSEN4111	Compiler Design	3	0	0	3
9		CSEN4161	Compiler Design Lab	0	0	2	1
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 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



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

1st Year 2nd Semester Syllabus:

A. Theory								
Sl. No.	Category	Course Code	Course Title	Contact Hours/Week				Credit Points
				L	T	P	Total	
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/ Manufacturing 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

2nd Year 1st Semester:

A. Theory									
Sl. No.	Category		Course Code	Course Title	Contact Hours/Week				Credit Points
					L	T	P	Total	
1	Professional Course	Core	ECEN2101	Analog Circuits	3	0	0	3	3
2	Professional Course	Core	ECEN2102	Circuit and Network Theory	3	0	0	3	3
3	Professional Course	Core	ECEN2103	Signals and Systems	3	0	0	3	3
4	Basic Science 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 Course	Core	ECEN2151	Analog Circuits Laboratory	0	0	2	2	1
2	Professional Course	Core	ECEN2152	Circuit and Network Theory Laboratory	0	0	3	3	1.5
3	Professional Course	Core	ECEN2153	Signals and Systems Laboratory	0	0	2	2	1
4	Engg. Science courses		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

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

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

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

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								
Sl. No.	Category	Course Code	Course Title	L	T	P	Total	Credit Points
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

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

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

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

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

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

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 Cellular Communication Laboratory	0	0	2	1
5	7th	ECEN4111	Microelectronics and Analog VLSI design	3	0	0	3
		ECEN4161	Microelectronics and Analog 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.

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	
ECEN1061	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				

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

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

Heritage Institute of Technology
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

Heritage Institute of Technology
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

Heritage Institute of Technology
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

Heritage Institute of Technology
Electrical Engineering Department

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

Heritage Institute of Technology

Electrical Engineering Department

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

Heritage Institute of Technology

Electrical Engineering Department

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

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

Heritage Institute of Technology
Electrical Engineering Department

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

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

- ELEC4221 Applied Illumination Engineering

Heritage Institute of Technology
Electrical Engineering Department

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

Heritage Institute of Technology
Electrical Engineering Department

Honours Credit Chart

SI 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.

Heritage Institute of Technology
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



Heritage Institute of Technology
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	

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	

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	

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	

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

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) 1. INFO3231 – Multimedia Technology & Applications 2. INFO3232 – E-Commerce & ERP 3. INFO3233 – Cryptography & Network Security	Open Elective I(6th Sem) 1. MATH3223 – Scientific Computing 2. ELEC3221 – Fundamentals of Circuit Theory 3. ECEN3222 – Designing with Processors and Controllers
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** Open Elective I offered by IT Department is: **Introduction to E-Commerce(INFO3221)**

4th Year

7th Semester Syllabus:

Theory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			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								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			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	

<p><u>Elective III(7th Sem)</u></p> <ol style="list-style-type: none"> 1. INFO4131 – Introduction to Internet of Things 2. INFO4132 – Mobile Computing 3. INFO4133 – Real Time Systems 	<p><u>Open Elective II(7th Sem)</u></p> <ol style="list-style-type: none"> 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
	<p><u>Open Elective III(7th Sem)</u></p> <ol style="list-style-type: none"> 1. ECEN4124 – Principles of Radar 2. ECEN4125 - Ad Hoc Wireless Networks 3. AEIE4127 – Introduction to Embedded System 4. BIOT4124 - Bio Sensor 5. BIOT4125 - Biopolymer 6. MATH4122 - Advanced Linear Algebra

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

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	

<p>Elective IV(8th Sem)</p> <ol style="list-style-type: none"> 1. INFO4231 – Fundamentals of Blockchain Technology. 2. INFO4232 –Internet Technology 3. INFO4233 –Distributed Computing 	<p>Open Elective IV(8th Sem)</p> <ol style="list-style-type: none"> 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
<p>Elective V(8th Sem)</p> <ol style="list-style-type: none"> 1. INFO4241 – Soft Computing 2. INFO4242 – Cloud Computing 3. INFO4243 – Pattern Recognition 	

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

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.

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.

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

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

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

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

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 and Instrumentation Lab	0	0	2	2	1
Total Semester with Honours				18	2	10	30	25

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

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

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

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

DISTRIBUTION OF COURSE CREDIT

Honours Papers:

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

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			

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
2 nd semester	20.5	4	26	26+5=31
3 rd semester	22	0	27	27
4 th semester	21	4	25	25+5=30
5 th semester	23.5	0	30	30
6 th semester	19.5	4	24	24+5=29
7 th semester	18	4	20	20+5=25
8 th semester	18	0	28	28
TOTAL	160	20	203	228

Category of Course Distribution of Credit Points

Sl. No.	Categories	Semesters								Total	Total as per AICTE
		1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th		
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.



Heritage Institute of Technology
(An Autonomous Institute under MAKAUT)

Computer Science and Business Systems

B. Tech. Course

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	

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 Practice	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	

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	CSBS2101	Data Structure & Algorithms	4	0	0	4	4	Professional Core Courses
2	CSEN2102	Discrete Mathematics	4	0	0	4	4	Engineering Science Course
3	HMTS2101	Economics for Engineers	3	0	0	3	3	Humanities & Social Sciences including Management Courses
4	ECEN2104	Digital Logic	3	0	0	3	3	Engineering Science Course
5	HMTS2001	Human Values and Professional Ethics	3	0	0	3	3	Humanities & Social Sciences including Management Courses
Total Theory			17	0	0	17	17	

Laboratory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	CSBS2151	Data Structure & Algorithms Lab	0	0	3	3	1.5	Professional Core Courses
2	ECEN2154	Digital Logic Lab	0	0	2	2	1	Engineering Science Course
Total Laboratory			0	0	5	5	2.5	
Total of Semester without Honours			17	0	5	22	19.5	
1	MATH2111	Probability and Statistical Methods	4	0	0	4	4	Honours Course
Total of Semester with Honours			21	0	5	26	23.5	

4th Semester Syllabus:

Theory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	CSBS2201	Operating System Concept	4	0	0	4	4	Professional Core Courses
2	CSBS2202	Computer Organization and Architecture	4	0	0	4	4	Professional Core Courses
3	CSBS2203	Design and Analysis of Algorithms	4	0	0	4	4	Professional Core Courses
4	CSBS2204	Introduction to Innovation and Entrepreneurship	4	0	0	4	4	Professional Core Courses
5	CSBS2205	Managerial Economics	3	0	0	3	3	Professional Core Courses
6	EVSC2016	Environmental Sciences (MANDATORY)	2	-	-	2	-	Mandatory Courses
Total Theory			21	0	0	21	19	

Laboratory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	CSBS2251	Operating System Concept Lab	0	0	3	3	1.5	Professional Core Courses
2	CSBS2252	Computer Organization and Architecture Lab	0	0	3	3	1.5	Professional Core Courses
3	CSBS2253	Design and Analysis of Algorithms Lab	0	0	3	3	1.5	Professional Core Courses
Total Laboratory			0	0	9	9	4.5	
Total of Semester			21	0	9	30	23.5	

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	CSBS3101	Computer Networks	4	0	0	4	4	Professional Core Courses
2	CSBS3102	Object Oriented Programming	4	0	0	4	4	Professional Core Courses
3	CSBS3103	Formal Language & Automata Theory	4	0	0	4	4	Professional Core Courses
4	CSBS3104	Business Strategy	3	0	0	3	3	Professional Core Courses
5	CSBS3131 - CSBS3133	Professional Elective – I	3	0	0	3	3	Professional Elective Courses
	CSBS3131 CSBS3132 CSBS3133	Computer Graphics Advanced Operating Systems E-Commerce and ERP						
Total Theory			18	0	0	18	18	

Laboratory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	CSBS3151	Computer Networks Lab	0	0	3	3	1.5	Professional Core Courses
2	CSBS3152	Object Oriented Programming Lab	0	0	3	3	1.5	Professional Core Courses
Total Laboratory			0	0	6	6	3	
Total of Semester without Honours			18	0	6	24	21	
1	CSBS3111	Machine Learning	3	0	0	3	3	Honours Course
2	CSBS3161	Machine Learning Lab	0	0	2	2	1	Honours Course
Total of Semester with Honours			21	0	8	29	25	

6th Semester Syllabus:

Theory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	CSBS3201	Software Engineering	4	0	0	4	4	Professional Core Courses
2	CSBS3202	Database Management Systems	4	0	0	4	4	Professional Core Courses
3	CSBS3203	Enterprise System and IT Solutions	3	0	0	3	3	Professional Core Courses
4	CSBS3231- CSBS3235	Professional Elective-II	3	0	0	3	3	Professional Elective Courses
	CSBS3231 CSBS3232 CSBS3233 CSBS3234 CSBS3235	Mobile Computing Artificial Intelligence Compiler Design Introduction to IoT Introduction to Blockchain						
5		Open Elective-I	3	0	0	3	3	Open Elective Courses
	AEIE3221 ECEN3222 MATH3221 HMTS3221	Fundamentals of Sensors and Transducers Designing with Processors and Controllers Computational Mathematics Human Resource Management						
6	INCO3016	Indian Constitution and Civil Society (MANDATORY)	2	-	-	2	-	Mandatory Courses
Total Theory			19	0	0	19	17	

Laboratory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1.	CSBS3251	Software Engineering Lab	0	0	3	3	1.5	Professional Core Courses
2.	CSBS3252	Database Management Systems 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	CSBS3293	Term Paper and Seminar	0	0	4	4	2	Seminar
Total Sessional			0	0	4	4	2	
Total of Semester			19	0	10	29	22	

** Open Elective-I offered by CSBS Department is: **Introduction to E-Commerce and ERP (CSBS3221)**

4th Year

7th Semester Syllabus:

Theory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	HMTS4101	Principles of Management	3	0	0	3	3	Humanities & Social Sciences including Management Courses
2	CSBS4131- CSBS4133	Professional Elective-III	3	0	0	3	3	Professional Elective Courses
	CSBS4131 CSBS4132 CSBS4133	Introduction to Industrial Management Introduction to Marketing Management Digital Marketing						
3		Open Elective-II	3	0	0	3	3	Open Elective Courses
	AEIE4122 CHEN4123 ECEN4122 ECEN4123 MATH4121	Linear Control Systems and Applications Industrial Total Quality Management Software Defined Radio Error Control Coding Methods in Optimization						
4		Open Elective-III	3	0	0	3	3	Open Elective Courses
	AEIE4127 MATH4122 BIOT4124 HMTS4125	Introduction to Embedded System Advanced Linear Algebra Biosensor Marketing Research & Marketing Management						
Total Theory			12	0	0	12	12	

Sessional								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	CSBS4191	Industrial Training / Internship	-	-	-	-	2	Internship in industry or Elsewhere
2	CSBS4195	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	CSBS4111	Data Analytics	3	0	0	3	3	Honours Course
2	CSBS4161	Data Analytics Lab	0	0	2	2	1	Honours Course
Total of Semester with Honours			15	0	10	25	22	

** Open Elective-III offered by CSBS Department is: **Soft Computing (CSBS4121)**

8th Semester Syllabus:

Theory								Type of Paper
Sl. No	Course Code	Course Name	Contact Hrs per Week				Credit Points	
			L	T	P	Total		
1	CSBS4231- CSBS4233	Professional Elective-IV	3	0	0	3	3	Professional Elective Courses
	CSBS4231 CSBS4232 CSBS4233	Organizational Behavior Behavioral Economics Leadership						
2	CSBS4241- CSBS4243	Professional Elective-V	3	0	0	3	3	
	CSBS4241 CSBS4242 CSBS4243	Introduction to Cognitive Science Cyber Sociality Business Analytics						
3		Open Elective-IV	3	0	0	3	3	Open Elective Courses
	AEIE4221 BIOT4222 HMTS4224 HMTS4226	Process Instrumentation Non-conventional Energy Psychology Advanced Finance						
Total Theory			9	0	0	9	9	

Sessional								
1	CSBS4295	Project-II	0	0	16	16	8	Project work, internship in industry or Elsewhere
2	CSBS4297	Comprehensive Viva-voce	-	-	-	-	1	
Total Sessional			0	0	16	16	9	
Total of Semester			9	0	16	25	18	

** Open Elective-IV offered by CSBS Department is: **Introduction to Industrial Sociology (HMTS4281)**

Credit points distribution

Sl. No.	Category	CSBS
1	Humanities and Social Sciences including Management Courses	12
2	Basic Science Courses	19
3	Engineering Science Courses including Workshop, Drawing, Basics of Electrical / Mechanical / Computer, etc.	24
4	Professional Core Courses	61
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	Honours Courses	20
	Grand Total	180

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

Honours Credit Chart

Sl. No.	Semester	Paper Code	Course Title	Contact Hours / Week			Credit Points
				L	T	P	
1.	1 st	HMTS1011	Communication for Professionals	3	0	0	3
2.		HMTS1061	Professional Communication Lab	0	0	2	1
3.	2 nd	ECEN1011	Basic Electronics	3	0	0	3
4.		ECEN1061	Basic Electronics lab	0	0	2	1
5.	3 rd	MATH2111	Probability and Statistical Methods	4	0	0	4
6.	5 th	CSBS3111	Machine Learning	3	0	0	3
7.		CSBS3161	Machine Learning Lab	0	0	2	1
8.	7 th	CSBS4111	Data Analytics	3	0	0	3
9.		CSBS4161	Data Analytics lab	0	0	2	1
	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.



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

SECOND SEMESTER

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

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

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

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	Distributed Database Management					
	MCAP3151	Machine Learning					
	MCAP3152 MCAP3153	Management of Software Projects Blockchain Technology & Applications					
4	MCAP3160- MCAP3163	Elective IV	3	0	0	4	4
	MCAP3160	Image Processing					
	MCAP3161	Data Mining & Data Warehousing					
	MCAP3162 MCAP3163	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

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



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.

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 and Written Communication	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 Structures and Algorithms	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 and Design	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

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	Machine Learning					
	MCAP2151	Mobile Computing					
	MCAP2152 MCAP2153	Ecommerce and ERP Cloud Computing					
5	MCAP2160- MCAP2162, HMTS2163	Elective II	3	0	0	3	3
	MCAP2160	Cryptography and Network Security					
	MCAP2161	Automata Theory and Compiler Design					
	MCAP2162 HMTS2163	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

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	Advanced Database Management Data Mining & KnowledgeDiscovery					
	MCAP2252	Secure Software Design and Enterprise Computing					
	MCAP2253	Internet of Things					
	MCAP2254	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



Applied Electronics & Instrumentation Engineering Department

SYLLABUS FOR M.TECH. PROGRAMME

PART-I: COURSE STUCTURE



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
	AEIE5141/ AEIE5142/ AEIE5143	Elective-II (1) Mechatronics (2) Advanced Digital Control System (3) Advanced Optical Instrumentation	3	0	0	3	3
	LAB	AEIE5151 AEIE5152	Digital Signal Processing LAB Programming Language LAB	0 0	0 0	4 4	4 4
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



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
	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
	AEIE5251	Embedded Systems LAB	0	0	4	4	2
LAB	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



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/	Elective-V (1) Micro-Electromechanical System Design	3	0	0	3	3
	AEIE6132/	(2) VLSI Technology					
	AEIE6133	(3) Robotics Engineering					
	AEIE6134	(4) Remote Sensing					
Open Elective* (Any one subject from the course list)	AEIE6121/	Elective-VI (1) Biosignal and Biomedical Image Processing	3	0	0	3	3
	AEIE6122/	(2) Intelligent Control					
	CSEN6121/	(3) Business Analytics					
	CSEN6122/	(4) Advanced Artificial Intelligence					
	MATH6121	(5) Optimization Techniques					
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

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.	Advanced Enzyme Technology	3	0	0	3
BIOT5132	Elective 1	Nanotechnology				
BIOT5141	Prof.	Agricultural Biotechnology	3	0	0	3
BIOT5142	Elective 2	Advanced Environmental Biotechnology				
DIMA5116	Audit	Disaster Management	2	0	0	0
INCO5117	Course-1	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

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

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



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 PDL5118 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

**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

**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



Heritage Institute of Technology

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

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 I Elective III or Professional I 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

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					

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



Heritage Institute of Technology

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

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

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						

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

M.TECH IN RENEWABLE ENERGY

Heritage Institute of Technology



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

M.TECH. IN RENEWABLE ENERGY

IstYear 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

M.TECH. IN RENEWABLE ENERGY

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	2 0	2 0	1 0
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

M.TECH. IN RENEWABLE ENERGY

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	8	14
02	REEN 6297	Grand Viva	0	0	0	0	2
Semester Total							16