



**INDIAN INSTITUTE OF TECHNOLOGY MADRAS
CHENNAI 600 036**

**Curriculum for
M.Tech. Degree Programme
2022 Batch**



INDIAN INSTITUTE OF TECHNOLOGY MADRAS

Curriculum for M.Tech. Degree Programme 2022 Batch

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Branch Code: AE1

M.Tech. in Aerospace Engineering

2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	AS5010	Aerodynamics and Aircraft performance	3	0	0	0	6	9
2	AS5020	Aerospace Propulsion	3	0	0	0	6	9
3	AS5030	Aerospace Structures	4	0	0	0	8	12
4	AS5110	Laboratory I	0	0	0	3	0	3
5	AS5011	Compressible Fluid flows	3	0	0	0	6	9
6	MAE1	Mathematics Elective 1	3	0	0	0	6	9
7	GN5003	Personal and Professional Growth	1	0	0	0	2	0
		Total Credits :	16	0	0	3	32	51

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	AS5040	Flight Mechanics	4	0	0	0	7	11
2	AS5120	Laboratory II (Str. Lab)	0	0	0	3	0	3
3		Aircraft Design Elective*	2	1	2	3	4	12
4	DPE1	Department Elective 1	3	0	0	0	6	9
5	DPE2	Department Elective 2	3	0	0	0	6	9
6	DPE3	Department Elective 3	3	0	0	0	6	9
7	AS5150\$	M.Tech. Project Proposal	0	0	0	0	4	4
		Total Credits :	15	1	2	6	37	57

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	AS5150#	MTech Project (summer)	0	0	0	0	20	20

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	AS5150+	MTech Project (III semester)	0	0	0	0	27	27
2	AS5100	Mini Project	1	2	1	3	5	12
		Total Credits :	1	2	1	3	32	39

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	AS5150	M.Tech Project (IV semester)	0	0	0	0	38	38
		Total Credits :						38

Semester	I	II	Summer	III	IV	Total
Credits	51	57	20	39	38	205

Notes:

- Credits and grades for MTech Project (AS5150\$, AS5150#, AS5150+ and AS5150 together) in fourth semester
- Students with AE background may take alternate courses in lieu of AS5010, AS5020, AS5030, AS5011 and AS5040 with the consent of the department.
- A minimum of 2 electives to be taken from the list of AS electives or their equivalents. Any other M.Tech. level course may be taken as the third elective with the consent of Faculty Advisor.
- Aircraft Design Elective * may be one of the following
 - AS5211 Design of Subsonic aircraft,
 - AS5212 Design of Supersonic aircraft
 - AS5213 Design of MAVs and UAVs.

LIST OF ELECTIVES FOR M.TECH. IN AEROSPACE ENGINEERING

S.No	Course No	Course Name	L	T	E	P	O	C
1.	AS5300	Physical Gas Dynamics	3	0	0	0	6	9
2.	AS5310	Object Oriented Prog. for Science & Engineers	3	0	0	0	6	9
3.	AS5320	Boundary Layer Theory	3	0	0	0	6	9
4.	AS5330	Computational Aerodynamics	3	0	0	0	6	9
5.	AS5340	Advanced Flight Mechanics	3	0	0	0	6	9
6.	AS5350	Transonic Aerodynamics	3	0	0	0	6	9
7.	AS5360	Advanced Aerodynamics	3	0	0	0	6	9
8.	AS5370	Helicopter Aerodynamics	3	0	0	0	6	9
9.	AS5380	Flight Testing and Performance Reduction	3	0	0	0	6	9
10.	AS5390	Numerical Methods in Gas Dynamics	3	0	0	0	6	9
11.	AS5400	Theory & Computation of Vortex Dominated Flows	3	0	0	0	6	9
12.	AS5410	Grid Generation	3	0	0	0	6	9
13.	AS5420	Introduction to CFD	3	0	0	0	6	9
14.	AS5430	Stability of Shear Flows	3	0	0	0	6	9
15.	AS5440	Hydrodynamic Stability, transition and Flow control	3	0	0	0	6	9
16.	AS5470	Unsteady Aerodynamics of Moving Bodies	3	0	0	0	6	9
17.	AS5550	Aerospace Systems Control and Estimation	3	0	0	0	6	9
18.	AS5610	Rocket Propulsion	3	0	0	0	6	9
19.	AS5620	Theory and Design of Gas Turbines	3	0	0	0	6	9
20.	AS5630	Performance of Gas Turbines	3	0	0	0	6	9
21.	AS5640	Combustion, Explosion and Detonation	3	0	0	0	6	9
22.	AS5650	Multiphase Flow	3	0	0	0	6	9
23.	AS5660	Hypersonic Air breathing Propulsion	3	0	0	0	6	9
24.	AS5670	Transport Processes in Reacting Flows	3	0	0	0	6	9
25.	AS5680	High Temperature Gas Dynamics	3	0	0	0	6	9
26.	AS5690	Radiation Heat Transfer	3	0	0	0	6	9
27.	AS5810	Theories of Modern Plate Structures	3	0	0	0	6	9
28.	AS5820	Analysis of Plates and Shells	3	0	0	0	6	9
29.	AS5830	Approximate Methods in Structural Analysis	3	0	0	0	6	9
30.	AS5840	Thermal Stress Analysis	3	0	0	0	6	9
31.	AS5850	Finite Element Analysis	3	0	0	0	6	9
32.	AS5860	Composite Structures	3	0	0	0	6	9
33.	AS5870	Energy Methods in Structural Analysis	3	0	0	0	6	9
34.	AS5880	Mechanics of Damage Tolerance	3	0	0	0	6	9
35.	AS5890	Mechatronics Design	3	0	0	0	6	9
36.	AS5900	Elasticity	3	0	0	0	6	9
37.	AS5910	Aero elasticity	3	0	0	0	6	9
38.	AS5920	Dynamics of Elastic Systems	3	0	0	0	6	9
39.	AS5930	Elastic Stability	3	0	0	0	6	9
40.	AS5940	Non-Linear Behaviour of Plates and Shells	3	0	0	0	6	9
41.	AS5950	Continuum Mechanics	3	0	0	0	6	9
42.	AS5960	Advanced Strength of Materials	3	0	0	0	6	9
43.	AS5970	Structural Dynamics and Aero-elasticity	3	0	0	0	6	9
44.	AS5980	Contact Mechanics and Tribology	3	0	0	0	6	9
45.	AS6010	Hypersonic Flow Theory	3	0	0	0	6	9
46.	AS6015	Aerodynamics of Missiles and Launch Vehicles	3	0	0	0	6	9
47.	AS6020	Introduction to Turbulent Flows & their Predictions	3	0	0	0	6	9
48.	AS6030	Experimental Methods in Aero / Gas Dynamics	3	0	0	0	6	9
49.	AS6040	Turbulent Flows and their Computation	3	0	0	0	6	9
50.	AS6310	System Simulation and Process Optimization	3	0	0	0	6	9
51.	AS6320	Acoustics Instabilities in Aerospace Propulsion	3	0	0	0	6	9
52.	AS6330	Aero Acoustics	3	0	0	0	6	9
53.	AS6340	Combustion & Flow Diagnostics	3	0	0	0	6	9
54.	AS6510	Experimental Techniques in Structural Mechanics	3	0	0	0	6	9

Branch Code: AM12
M.Tech. in COMPUTATIONAL AND EXPERIMENTAL MECHANICS
2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	AM5390	Advanced Solid Mechanics	3	0	0	0	6	9
2	AM5530	Advanced Fluid Mechanics	3	0	0	0	6	9
3		Computational Core I *	3	0	0	0	6	9
4		Computational Core II *	3	0	0	0	6	9
		Elective 1^^	3	0	0	0	6	9
5	AM5810	Computational Laboratory	0	0	0	3	3	6
6	GN5003	Personal and Professional Growth	1	0	0	0	2	0
		Total Credits :						51

* Computational Cores (any 2)		L	T	E	P	O	C
AM5450	Fundamentals of Finite Element Analysis	3	0	0	0	6	9
AM5630	Foundation of Computational Fluid Dynamics	3	0	0	0	6	9
AM5600	Computational Methods in Mechanics	3	0	0	0	6	9

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1		Experimental Core **	3	0	0	0	6	9
2		Elective 2^^	3	0	0	0	6	9
3		Elective 3^^	3	0	0	0	6	9
4		Elective 4^^	3	0	0	0	6	9
5		Elective 5^^	3	0	0	0	6	9
6	AM5400 / AM5820	Experimental Lab^	0	0	0	6	6	12
		Total Credits :						57

** Experimental Cores (any 1)		L	T	E	P	O	C
AM5240	Experimental Solid Mechanics	3	0	0	0	6	9
AM5018	Experimental Techniques in Fluid Mechanics	3	0	0	0	6	9

^ Experimental Lab:

AM5400 (need to co-credit AM5240: Experimental Solid Mechanics) or

AM5820 (need to co-credit AM5018: Experimental Fluid Mechanics)

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	AM5200 / AM5210	Summer Industrial Internship Summer Project	0	0	0	0	15	15

AM5200: "Summer Industrial Internship" facilitates project work during summer in different industries/ hospitals/ clinical environments of students choice.

AM5210: "Summer Project" was earlier named as "Project Summer". This option facilitates those who would like to stay back in IIT and start their project work early.

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1		Elective 6^^	3	0	0	0	6	9
2	AM5401	Project I	0	0	0	0	30	30
3	AM5480	Seminar	0	0	0	0	3	3
		Total Credits :						42

AM5401: Project I This is compulsory for all. The grade shall be awarded at the end of the semester without keeping in abeyance.

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	AM5402	Project II	0	0	0	0	40	40
		Total Credits :						40

AM5402: Project II This is optional and the choice is given to the candidate by the end of the third semester. If the performance of the candidate in Project I, is not satisfactory, the candidate will be advised by the evaluation committee to pursue equivalent number of course based credits in the fourth semester

Semester	I	II	Summer	III	IV	Total
Credits	51	57	15	42	40	205

	Electives (Fluid Mechanics Stream)	L	T	E	P	O	C
AM5014	Micro-Hydrodynamics	3	0	0	0	6	9
AM5060	Topics in Thermal Engineering	3	0	0	0	6	9
AM5113	Atomization in Sprays	3	0	0	0	6	9
AM5114	Flow and Transport in Heterogenous Porous Media	3	0	0	0	6	9
AM5460	Physicochemical Hydrodynamics	3	0	0	0	6	9
AM5540	Hydrodynamics	3	0	0	0	6	9
AM5550	Vorticity Dynamics	3	0	0	0	6	9
AM5570	Introduction to Turbulence	3	0	0	0	6	9
AM5600	Advanced Gas Dynamics	3	0	0	0	6	9
AM5640	Turbulence modeling	3	0	0	0	6	9
AM6001	Theory of Free Surface Wave motion	3	0	0	0	6	9
AM6110	Bio-Fluid Mechanics	3	0	0	0	6	9
AM6512	Application to Molecular Dynamics	3	0	0	0	6	9
AM6513	Advanced CFD	3	0	0	0	6	9
AM6515	Boundary Layer Stability	3	0	0	0	6	9
AM6517	Foundations of Micro and Nano scale Fluid Mechanics	3	0	0	0	6	9
AM6570	Flow induced Vibrations	3	0	0	0	6	9
AM6590	Turbulent Shear Flows	3	0	0	0	6	9

Branch Code: AM9
M.Tech. in BIOMEDICAL ENGINEERING
2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	AM5119	Core 1: Physiology for Engineers	3	0	0	0	6	9
2	AM5010	Core 2: Biomechanics	3	0	0	0	6	9
3	AM5XXX	Core 3: (from basket of core courses)	3	0	0	0	6	9
4	DPE1	Elective 1 (DPE list / core basket)	3	0	0	0	6	9
5	DPE2	Elective 2 (DPE list/ core basket)	3	0	0	0	6	9
6	AM5023	Physiological measurements and Instrumentation Lab	0	0	0	3	3	6
7	GN5003	Personal and Professional Growth	1	0	0	0	2	0
		Total Credits :						51

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	AM5160	Core 4: Biomedical Imaging Systems	3	0	0	0	6	9
2	AM5140	Core 5: Biomedical Instrumentation	3	0	0	0	6	9
3	AM5XXX	Core 6: (From basket of core courses)	3	0	0	0	6	9
4	FRE1	Elective 3 (FRE)	3	0	0	0	6	9
5	FRE2	Elective 4 (FRE)	3	0	0	0	6	9
6	AM5019	Advanced BME lab	0	0	0	3	6	6
7	AM5022	Modelling and simulation lab	0	0	0	3	3	6
		Total Credits :						57

SUMMER

Option A

S.No	Course No	Course Name	L	T	E	P	O	C
1	AM5200	Summer Industrial Internship	0	0	0	0	15	15

AM5200: "Summer Industrial Internship" facilitates project work during summer in different industries/ hospitals/ clinical environments.

Option B

S.No	Course No	Course Name	L	T	E	P	O	C
1	AM5220	Summer Project	0	0	0	0	10	10
2	AM5230	Clinical practice observation	0	0	0	0	5	5

AM5220-Summer Project: This option facilitates those who would like to stay back in IIT for a short project may / may not be related to main project.

Students who opt for AM5220 Summer Project will also undergo the successful completion of the course AM5230-Shadowing practice in hospitals in order to complete the credit requirements.

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	AM5480	Seminar	0	0	0	0	3	3
2	AM5401	Project I	0	0	0	0	30	30*
		Total Credits :						33

AM5401- Project I: This is compulsory for all. The grade shall be awarded at the end of the semester.

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	AM5402	Project II	0	0	0	0	40	40
		Total Credits :						40

AM5402- Project II: This is optional and the choice is given to the candidate by the end of the third semester. If the performance of the candidate in Project I, is not satisfactory, the candidate will be advised by the evaluation committee to pursue equivalent number of course based credits in the fourth semester

Semester	I	II	Summer	III	IV	Total
Credits	51	57	15	33	40	196

- Project guide will be assigned in 2nd semester
- Electives from above list or any relevant courses from other Departments could be chosen in consultation with Faculty Advisor/ Project guide

Sl.No	Course No	Basket of core courses	L	T	E	P	O	C
1	AM5520	Medical Electronics	3	0	0	0	6	9
2	AM5510	Biomedical Signals and Systems	3	0	0	0	6	9
3	AM5050	Biomedical sensors and measurements	3	0	0	0	6	9
4	AM5017	Statistics for biomedical engineers	3	0	0	0	6	9
5	MM5040	Medical materials	3	0	0	0	6	9
6	AM5120	Biomaterials	3	0	0	0	6	9
7	AM 5130	Quantitative Physiology	3	0	0	0	6	9
8	AM5016	Numerical methods in Biomedical Engineering	3	0	0	0	6	9
		Basket of elective courses (DPE list)						
1	AM5190	Haptics and Biomedical Engineering	3	0	0	0	6	9
2	AM5100	Biomedical laser instrumentation	3	0	0	0	6	9
3	AM6514	Biomedical sensors	3	0	0	0	6	9
4	AM6516	Neuromechanics of human movement	0	0	0	3	2	5
5	AM7010	Classics in neuromechanics	3	0	0	0	6	9
6	AM6190	Cellular structures and mechanics	3	0	0	0	6	9
7	AM6518	Biophysical aspects of tumor microenvironment	3	0	0	0	6	9
8	AM5013	Operating theatre instrumentation and surgical technology	3	0	0	0	6	9
9	AM5011	Virtual Reality Engineering	3	0	0	0	6	9
10	AM4010	Biomedical signal processing	3	0	0	0	6	9
11	AM5060	Psychophysics	3	0	0	0	6	9
12	AM5020	Biomedical ultrasonics	3	0	0	0	6	9
13	AM6110	Bio fluid mechanics	3	0	0	0	6	9
14	AM5028	Clinical Practice Observations in Hospitals	0	0	0	0	5	5

Branch Code: AM13
M.Tech. in CLINICAL ENGINEERING
2022 Batch

Semester I (August-December) @ IIT-Madras

S.No	Course No	Course Name	L	T	E	P	O	C	TH
1	AM5XXX	Core:1 (from basket of core courses)	3	0	0	0	6	9	9
2	AM5010	Biomechanics	3	0	0	0	6	9	9
3	ID6020	Intro to Research	2	0	0	0	4	6	6
4	FRE1	Free elective	3	0	0	0	6	9	9
5	FRE2	Free elective	3	0	0	0	6	9	9
6	DPE1	Elective 1 (DPE list/Core basket)	3	0	0	0	6	9	9
7	GN5003	Personal and Professional Growth	1	0	0	0	2	0	
		Total Credits						51	

Semester II (January-July) @ CMC-Vellore

S.No	Course No	Course Name	Credit
1		Functional Anatomy & Physiology	4
2		Anatomy & Physiology Lab	2
3		Biomedical Imaging Systems	3
4		Clinical Attachment	4
5		Transducers & Instrumentation	3
6		Elective	3
		Total Credits	19
		Equivalent IIT-M credits	57

Semester III (August-December) @ SCTIMST-Tvm

S.No	Course No	Course Name	Credit
1		Medical Device Technology	3
2		Biomaterials	3
3		Clinical Engg, Health Systems & Mgmt	3
4		Elective	3
5		Design Tools for ClinEngg - Lab	2
6		Engg Problems in Hospitals - Lab	2
7		Clinical Attachment	4
8		Clinical Engg Internship - External	2
		Total Credits	22
		Equivalent IIT-M credits	66

Semester IV (January-June)

S.No	Course No	Course Name	L	T	E	P	O	C	TH
1	AM5XXX	Project	0	0	0	0	0	20	20
		Total Credits						20	

Semester	I	II	III	IV	Total
Credits	51	57	66	20	194

		Basket of core courses	L	T	+	P	O	C
1	AM 5160	Biomedical Imaging systems	3	0	0	0	6	9
2	AM5130	Quantitative physiology	3	0	0	0	6	9
3	AM5140	Biomedical instrumentation	3	0	0	0	6	9
4	AM5510	Biomedical Signals and Systems	3	0	0	0	6	9
5	AM 5050	Biomedical sensors and measurements	3	0	0	0	6	9

		Elective streams (Basket of Biomedical Electives)						
	Stream 1	Biomechanics						
1	PH5730	Methods of Computational Physics	3	0	0	0	6	9
2	ME6000	Computational Methods in Engg	3	0	0	0	6	9
3	MA6270	Numerical solutions of partial differential equations	3	0	0	0	6	9
4	MA5890	Numerical linear algebra	3	0	0	0	6	9
5	AM 7010	Classics in Neuroscience	3	0	0	0	6	9
6	AM 5170	Orthopedics Mechanics	3	0	0	0	6	9
7	AM 6190	Movement disorders and neurorehabilitation	3	0	0	0	6	9
8	AM 5190	Haptics and biomedical engineering	3	0	0	0	6	9
9	AM 5060	Psychophysics	3	0	0	0	6	9
10	AM 6516	Neuromechanics of human movement	3	0	0	0	6	9
11	ME6012	Mechanics of human movement	3	0	0	0	6	9
12	AM 5110	Biofluid mechanics	3	0	0	0	6	9
	Stream 2	Biomedical instrumentation						
1	AM 5050	Biomedical sensors and measurements	3	0	0	0	6	9
2	AM 5140	Biomedical instrumentation	3	0	0	0	6	9
3	AM 5100	Biomedical laser instrumentation	3	0	0	0	6	9
4	AM5160	Biomedical imaging systems	3	0	0	0	6	9
5	AM 5013	Operating theatre instrumentation and surgical tech	3	0	0	0	6	9
6	AM 5115	Systems approach in Biomedical engineering	3	0	0	0	6	9
10	EE6403	Transducers for instrumentation	3	0	0	0	6	9
11	EE6402	Biomedical electronic systems	3	0	0	0	6	9
12	EE6501	Optical sensors	3	1	0	0	8	12
13	EE5502	Optical engineering	2	3	0	0	7	12
	Stream 3	Medical Physics						
1	AM 6518	Biophysical aspects of tumor microenvironment	3	0	0	0	6	9
2	AM 5190	Cellular structures and mechanics	3	0	0	0	6	9
3	AM 5120	Biomaterials	3	0	0	0	6	9
4	BT5011	Biomaterials engineering	3	0	0	0	6	9
5	EE5500	Introduction to photonics	3	0	0	0	6	9
6	EE6506	Computational electromagnetics	4	0	0	0	0	12
	Stream 4	Image and Signal processing in Biomedical Engineering						

1	AM4010	Biomedical signal processing	3	0	0	0	6	9
2	CS6300	Speech Technology	3	0	0	0	6	9
3	CS6690	Pattern recognition	3	0	0	0	6	9
4	AM5020	Biomedical Ultrasonics	3	0	0	0	6	9
5	EE4240	Image signal processing	3	0	0	0	6	9

Branch Code: BT4
M.Tech. in BIOPROCESS ENGINEERING
2022 Batch

I semester

S.No		Course	Credits	Core/Elective
1	BT5031	Biochemical Thermodynamics	10	Core
2	BT5071	Bioreactor Design and Analysis	10	Core
3	BT5051	Transport Phenomena	10	Core
4	BT5111	Bioprocess Engineering Laboratory I	3	Core
5		Professional Elective 1	9	Elective
6		Free Elective 1	9	Elective
7	GN5003	Personal and Professional Growth	0	Core
		Total credits	51	

II semester

S.No		Course	Credits	Core/Elective
1	BT5041	Downstream Processing	10	Core
2	BT5210	Bioprocess Control	9	Core
6	BT5121	Bioprocess Engineering Laboratory II	3	Core
3		Professional Elective 2	9	Elective
4		Professional Elective 3	9	Elective
5		Free Elective 2	9	Elective
		Total credits	49	

Summer

S.No		Course	Credits	Core/Elective
1	BT5931	Project	20	Core
		Total credits	20	

III semester

S.No		Course	Credits	Core/Elective
1	BT5932	Project	40	Core
		Total credits	40	

IV Semester

S.No		Course	Credits	Core/Elective
1	BT5933	Project	40	Core
		Total credits	40	

Semester	I	II	Summer	III	IV	Total
Credits	51	49	20	40	40	200

List of professional electives

1. Fermentation Technology	8. Computational Systems Biology
2. Plant Cell Bioprocessing	9. Reactive Species in Medical and Related Tech
3. Tissue Engineering	10. Biomaterials Engineering
4. Metabolic Engineering	11. Drug Delivery
5. Computer Simulations of Biomolecular Systems	12. Bioprocess Modeling and Simulation
6. Biosensors and Instrumentation	13. Bioprocess Equipment Design
7. Molecular Modeling and Drug Design	14. Unit Operations in Biochemical Engg.
	15. Advanced Bioprocess Technology

Any other appropriate courses from other departments

- In MTech Bioprocess Engineering program, students will undergo course work for one year (5 core subjects, 1 Lab and 5 electives) and carry out an intensive project in the second year (12 months).
- At the end of 1st year, the student can appear for a comprehensive examination. Upon successfully clearing this exam, the student can upgrade to a PhD. At the end of the PhD, the student will be awarded both MTech and PhD degrees as per the existing institute norms.

Branch Code: CH1

M.Tech. in CHEMICAL ENGINEERING 2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	CH5010	Chemical Reactor Theory	3	1	0	0	6	10
2	CH5050	Advanced Chemical Engg. Thermodynamics	3	1	0	0	6	10
3	CH5520	Mathematical Methods for Chemical Engrs	3	1	0	0	6	10
4	DPE1	Department Elective 1	3	0	0	0	6	9
5	GN5003	Personal and Professional Growth	1	0	0	0	2	0
Total Credits								39

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	CH5030	Transport Phenomena	3	1	0	0	6	10
2	CH5060	Seminar	0	0	0	3	0	3
3	DPE2	Department Elective 2	3	0	0	0	6	9
4	DPE3	Department Elective 3	3	0	0	0	6	9
5	DPE4	Department Elective 4	3	0	0	0	6	9
6	CH5530	Process Simulation Lab	0	0	0	6	3	9
Total Credits								49

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	CH5560*	Project 1	0	0	0	0	25	25*
Total Credits								25

** Project (CH5560*) grade will be assigned in 4th semester*

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	DPE5	Department Elective 5	3	0	0	0	6	9
2	CH5560	Project-II	0	0	0	0	30	30*
Total Credits								39

** Project (CH5560*) grade will be assigned in 4th semester*

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	CH5561	Project-III	0	0	0	0	40	40
Total Credits :								40

Semester	I	II	Summer	III	IV	Total
Credits	39	49	25	39	40	192

Branch Code: CA1
M.Tech. in CHEMICAL ENGINEERING
Stream: CATALYSIS TECHNOLOGY
2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	CA5010	Fundamentals of Adsorption and Catalysis	3	0	0	0	6	9
2	CA5020	Principles of Solids and Surfaces	3	0	0	0	6	9
3	CH5010	Chemical Reactor Theory	3	1	0	0	6	10
4	DPE1	Elective 1	3	0	0	0	6	9
5	DPE2	Elective 2	3	0	0	0	6	9
6	GN5003	Personal and Professional Growth	1	0	0	0	2	0
Total Credits								46

Electives from list only.

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	CA5030	Experimental Methods in Catalysis	3	0	0	0	6	9
2	CH5026	Transport Phenomena in Catalysis	3	1	0	0	6	10
3	CA5050	Catalyst Preparation and Characterization Lab	1	0	0	6	2	9
4	CA5060	Seminar	0	0	0	3	0	3
5	DPE 3	Elective 3	3	0	0	0	6	9
6	DPE 4	Elective 4	3	0	0	0	6	9
Total Credits								49

Summer

S.No	Course No	Course Name	L	T	E	P	O	C
1	CA5560	Project I	0	0	0	0	25	25
Total Credits								25

Electives from CH2 list only. *Project (CA5560/CA5561) grades will be assigned in semester IV.

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	CA5561	Project II	0	0	0	0	35	35
Total Credits								35

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	CA5562	Project III	0	0	0	0	40	40
Total Credits :								40

Semester	I	II	Summer	III	IV	Total
Credits	46	49	25	35	40	195

LIST OF ELECTIVES (M.Tech. – Catalysis Technology)

DPE1, DPE2, DPE3 & DPE4

Course No.	COURSE TITLE
CA5320	Homogeneous and Enzyme Catalysis
CA5340	Computational Methods in Catalysis
CA5360	Catalysis in Production of Chemicals and Fuels
CA6110	Catalysis in Green Chemistry and Environment
CA6120	Photo-and Electro-Catalysis
CH5020	Statistical Analysis and Design of Experiments
CY6129	Advanced Methods in Experimental Physical Chemistry
BT5280	Biocatalysis and Biotransformations
CA5040	Principles of Surface Analysis
CA5350	Catalysis in Petroleum Technology
CA5370	Nanostructured Materials in Catalysis
CH5160	Chemical and Catalytic Reaction Engineering
CH6531	Multiscale Modeling of Heterogeneous Catalytic Systems
CY6111	Electron Spectroscopy
CY6112	Surface Chemistry and Catalysis
CY6118	Experimental Methods in Chemistry

Branch Code: CE1
M.Tech. in CIVIL ENGINEERING
Stream: Building Technology and Construction Management
2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE5010	Modern Construction Materials	3	0	0	0	6	9
2	CE5110	Building Services	3	0	0	2	6	11
3	CE6010	Construction Contracts & Specifications	3	0	0	0	6	9
4	CE5020	Construction Planning and Control	3	0	0	0	6	9
5	DPE1	Department Elective 1	3	0	0	0	6	9
6	CE5060	Industrial Seminar	0	0	0	3	1	4
7	GN5003	Personal and Professional Growth	1	0	0	0	2	0
Total Credits								51

(Work Load = 51 hours + 8 hours for HTTA/HTRA=59 hours)

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE5100	Construction Software Lab	1	0	0	2	3	6
2	CE5090	Construction Materials Laboratory	0	0	0	6	2	8
3	DPE2	Dept. Elective 2	3	0	0	0	6	9
4	DPE3	Dept. Elective 3	3	0	0	0	6	9
5	DPE4	Dept. Elective 4	3	0	0	0	6	9
6	FRE1	Free Elective 1	3	0	0	0	6	9
Total Credits								50

(Work Load = 50 hours + 8 hours for HTTA/HTRA=58 hours)

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6121	Project - Summer term (Building Technology and Construction Management)	0	0	0	0	20	20

(Work Load = 20 hours + 8 hours for HTTA/HTRA=28 hours)

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6122	Project - Odd semester (building technology and construction management)	0	0	0	0	28	28
2	DPE5	Dept. Elective 5	3	0	0	0	6	9
Total Credits								37

(Work Load = 37 hours + 8 hours of HTTA/HTRA=45 hours)

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6123	Project - Even Semester (building technology and construction management)	0	0	0	0	45	45
Total Credits :								45

(Work Load = 45 hours + 8 hours of HTTA/HTRA=53 hours)

Semester	I	II	Summer	III	IV	Total
Credits	51	50	20	37	45	203

REMARKS

- Credits and grades for M.Tech Project (CE6121, CE6122 and CE6123 together) will be assigned in 4th semester

Branch Code: CE2
M.Tech. in CIVIL ENGINEERING
Stream: ENVIRONMENTAL ENGINEERING
2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE5150	Environmental Chemistry and Microbiology	4	0	0	0	8	12
2	CE5170	Physico-chemical Processes for Water & WW Treatment	4	0	0	0	8	12
3	CE5190	Environmental Monitoring Lab	0	0	0	3	1	4
4	CE6015	Solid Waste Management	3	0	0	0	6	9
5	DPE1	Dept. Elective 1	3	0	0	0	6	9
6	MAE1	Math. Elective	3	0	0	0	6	9
7	GN5003	Personal and Professional Growth	1	0	0	0	2	0
Total Credits								55

(Work Load = 55 hours + 8 hours for HTTA/HTRA=63 hours)

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE5160	Biological Process Design for Wastewater Treatment	4	0	0	0	8	12
2	CE5180	Air Pollution and Control Engineering	4	0	0	0	8	12
3	CE5200	Environmental Microbiology and Engineering Lab	0	0	0	6	2	8
4	CE5220	Environmental Engineering Seminar	1	0	0	0	2	3
5	DPE2	Dept. Elective 2	3	0	0	0	6	9
6	DPE3	Dept. Elective 3	3	0	0	0	6	9
Total Credits								53

(Work Load = 52 hours + 8 hours for HTTA/HTRA=60 hours)

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6291	Project - Summer Term (Environmental Engineering)	0	0	0	0	20	20

(Work Load = 20 hours + 8 hours for HTTA/HTRA=28 hours)

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6292	Project - Odd semester (Environmental Engineering)	0	0	0	0	30	30
2	DPE4	Dept. Elective 4	3	0	0	0	6	9
3	DPE5	Dept. Elective 5	3	0	0	0	6	9
Total Credits								48

(Work Load = 48 hours + 8 hours of HTTA/HTRA=56 hours)

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6293	Project - Even semester (Environmental Engineering)	0	0	0	0	35	35
Total Credits :								35

(Work Load = 35 hours + 8 hours of HTTA/HTRA=43 hours)

Semester	I	II	Summer	III	IV	Total
Credits	55	53	20	48	35	211

REMARKS

- Credits and Grades for M.Tech Project (CE6291, CE6292 and CE6293 together) will be assigned in 4th semester
- One of the Department Elective can be a FREE Elective

Branch Code: CE3
M.Tech. in CIVIL ENGINEERING
Stream: GEOTECHNICAL ENGINEERING
2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE5310	Advanced Soil Mechanics	4	0	0	0	8	12
2	CE5330	Advanced Foundation Engg	3	1	0	0	6	10
3	CE5320	Soil Dynamics	3	1	0	0	6	10
4	CE5421	Geotechnical Engg. Seminar	1	0	0	0	1	2
5	DPE1	Dept. Elective	3	0	0	0	6	9
6	MAE1	Math. Elective	3	0	0	0	6	9
7	GN5003	Personal and Professional Growth	1	0	0	0	2	0
Total Credits								52

(Work Load = 52 hours + 8 hours for HTTA/HTRA=60 hours)

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE5300	Applied Soil Mechanics	3	1	0	0	6	10
2	CE5340	FEM and Constitutive Modelling in Geomechanics	4	0	0	0	8	12
3	CE5410	Experimental Geotechnics	0	0	0	6	2	8
4	DPE2	Dept. Elective	3	0	0	0	6	9
5	DPE3	Dept. Elective	3	0	0	0	6	9
6	DPE4	Dept. Elective	3	0	0	0	6	9
Total Credits								57

(Work Load = 55 hours + 8 hours for HTTA/HTRA=63 hours)

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6431	Project - Summer term (Geotechnical Engineering)	0	0	0	0	20	20

(Work Load = 20 hours + 8 hours for HTTA/HTRA=28 hours)

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6432	Project - Odd semester (Geotechnical Engineering)	0	0	0	0	25	25
2	CE5430	GT Engg. Design Studio	1	0	0	3	2	6
3	DPE5	Dept. Elective	3	0	0	0	6	9
Total Credits								40

(Work Load = 40 hours + 8 hours of HTTA/HTRA=48 hours)

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6433	Project - Even semester (Geotechnical Engineering)	0	0	0	0	44	44
Total Credits :								44

(Work Load = 44 hours + 8 hours of HTTA/HTRA=52 hours)

Semester	I	II	Summer	III	IV	Total
Credits	52	57	20	40	44	213

REMARKS

- Credits and Grades for M.Tech Project (CE6431, CE6432 and CE6433 together) will be assigned in 4th semester
- One of the Department Elective can be a FREE Elective

Branch Code: CE4
M.Tech. in CIVIL ENGINEERING
Stream: HYDRAULICS AND WATER RESOURCES ENGINEERING
2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE5450	Applied Hydraulic Engineering	3	1	0	0	6	9
2	CE5470	Surface Water Hydrology	4	0	0	0	8	12
3	CE5460	Ground Water Engineering	4	0	0	0	8	12
4	CE5490	Hydraulic Engineering Lab.	0	0	0	3	1	4
5	DPE1	Dept. Elective 1	3	0	0	0	6	9
6	MAE1	Math. Elective	3	0	0	0	6	9
7	GN5003	Personal and Professional Growth	1	0	0	0	2	0
Total Credits								55

(Work Load = 55 hours + 8 hours for HTTA/HTRA=63 hours)

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE5480	Water Res. Planning & Mgmt.	4	0	0	0	8	12
2	CE6013	River Engineering	3	0	0	0	6	9
3	CE5520	Hyd. & Water Resources Engg. Seminar	1	0	0	0	1	2
4	CE5500	Hydro-Informatics Lab.	1	0	0	3	2	6
5	DPE2	Dept. Elective	3	0	0	0	6	9
6	DPE3	Dept. Elective	3	0	0	0	6	9
7	DPE4	Dept. Elective	3	0	0	0	6	9
Total Credits								56

(Work Load = 56 hours + 8 hours for HTTA/HTRA=64 hours)

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6491	Project - Summer Term (Hydraulics and Water Resources Engineering)	0	0	0	0	20	20

(Work Load = 20 hours + 8 hours for HTTA/HTRA=28 hours)

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6492	Project - Odd semester (Hydraulics and Water Resources Engineering)	0	0	0	0	30	30
2	DPE5	Dept. Elective	3	0	0	0	6	9
Total Credits								39

(Work Load = 39 hours + 8 hours of HTTA/HTRA=47 hours)

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6493	Project - Even semester (Hydraulics and Water Resources Engineering)	0	0	0	0	40	40
Total Credits :								40

(Work Load = 40 hours + 8 hours of HTTA/HTRA=48 hours)

Semester	I	II	Summer	III	IV	Total
Credits	55	56	20	39	40	210

REMARKS

- Grades for M.Tech Project (CE6491, CE6492 and CE6493 together) will be assigned in 4th semester
- One of the Department Elective can be a FREE Elective

Branch Code: CE5
M.Tech. in CIVIL ENGINEERING
Stream: Structural Engineering
2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6780	Advanced Mechanics of Structures	3	1	0	0	6	10
2	CE5620	Structural Dynamics	3	1	0	0	6	10
3	CE5630	Adv. Design of Concrete Structures	3	1	0	0	6	10
4	CE5740	Experimental Techniques	1	0	0	2	3	6
5	DPE1	Dept. Elective 1	3	0	0	0	6	9
6	MAE1	Math. Elective 1	3	0	0	0	6	9
7	GN5003	Personal and Professional Growth	1	0	0	0	2	0
Total Credits								54

(Work Load = 54 hours + 8 hours for HTTA/HTRA=62 hours)

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE5610	Finite Element Analysis	3	0	1	0	8	12
2	CE5660	Adv. Metal Structures	3	1	0	0	6	10
3	CE6650	St. Engg. Seminar	1	0	0	0	1	2
4	DPE2	Dept. Elective 2	3	0	0	0	6	9
5	DPE3	Dept. Elective 3	3	0	0	0	6	9
6	DPE4	Dept. Elective 4	3	0	0	0	6	9
Total Credits								51

(Work Load = 51 hours + 8 hours for HTTA/HTRA=59 hours)

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6691	Project - Summer term (Structural Engineering)	0	0	0	0	20	20

(Work Load = 20 hours + 8 hours for HTTA/HTRA=28 hours)

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6670	St. Engg. Design Studio	0	0	0	3	6	9
2	CE6692	Project - Odd semester (Structural engineering)	0	0	0	0	32	32
3	DPE5	Dept. Elective	3	0	0	0	6	9
Total Credits								50

(Work Load = 50 hours + 8 hours of HTTA/HTRA=58 hours)

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6693	Project - Even Semester (Structural Engineering)	0	0	0	0	35	35
Total Credits :								35

(Work Load = 35 hours + 8 hours of HTTA/HTRA=43 hours)

Semester	I	II	Summer	III	IV	Total
Credits	54	51	20	50	35	210

REMARKS

- Credits and Grades for M.Tech Project (CE6691, CE6692 and CE6693 together) will be assigned in 4th semester
- One of the Department Elective can be a FREE Elective

Branch Code: CE6
M.Tech. in CIVIL ENGINEERING
Stream: Transportation Engineering
2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE5810	Urban Transportation Planning	3	0	0	0	6	9
2	CE5530	Pavement Materials	3	0	0	0	6	9
3	CE5830	Traffic Engg & Management	3	0	0	0	6	9
4	CE6810	Geometric Design of Highways	3	0	0	0	6	9
5	DPE1	Dept. Elective	3	0	0	0	6	9
6	MAE1	Math. Elective	3	0	0	0	6	9
7	GN5003	Personal and Professional Growth	1	0	0	0	2	0
Total Credits								54

(Work Load = 54 hours + 8 hours for HTTA/HTRA=62 hours)

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE5800	Pavement Analysis and Design	3	0	0	0	6	9
2	CE5840	Tr. Engg. Seminar	1	0	0	0	1	2
3	CE5850	Pavement Mat. and Eval. Lab	1	0	0	2	3	6
4	DPE2	Dept. Elective	3	0	0	0	6	9
5	DPE3	Dept. Elective	3	0	0	0	6	9
6	DPE4	Dept. Elective	3	0	0	0	6	9
7	DPE5	Dept. Elective	3	0	0	0	6	9
Total Credits								53

(Work Load = 53 hours + 8 hours for HTTA/HTRA=61 hours)

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6931	Project - Summer term (Transportation Engineering)	0	0	0	0	20	20

(Work Load = 20 hours + 8 hours for HTTA/HTRA=28 hours)

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE5831	Transp. Engg. Design Studio	0	0	0	3	6	9
2	CE6932	Project - Odd semester (Transportation Engineering)	0	0	0	0	22	22
3	DPE6	Dept. Elective	3	0	0	0	6	9
Total Credits								40

(Work Load = 40 hours + 8 hours of HTTA/HTRA=48 hours)

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6933	Project - Even semester (Transportation Engineering)	0	0	0	0	43	43
Total Credits :								43

(Work Load = 43 hours + 8 hours of HTTA/HTRA=51 hours)

Semester	I	II	Summer	III	IV	Total
Credits	54	53	20	40	43	210

REMARKS

- Credits and Grades for M.Tech Project (CE6931, CE6932 and CE6933 together) will be assigned in 4th semester
- One of the Department Elective can be a FREE Elective

Branch Code: CE7

M.Tech. in Construction Technology and Management (L&T - UOP) 2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE5020	Construction Planning & Control	3	0	0	0	6	9
2	CE6010	Construction Contracts & Specifications	3	0	0	0	6	9
3	CE5130	Construction Quality and Safety Management	4	0	0	0	8	12
4	MS5020	Organizational Behaviour	2	0	0	0	4	6
5	CE5060	Industrial Seminar	0	0	0	3	1	4
6	DPE1	Department Elective 1**	3	0	0	0	6	9
7	GN5003	Personal and Professional Growth	1	0	0	0	2	0
Total Credits								49

(Work Load = 46 hours + 8 hours for HTTA/HTRA=54 hours)

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6030	Construction Economics & Finance	3	0	0	0	6	9
2	CE6050	Lean Construction Concepts, Tools & Practices	2	1	0	0	6	9
3	CE5100	Construction Software Lab	1	0	0	2	3	6
4	DPL1	Department Elective Lab 1	0	0	0	3	3	6
5	DPE2	Department Elective 2**	3	0	0	0	6	9
6	DPE3	Department Elective 3**	3	0	0	0	6	9
Total Credits								48

(Work Load = 48 hours + 8 hours for HTTA/HTRA=56hours)

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6141	Project - Summer (construction technology and management)	0	0	0	0	20	*

(Work Load = 20 hours + 8 hours for HTTA/HTRA=28 hours)

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6142	Project - Odd semester (construction technology and management)	0	0	0	0	20	*
2	DPE4	Department Elective 4**	3	0	0	0	6	9
3	DPE5	Department Elective 5**	3	0	0	0	6	9
Total Credits								18

(Work Load = 41 hours + 8 hours of HTTA/HTRA=49 hours)

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	CE6143	Project - Even semester (construction technology and management)	0	0	0	0	48	88
Total Credits :								88

(Work Load = 48 hours + 8 hours of HTTA/HTRA=56 hours)

Semester	I	II	Summer	III	IV	Total
Credits	49	48	-	18	88	203

REMARKS

* Credits and Grades for M.Tech Project (CE61401, CE6142 and CE6143 together) will be assigned only in 4th semester

** From the "Approved List of Elective for L & T UOP CTAM

Approved List of Elective for L&T UOP CTAM

COMMON ELECTIVE COURSES								
S.No	Course No	Course Name	L	T	E	P	O	C
1	CE5014	Sustainable Construction	3	0	0	0	6	9
2	MS5113	Basics of Probability and Statistics	3	0	0	0	6	9
3	MS5131	Data Analysis for Management	3	0	0	0	6	9
4	MS5130	Operations Research	3	0	0	0	6	9
5	MS5480	Cross Cultural Management	3	0	0	0	6	9
6	MS6620	Infrastructure Finance	3	0	0	0	6	9
7	MS5320	Human Resource Management	3	0	0	0	6	9
8	MS5330	Supply Chain Management	3	0	0	0	6	9
9	MS6710	Financial Risk Management	3	0	0	0	6	9
10	MA5540	Probability and Statistics	3	0	0	0	6	9
11	MA5313	Introduction to Mathematical Statistics	3	0	0	0	6	9

ELECTIVE COURSES FOR CIVIL ENGINEERING STUDENTS								
S.No	Course No	Course Name	L	T	E	P	O	C
1	CE5010	Modern Construction Materials	3	0	0	0	6	9
2	CE5080	GIS in Civil Engineering	3	0	0	0	6	9
3	CE5014	Sustainable Construction	3	0	0	0	6	9
4	CE5110	Building Services	3	0	0	0	6	9
5	CE5120	Maintenance and Rehabilitation of Constructed Facilities	3	0	0	0	6	9
6	CE5210	Transport of Water and Wastewater	3	0	0	0	6	9
7	CE5280	Hazardous Waste Management	3	0	0	0	6	9
8	CE5300	Applied Soil Mechanics	3	0	0	0	6	9
9	CE5330	Advanced Foundation Engineering	3	0	0	0	6	9
10	CE5350	Reinforced Soil Structures	3	0	0	0	6	9
11	CE5360	Soil Exploration and Field Tests	3	0	0	0	6	9
12	CE5370	Geotechnics for Infrastructure	3	0	0	0	6	9
13	CE5800	Analysis and Design of Pavements	3	0	0	0	6	9
14	CE6110	Advanced Concrete Technology	3	0	0	0	6	9
15	CE5950	Characterization of Construction Materials	3	0	0	0	6	9
16	CE7013	Advanced Topics in Project Delivery Finance	3	0	0	0	6	9
17	CE5870	Infrastructure Planning and Management	3	0	0	0	6	9
18	CE5750	CAD in Civil Engineering	3	0	0	0	6	9
19	CE6011	Smart Buildings and Automation	3	0	0	0	6	9
20	CE6130	Construction Project Modeling	3	0	0	0	6	9
21	CE6420	Ground Improvement Techniques	3	0	0	0	6	9
22	OE5050	Ocean Structures and Materials	3	0	0	0	6	9
23	OE5090	Marine Geotechnical Engineering	3	0	0	0	6	9
24	OE5210	Port Planning and Development	3	0	0	0	6	9
25	OE5340	Ocean Environment, Policy and Coastal Zone Mgmt.	3	0	0	0	6	9
26	OE5400	Port and Harbour Structures	3	0	0	0	6	9
27	OE6400	Marine Foundations	3	0	0	0	6	9
28	OE6850	Concrete and Concrete Structure for Oceans	3	0	0	0	6	9

ELECTIVE COURSES FOR MECHANICAL ENGINEERING STUDENTS								
S.No	Course No	Course Name	L	T	E	P	O	C
1	ME6320	Pump Application Engineering	3	0	0	0	6	9
2	ME6530	HVAC Systems and Applications	3	0	0	0	6	9
3	ME6960	Design of Materials Handling Equipment	3	0	0	0	6	9
4	ME5570	Pipeline Engineering	3	0	0	0	6	9
5	MM5180	Nondestructive Evaluation	3	0	0	0	6	9
6	MM5012	Welding Processes	3	0	0	0	6	9
7	ME5710	Welding Processes - I	3	0	0	0	6	9
8	MM5760	Advanced Topics in Metal Joining	3	0	0	0	6	9
9	ME6005	Solar energy for process heat and power generation	3	0	0	0	6	9
10	ME7010	Microprocessors in Automation	3	0	0	0	6	9
11	ME7740	Structural Health and Integrity Monitoring	3	0	0	0	6	9
12	ME7680	Optimization Methods for Mechanical Design	3	0	0	0	6	9
13	NE6000	Introduction to Nuclear Engineering	3	0	0	0	6	9
14	NE6010	Advanced Non-destructive Evaluation	3	0	0	0	6	9

ELECTIVE COURSES FOR ELECTRICAL ENGINEERING STUDENTS								
S.No	Course No	Course Name	L	T	E	P	O	C
1	EE5020	Topics in Electromagnetic Compatibility	3	0	0	0	6	9
2	EE5070	Instrumentation Engineering	3	0	0	0	6	9
3	EE5140	Computer Communication Network	3	0	0	0	6	9
4	EE5360	Microprocessor and Application	3	0	0	0	6	9
5	EE5430	Optical Communication	3	0	0	0	6	9
6	EE5510	Analysis of Networks & Systems	3	0	0	0	6	9
7	EE5610	Transducers	3	0	0	0	6	9
8	EE5620	Power System Instrumentation	3	0	0	0	6	9
9	EE5870	Power Electronic Control of Electric Machines	3	0	0	0	6	9
10	EE5910	Computer Methods in Power System Analysis	3	0	0	0	6	9
11	EE5920	High Voltage Technology	3	0	0	0	6	9
12	EE5940	Power Circuit Breakers & Protective Relays	3	0	0	0	6	9
13	EE5950	High Voltages Power Transmission	3	0	0	0	6	9
14	E5960	Computer Applications in Power System Operation & Planning	3	0	0	0	6	9
15	EE5970	Energy Management System & SCADA	3	0	0	0	6	9
16	EE6920	Advance Topics in Electrical Insulation	3	0	0	0	6	9

LIST OF ELECTIVE LAB COURSES FOR CIVIL ENGINEERING STUDENTS								
S.No	Course No	Course Name	L	T	E	P	O	C
1	CE5090	Construction Materials Laboratory	0	0	0	3	3	6
2	CE5850	Pavement Engineering Laboratory	0	0	0	3	3	6
3	CE5410	Experimental Geotechnics Laboratory	0	0	0	3	3	6
4	CE5190	Environmental Monitoring Laboratory	0	0	0	3	3	6

LIST OF ELECTIVE LAB COURSES FOR MECHANICAL ENGINEERING STUDENTS								
S.No	Course No	Course Name	L	T	E	P	O	C
1	MM5190	Non-Destructive Testing Laboratory	0	0	0	3	3	6
2	MM5770	Welding Laboratory I	0	0	0	3	3	6

LIST OF ELECTIVE LAB COURSES FOR ELECTRICAL ENGINEERING STUDENTS								
S.No	Course No	Course Name	L	T	E	P	O	C
1	EE5000	Electrical Engineering Laboratory I	0	0	0	3	3	6
2	EE5500	Electrical Engineering Laboratory II (CGI/PS Stream/Microprocessors)	0	0	0	3	3	6

Branch Code: CS1

M.Tech. in COMPUTER SCIENCE AND ENGINEERING

2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	CS5800	Advanced Data Structures and Algorithms	3	1	0	0	8	12
2	CS6150	Advanced Programming	1	0	0	3	8	12
3	DPE1	Dept. Elective 1	3	1	0	0	8	12
4	DPE2	Dept. Elective 2	3	1	0	0	8	12
5	GN5003	Personal and Professional Growth	1	0	0	0	2	0
Total Credits								48

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	DPE3	Dept. Elective 3	3	1	0	0	8	12
2	DPE4	Dept. Elective 4	3	1	0	0	8	12
3	DPE5	Dept. Elective 5	3	1	0	0	8	12
4	DPE6	Dept. Elective 6	3	1	0	0	8	12
Total Credits								48

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	CS5998	M Tech Project Phase I *	0	0	0	0	48	48
Total Credits								48

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	CS6019	M Tech Project Phase II	0	0	0	0	48	48
Total Credits :								48

Semester	I	II	III	IV	Total
Credits	48	48	48	48	192

Notes:

1. Project Phase I is a prerequisite for Project Phase II. Project Phase I will be evaluated by a PG committee in the month of November/December (the third semester in the program).

The following are the three cases based on the Project Phase I grade:

Grade C or above: Project Phase II in 4 th semester (48 credits)

Grade D and E: Project Phase IIA (12 credits) and 3 Dept. Electives in 4 th semester (36 credits)

Grade U: Repeat Project Phase I in 4 th semester (48 credits). Then do Project Phase IIA (12 credits and 3 Dept. Electives in 5 th semester (48 credits)

2. For students with CGPA of 6.0 or below at the end of the second semester, the Faculty Advisor and Head of the Dept. may recommend, on a case-by-case basis, that the student register for M.Tech. Project credits of 60 (CS5998 and CS 6119) in the fourth semester or later, after completing 36 credits of Dept. electives.

3. Only students who have completed at least 7 courses at the end of the second semester, will be permitted to register for M. Tech. Project Phase-I in the third semester. Students with more than one uncompleted course must complete all coursework by the end of third semester and then register for M.Tech. project credits, in consultation with the Faculty Advisor and the Head of the Dept. These students will take more than 4 semesters to meet the requirements for M.Tech. degree.

4. Maximum of two Non-CSE Dept. courses can be credited as Department electives, with the approval of the Faculty Advisor and HoD, CSE. The current list of Non-CSE Dept. courses approved by the Dept. is given in Annexure - I. This list may be revised from time to time.

Annexure

List of Non-CSE Dept. courses that can be taken as Department Electives

Sl.No.	Course No.	Course Title
1	BT6270	Computational Neuroscience
2	BT5420	Computer Simulations of Biomolecular Systems
3	EE5120	Applied Linear Algebra
4	EE5121	Convex Optimization
5	EE5130	Digital Signal Processing
6	EE5140	Digital Modulation and Coding
7	EE5142	Introduction to Information Theory and Coding
8	EE5154	Complex Network Analytics
9	EE5162	Information Theory
10	EE5170	Speech Signal Processing
11	EE5175	Image Signal Processing
12	EE5176	Computational Photography
13	EE6132	Machine Learning for Computer Vision
14	MA5011	Advanced Graph Theory
15	MA5014	Applied Stochastic Processes
16	MA5015	Number Theory
17	MA5440	Combinatorics and Number Theory
18	MA5850	Operations Research
19	MA5890	Numerical Linear Algebra
20	MA6001	Introduction to Coding Theory
21	MA6005	Applied Linear Algebra
22	MA6190	Mathematical Logic
23	MA6210	Combinatorial Optimization
24	MA6312	Mathematical theory of Games
25	MA6420	Algebraic Theory of Codes and Automata
26	MA6470	Commutative algebra
27	MA6480	Galois theory

Branch Code: EE7

M.Tech. in ELECTRICAL ENGINEERING STREAM: COMMUNICATIONS AND SIGNAL PROCESSING 2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1		MTech core I^	4	0	0	0	8	12
2		MTech core II^	4	0	0	0	8	12
3		MTech core III^	4	0	0	0	8	12
4		MTech core IV^	3	0	0	0	6	9
5	GN5003	Personal and Professional Growth	1	0	0	0	2	0
		Total	15	0	0	0	30	45

^ Total number of core credits must be at least 45. Core courses are to be taken from the following basket of core courses (courses can be added to this basket with HOD approval):

No.	Course No.	Title	L	T	E	P	O	C
1	EE5110	Probability Foundations for Electrical Engineers	4	0	0	0	8	12
2	EE5120	Applied Linear Algebra I for EE	4	0	0	0	8	12
3	EE5130	Digital signal processing	4	0	0	0	8	12
4	EE5151	Communication techniques	4	0	0	0	8	12
5	EE5140	Digital modulation and coding	4	0	0	0	8	12
6	EE5150	Communication Networks	4	0	0	0	8	12
7	EE5505	Wave propagation in communications	4	0	0	0	8	12
8	EE5500	Introduction to photonics	4	0	0	0	8	12
9	EE5142	Introduction to Information Theory and Coding	4	0	0	0	8	12
10	EE5153	Foundations of Optical Networking	4	0	0	0	8	12
11	EE5143	Information Theory	3	0	0	0	6	9

Note: Only one of the two courses EE5142 and EE5143 can be taken to meet the credit requirement.

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1		Electives**	0	0	0	0	0	0

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6901	Project I	0	0	0	0	25	25

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6902	Project II	0	0	0	0	30	30
2		Electives**						

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6903	Project III	0	0	0	0	30	30
		Total						30

Semester	I	II	Summer	III	IV	Total
Credits	45	0**	25	30**	30	190

** Indicated credits are only for core programme. In addition, 60 credits of electives have to be taken. Of these 60 elective credits, 48 credits of electives have to be taken from Elec. Engg. (or equivalent) at the 5000 level or higher, and 12 credits can be taken in any department at the 5000 level or higher. All elective lab courses will also be eligible. Courses from the core basket can also be taken as electives after the minimum requirement for core courses are satisfied.

The EE Department proposes to split the M.Tech project into two phases --- Project Phase-1 carrying 55-credits (to be carried out usually over the summer and the odd semester), and Project Phase-2 carrying 30-credits (to be carried out in the even semester).

Project Phase-1 is mandated for all students. On the other hand, Project Phase-2, which is the continuation of Phase-1, can be pursued only if it is approved by the evaluation committee.

At the end of Project Phase-1, the student should submit a report and make a presentation. The committee will then recommend whether or not the student is eligible to pursue Project Phase-2. If the student is not found eligible, additional course work has to be done so as to meet the total credit requirements for obtaining the M.Tech degree.

Branch Code: EE2

M.Tech. in ELECTRICAL ENGINEERING STREAM: Power Systems and Power Electronics 2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE5200	Power Converter Analysis and Design	3	0	0	0	6	9
2	EE5201	Modeling and Analysis of Electric Machines	3	0	0	0	6	9
3	EE5253	Computer Method in Power System Analysis	3	0	0	0	6	9
4		Electives **						**
5	GN5003	Personal and Professional Growth	1	0	0	0	2	0
		Total						27**

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE5254	High Voltage Engineering	3	0	0	0	6	9
2	EE5702	Laboratory (Power)	0	0	0	3	3	6
3		Electives **						**
		Total						15**

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6901	Project I	0	0	0	0	25	25

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6902	Project II	0	0	0	0	30	30

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6903	Project III	0	0	0	0	30	30
		Total						30

Semester	I	II	Summer	III	IV	Total
Credits	27**	15**	25*	30*	30*	190

** Indicated credits are only for core programme. In addition, a minimum of **63 credits of electives** have to be taken either from the list of electives added in the next page or from the electives offered by any Department of the Institution at the 5000 level or higher.

The EE Department proposes to split the M.Tech project into two phases --- Project Phase-1 carrying 55-credits (to be carried out usually over the summer and the odd semester), and Project Phase-2 carrying 30-credits (to be carried out in the even semester).

Project Phase-1 is mandated for all students. On the other hand, Project Phase-2, which is the continuation of Phase-1, can be pursued only if it is approved by the evaluation committee.

At the end of Project Phase-1, the student should submit a report and make a presentation. The committee will then recommend whether or not the student is eligible to pursue Project Phase-2. If the student is not found eligible, additional course work has to be done so as to meet the total credit requirements for obtaining the M.Tech degree.

SUGGESTED LIST OF ELECTIVES

S.No	Course No	Course Name	L	T	E	P	O	C
1.	EE5202	Computer Aided Design of Electrical Machines	3	0	0	0	6	9
2.	EE5203	Switched mode power conversion	3	0	0	0	6	9
3.	EE5212	Digital Control of Power Electronics	3	0	0	0	6	9
4.	EE5256	Computer Applications in power system operation and planning	3	0	0	0	6	9
5.	EE5257	Energy Management Systems and SCADA	3	0	0	0	6	9
6.	EE5258	Power System Optimization	3	0	0	0	6	9
7.	EE5260	Power Quality	3	0	0	0	6	9
8.	EE5261	FACTS	3	0	0	0	6	9
9.	EE6010	Smart Power Grids	3	0	0	0	6	9
10.	EE6200	Power electronic control of electrical machines	3	0	0	0	6	9
11.	EE6201	Digital simulation of power electronic circuits & systems	3	0	0	0	6	9
12.	EE6253	Power System Stability and Control	3	0	0	0	6	9
13.	EE6254	Advanced topics in Insulation	3	0	0	0	6	9
14.	EE6255	Power system protection	3	0	0	0	6	9
15.	EE6258	DC Power Transmission	3	0	0	0	6	9
16.	EE6259	Distributed Power systems	3	0	0	0	6	9
17.	EE6261	Restructured Power Systems	3	0	0	0	6	9
18.	EE6262	Advanced motor control	3	0	0	0	6	9
19.	EE7201	Directed study on Research Topics	4	0	0	0	8	12

Branch Code: EE3
M.Tech. in ELECTRICAL ENGINEERING
STREAM: Micro Electronics and VLSI Design
2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1		MTech core I [^]	4	0	0	0	8	12
2		MTech core II [^]	4	0	0	0	8	12
3		MTech core III [^]	4	0	0	0	8	12
4		MTech core IV [^]	4	0	0	0	8	12
5	GN5003	Personal and Professional Growth	1	0	0	0	2	0
		Total	16	0	0	0	32	48

[^] Total number of core credits must be at least 48. Core courses are to be taken from the following basket of core courses (courses can be added to this basket with HOD approval):

No.	Course No.	Title	L	T	E	P	O	C
1	EE5311	Digital IC design	4	0	0	0	8	12
2	EE5310	Analog electronic circuits	4	0	0	0	8	12
3	EE5190	Analog IC Design	4	0	0	0	8	12
4	EE5313	Semiconductor device modelling	4	0	0	0	8	12
5	EE5312	VLSI technology	4	0	0	0	8	12
6	EE5341	MOS device modeling	3	0	0	0	6	9
7	EE5340	Micro electro mechanical systems	3	0	0	0	6	9
8	EE5130	Digital signal processing	4	0	0	0	8	12

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1		Electives**	0	0	0	0	0	0**

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6901	Project I	0	0	0	0	25	25

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6902	Project II	0	0	0	0	30	30
2		Electives**						

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6903	Project III	0	0	0	0	30	30
		Total						30

Semester	I	II	Summer	III	IV	Total
Credits	48	0**	25	30	30	190

** Indicated credits are only for core programme. In addition, **57 credits of electives** have to be taken. Of these 57 credits, 39 credits of electives have to be taken from a specified basket of EE3 electives in Elec. Engg. (or equivalent) at the 5000 level or higher, and 18 credits can be taken from any course in Elec. Engg. (or equivalent) at the 5000 level or higher. All elective lab courses will also be eligible. Courses from the core basket can also be taken as electives after the minimum requirement for core courses are satisfied.

The EE Department proposes to split the M.Tech project into two phases --- Project Phase-1 carrying 55-credits (to be carried out usually over the summer and the odd semester), and Project Phase-2 carrying 30-credits (to be carried out in the even semester).

Project Phase-1 is mandated for all students. On the other hand, Project Phase-2, which is the continuation of Phase-1, can be pursued only if it is approved by the evaluation committee.

At the end of Project Phase-1, the student should submit a report and make a presentation. The committee will then recommend whether or not the student is eligible to pursue Project Phase-2. If the student is not found eligible, additional course work has to be done so as to meet the total credit requirements for obtaining the M.Tech degree.

Branch Code: EE12

M.Tech. in ELECTRICAL ENGINEERING STREAM: Electronic System Design and Instrumentation 2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE5400	Analog and Digital Systems	2	0	0	3	7	12
2	EE5412	Mathematical Methods in Systems Engg.	4	0	0	0	8	12
3		Core I #						12
4		Core II #						12
5		Electives **						**
6	GN5003	Personal and Professional Growth	1	0	0	0	2	0
		Total						48**

Students must be chosen core I & II from the following core basket

Core Basket for Controls

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE5413	Linear Dynamical Systems	4	0	0	0	8	12
2	EE5411	Synthesis of Control Systems	4	0	0	0	8	12

Core Basket for Instrumentation (students must be chosen 2 out of 3)

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE5401	Measurements and Instrumentation	4	0	0	0	8	12
2	EE5410	Introduction to Digital Signal Processing	4	0	0	0	8	12
3	EE5411	Synthesis of Control Systems	4	0	0	0	8	12

Core Basket for Controls & Instrumentation

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE5413	Linear Dynamical Systems	3	1	0	0	8	12
2	EE5410	Introduction to Digital Signal Processing	3	1	0	0	8	12

Semester 2

(for Controls)

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6415	Nonlinear Systems Analysis	3	0	0	0	6	9
2		Other control and related electives **						**
		Total						9**

(for Instrumentation)

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6403	Transducers for Instrumentation	4	0	0	0	8	12
2		Other instrumentation and related electives **						**
		Total						12**

(for Controls & Instrumentation)

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6415	Nonlinear Systems Analysis	3	0	0	0	6	9
2	EE6403	Transducers for Instrumentation	4	0	0	0	8	12
3		Other control & instrumentation and related electives **						**
		Total						21**

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6901	Project I	0	0	0	0	25	25

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6902	Project II	0	0	0	0	30	30
2		Electives**						**
								30**

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6902	Project III	0	0	0	0	30	30
		Total						30

Semester	I	II	Summer	III	IV	Total
Credits	48**	9/12/21**	25*	30*	30*	190

** Indicated credits are only for core programme. In addition, 48/45/36 credits of electives have to be taken. Of these elective credits, 27 credits of electives have to be taken from Elec. Engg. (or equivalent) at the 5000 level or higher. The remaining elective credits can be taken in any department at the 5000 level or higher, subject to approval of Faculty Advisor. All elective lab courses will also be eligible.

The EE Department proposes to split the M.Tech project into two phases --- Project Phase-1 carrying 55-credits (to be carried out usually over the summer and the odd semester), and Project Phase-2 carrying 30-credits (to be carried out in the even semester).

Project Phase-1 is mandated for all students. On the other hand, Project Phase-2, which is the continuation of Phase-1, can be pursued only if it is approved by the evaluation committee.

At the end of Project Phase-1, the student should submit a report and make a presentation. The committee will then recommend whether or not the student is eligible to pursue Project Phase-2. If the student is not found eligible, additional course work has to be done so as to meet the total credit requirements for obtaining the M.Tech degree.

List of Elective EE4 stream

No.	Subject
CS6230	CAD for VLSI Systems
EE5030	DSP Architectures and Embedded Systems
EE5430	Discrete Data Systems
EE5431	Adaptive & Optimal Control
EE5432	Robotic Control Systems
EE5510	Analysis of Networks & Systems
EE5970	Energy Management Systems & SCADA
EE6402	Biomedical Electronic Systems
EE6403	Transducers
EE6404	Power System Instrumentation
EE6405	Precision Measurements
EE6406	Embedded Systems in Instrumentation
EE6410	Mobile Robotics, Sensors, Vision & Control
EE6411	Allied Topics in Control Systems
EE6415	Non-linear Control Systems
EE6416	Robust Control
EE6419	Geometric nonlinear control theory
EE6490	Advanced Topics in Control Systems Technology
EE7420	Advanced Topics in Instrumentation
EE7421	Advanced Topics in Biomedical Instrumentation
EE7401	Directed Study on Research Topics
MA5070	Calculus of variations
MA6050	Dynamical Systems
MA6240	Algorithmic Graph Theory
PH6150	Dynamical Systems
*****	Any other course with the approval of the Department.

Branch Code: EE13

M.Tech. in ELECTRICAL ENGINEERING STREAM: RF and Photonics 2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE5500	Introduction to photonics	3	1	0	0	5	9
2	EE5505	Wave propagation in communication	3	1	0	0	5	9
3	EE5400	Analog and Digital Circuits	2	0	0	3	7	12
4	EE5501	Photonics Laboratory	0	0	0	3	3	6
5	GN5003	Personal and Professional Growth	1	0	0	0	2	0
		Total						36

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE5507	RF Systems Laboratory	0	0	0	3	3	6
2	EE6000	Seminar	1	0	0	0	2	3
		Total						9

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6901	Project I	0	0	0	0	25	25

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6902	Project II	0	0	0	0	30	30

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6903	Project III	0	0	0	0	30	30
		Total						30

Semester	I	II	Summer	III	IV	Total
Credits	36**	9**	25	30**	30	190

** Indicated credits are only for core programme. In addition, **60 credits of electives** have to be taken. All elective credits should be at the 5000 level or higher- courses of the institute, subject to the approval of the faculty advisor. Suggested list of elective courses are given below.

The EE Department proposes to split the M.Tech project into two phases --- Project Phase-1 carrying 55-credits (to be carried out usually over the summer and the odd semester), and Project Phase-2 carrying 30-credits (to be carried out in the even semester).

Project Phase-1 is mandated for all students. On the other hand, Project Phase-2, which is the continuation of Phase-1, can be pursued only if it is approved by the evaluation committee.

At the end of Project Phase-1, the student should submit a report and make a presentation. The committee will then recommend whether or not the student is eligible to pursue Project Phase-2. If the student is not found eligible, additional course work has to be done so as to meet the total credit requirements for obtaining the M.Tech degree.

Suggested List of Elective Courses

Course No.	Course Name	Credits
EE5502	Optical Engineering	12
EE5504	Fibre Optic Communication Technology	12
EE5410/ EE5130	Introduction to DSP/Digital Signal Processing	11
EE6500	Integrated Optoelectronic Devices and Circuits	12
EE6501	Optical Sensors	9
EE6700	Advanced Photonics Laboratory	9
EE6505	Waveguides, microwave circuits and antennas	12
ED5316	Antenna Theory and Design	10
	Radar and Signal Processing/ Radar Systems	
EE6320	RF Integrated Circuits	9
ED5052	Electromagnetic Compatibility for Product Design	11
EE8007	Microwave Photonics- Technologies, Systems and Networks	6
EE5153	Foundations of Optical Networking	12
EE5011	Computer Methods in EE	9
EE5312	VLSI Technology	12
PH5814	Laser Theory (Physics Dept)	9
EE5110	Probability Foundations for Signal Processing	11
EE5150	Communication Networks	12
EE5340	Micro Electro Mechanical Systems	9
EE5182	Computational Electromagnetics	12
PH5620	Coherent and Quantum Optics	9
PH6360	Nonlinear optical proc and devices	9
PH5890	Ultrafast Laser and Applications	9
EE6420	Optical Communication Networks	9
EE6502	Optical Signal Processing and Quantum Comm	9
EE7500	Advanced topics in RF and Photonics	9
EE7001	Directed Study on Research Topics	9

Remaining elective credits can be any 5xxx/6xxx/7xxx courses with the approval of faculty advisor.

EE10 - M.Tech. in ELECTRICAL ENGINEERING
STREAM: Integrated Circuits & Systems
2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE5310	Analog Electronic Circuits	4	0	0	0	8	12
2	EE5311	Digital IC Design	4	0	0	0	8	12
3		Elective Courses						**
4	GN5003	Personal and Professional Growth	1	0	0	0	2	0
		Total						24**

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
		Elective Courses						**

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6901	Project I	0	0	0	0	25	25

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6902	Project II	0	0	0	0	30	30

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6903	Project III	0	0	0	0	30	30

Semester	I	II	Summer	III	IV	Total
Credits	24**	0**	25	30**	30	190

** Only core credits are shown. In the EE6 curriculum, **81 credits of electives** have to be taken. Of these 81 credits, 48 credits of electives have to be taken from the specified basket of EE6 electives, and 24 credits can be taken from any course in Elec. Engg. (or equivalent) at the 5000 level or higher. All elective lab courses will also be eligible. All course credits should be finished in the first two semesters. EE6 students will be allowed to register only for project credits in the second year (including summer between second and third semesters).

The EE Department proposes to split the M.Tech project into two phases --- Project Phase-1 carrying 55-credits (to be carried out usually over the summer and the odd semester), and Project Phase-2 carrying 30-credits (to be carried out in the even semester).

Project Phase-1 is mandated for all students. On the other hand, Project Phase-2, which is the continuation of Phase-1, can be pursued only if it is approved by the evaluation committee.

At the end of Project Phase-1, the student should submit a report and make a presentation. The committee will then recommend whether or not the student is eligible to pursue Project Phase-2. If the student is not found eligible, additional course work has to be done so as to meet the total credit requirements for obtaining the M.Tech degree.

Elective courses in the EE6 area are to be taken from the following basket of courses (courses can be added to this basket with HOD approval):

- 1) EE5130 Digital Signal Processing
- 2) EE5410 Introduction to DSP
- 3) EE5110 Probability Foundations for Electrical Engineers
- 4) EE5330 Computer-Aided Design and Analysis of Digital ICs
- 5) EE5331 DSP Architectures & Embedded Systems
- 6) EE5332 Mapping Signal Processing Algorithms to DSP Architectures
- 7) EE5320 Analog IC Design
- 8) EE5321 Active Filter Design
- 9) EE5323 Advanced Electrical Networks
- 10) EE5325 Power Management Integrated Circuits
- 11) EE5350 Linear algebra techniques for data analysis and modelling
- 12) EE6320 RF Integrated Circuits
- 13) EE6321 VLSI Data Conversion Circuits
- 14) EE6322 VLSI Broadband Communication Circuits
- 15) EE6323 Wireless System Design
- 16) EE6324 Phase-Locked Loops
- 17) EE6325 Advanced Power Management Systems
- 18) EE6350 Analysis of noise in systems
- 19) EE6360 Advanced topics in VLSI
- 20) EE6361 Advanced topics in VLSI
- 21) EE7301 Directed Study on Research Topics
- 22) CS6330 Digital System Testing & Testable Design
- 23) CS6230 CAD for VLSI
- 24) EE5313 Semiconductor Device Modelling
- 25) EE5200 Power converter analysis and design
- 26) EE5140 Digital modulation and coding
- 27) EE6402 Biomedical Electronic Systems
- 28) EE6402 Transducers for Instrumentation
- 29) EE5401 Measurements and Instrumentation
- 30) EE5203 Switched mode power conversion

EE14 - M.Tech. in ELECTRICAL ENGINEERING
STREAM: Control and Optimization
2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1		MTech Core 1	4	0	0	0	8	12
2		MTech Core 2	4	0	0	0	8	12
3		MTech Core 3	3	0	0	0	6	9
4	EE5419	Advanced Control Laboratory	0	0	0	3	3	6
5	GN5003	Personal and Professional Growth	1	0	0	0	2	0
6		Elective**						
		Total						39

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1		Elective **						

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6901	Project I	0	0	0	0	25	25

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6902	Project II	0	0	0	0	30	30

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	EE6903	Project III	0	0	0	0	30	30

Semester	I	II	Summer	III	IV	Total
Credits	39**	0**	25	30**	30	190

**Indicated credits are only for the core courses. Total number of credits to be earned is 190. At least 33 credits have to be earned from the courses in the core basket. In addition to the 33 credits from the core basket, at least 48 credits have to be earned from the courses in the core basket and the suggested lists of electives. Up to 18 elective credits can be taken in any department at the 5000 level or higher, subject to the approval of the Faculty Advisor.

The M.Tech project is split into two phases --- Project Phase-1 carrying 55-credits (to be carried out usually over the summer and the odd semester), and Project Phase-2 carrying 30-credits (to be carried out in the even semester).

Project Phase-1 is mandated for all students. On the other hand, Project Phase-2, which is the continuation of Phase-1, can be pursued only if it is approved by the evaluation committee.

At the end of Project Phase-1, the student should submit a report and make a presentation. The committee will then recommend whether or not the student is eligible to pursue Project Phase-2. If the student is not found eligible, additional course work has to be done so as to meet the total credit requirements for obtaining the M.Tech degree.

Core basket

No	Course No	Course Name	Credits
1	EE5413	Linear Dynamical Systems	12
2	EE5412	Mathematical Methods in Systems Engineering	12
3	EE6412	Optimal Control	12
4	EE6415	Nonlinear Systems Analysis	12
5	EE6430	Fundamentals of Linear Optimization	9
6	EE5411	Synthesis of Control Systems	12

Suggested List of Electives (From EE)

S No	Course No	Course Name	Credits
1	EE6432	Stochastic Control	12
2	EE6433	Distributed Optimization for Control	12
3	EE6417	Allied topics in Control Systems	9
4	EE6419	Geometric Nonlinear Control Theory	9
5	EE6418	Dynamic Games - Theory and Applications	9
6	EE6431	Nonsmooth Analysis in Control and Optimization	9
7	EE5110	Probability Foundations for Electrical Engineers	12
8	EE5121	Convex Optimization	12

Suggested List of Electives (Outside EE)

S No	Course No	Course Name	Credits
1	CH5120	Modern Control Theory	9
2	CH5115	Parameter and State Estimation	10
3	CS6700	Reinforcement Learning	12
4	ED6007	Mechanics and Control of Serial Robots	12
5	CH5350	Applied Time Series Analysis	9
6	CH 5230	Data-driven Modelling of Process Systems	9

Branch Code: MA1

M.Tech. in INDUSTRIAL MATHEMATICS & SCIENTIFIC COMPUTING 2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	MA5710	Mathematical Modelling in Industry	2	0	0	2	6	10
2	MA5750	Applied Statistics	3	0	0	0	6	9
3	MA5910	Data Structures in Scientific Computing	4	0	0	0	8	12
4	MA5741	Object Oriented Programming	1	0	0	2	4	7
5	MA5892	Numerical methods & Scientific Computing	3	0	0	0	6	9
6	MA5890	Numerical Linear Algebra	3	0	0	0	6	9
7	GN5003	Personal and Professional Growth	1	0	0	0	2	0
Total Credits								56

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	MA6270	Numerical Solutions of Partial Differential Equations	3	0	0	0	6	9
2	MA5770	Modelling Workshop	0	0	0	3	3	6
3	MA5755	Data Analysis & Visualization in R/Python/SQL	0	0	0	3	3	6
4	MA5895	Numerical Optimization	3	0	0	0	6	9
5	MA6380	Stochastic Methods in Industry	3	0	0	0	6	9
6	Elective - 1	Elective - 1	3	0	0	0	6	9
Total Credits								48

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	Elective - 2	Elective - 2	3	0	0	0	6	9
2	Elective - 3	Elective - 3	3	0	0	0	6	9
3	Elective - 4	Elective - 4	3	0	0	0	6	9
4	Elective - 5	Elective - 5	3	0	0	0	6	9
5	MA5960	Project Proposal & Progress	0	0	0	0	14	14
Total Credits								50

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	MA5990	Project	0	0	0	0	40	40
Total Credits :								40

Semester	I	II	III	IV	Total
Credits	56	48	50	40	194

All the electives should be graduate courses. It may be taken from other department.

Branch Code: ME1

M.Tech. in MECHANICAL ENGINEERING

STREAM: Thermal Engineering

2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	ME5101	Advanced heat and mass transfer	3	1	0	0	6	10
2	ME5103	Incompressible fluid flow	3	0	0	0	6	9
3	ME5105	Applied Thermodynamics	3	0	0	0	6	9
4	ME5107	Numerical methods in thermal engineering	2	0	0	3	5	10
5	ME5109	Measurements in thermal engineering	2	0	0	3	5	10
6	GN5003	Personal and Professional Growth	1	0	0	0	2	0
		Credits for semester 1						48

Semester 2 (Student must register for at least three out of the five electives during 2nd sem)

S.No	Course No	Course Name	L	T	E	P	O	C
1		Professional elective 1	3	0	0	0	6	9
2		Professional elective 2	3	0	0	0	6	9
3		Professional elective 3	3	0	0	0	6	9
4		Professional elective 4	3	0	0	0	6	9
5		Professional free elective	3	0	0	0	6	9
6	ME5180	Thermal engineering lab	0	0	0	3	0	3
		Credits for semester 2						48

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	ME7691	Project Phase I	0	0	0	0	20	20
		Total Credits						20

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	ME7692	Project Phase II	0	0	0	0	35	35
		Total Credits :						35

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	ME7693	Project Phase III	0	0	0	0	40	40
		Total Credits :						40

Semester	I	II	Summer	III	IV	Total
Credits	48	48	20	35	40	191

Ratio of elective-credits to total-credits (excluding project credits): 46.8%

LIST OF ELECTIVES

S.No	Course No	Course Name	L	T	E	P	O	C
1.	ME5120	Gas Turbine Engineering	3	0	0	0	6	9
2.	ME5124	Heat and Mass Transfer in Biological Systems	3	0	0	0	6	9
3.	ME5127	Introduction to Atmospheric Science	3	0	0	0	6	9
4.	ME6120	Flow and Thermal Instabilities	3	0	0	0	6	9
5.	ME6122	Jetflow & Acoustics	3	0	0	0	6	9
6.	ME6123	Cavitation	3	0	0	0	6	9
7.	ME6124	Turbomachinery Noise and Control	3	0	0	0	6	9
8.	ME6125	Theory of steam and gas turbines	3	0	0	0	6	9
9.	ME6126	Design of pumps	3	0	0	0	6	9
10.	ME6127	Energy and Environment	3	0	0	0	6	9
11.	ME6128	Aerodynamic Design of Axial Compressors and Turbines	3	0	0	0	6	9
12.	ME6130	Theory and design of centrifugal m/c	3	0	0	0	6	9
13.	ME6132	Theory of axial compressors	3	0	0	0	6	9
14.	ME6134	Airconditioning and ventilation	3	0	0	0	6	9
15.	ME6136	Refrigeration machinery and components	3	0	0	0	6	9
16.	ME6138	Sorption refrigeration and heating systems	3	0	0	0	6	9
17.	ME6139	Simulation of IC Engines Processes	3	0	0	0	6	9
18.	ME6140	HVAC Systems and Applications	3	0	0	0	6	9
19.	ME6141	CFD and Its Applications to Engine Processes	3	0	0	0	6	9
20.	ME6142	Advanced Cryogenic Systems	3	0	0	0	6	9
21.	ME6143	Engine Instrumentation & Electronic Management	3	0	0	0	6	9
22.	ME6144	Thermal Energy Conservation	3	0	0	0	6	9
23.	ME6145	Transport Processes in Engines	3	0	0	0	6	9
24.	ME6146	Utilization of Solar Energy	3	0	0	0	6	9
25.	ME6147	Rocket technology	3	0	0	0	6	9

S.No	Course No	Course Name	L	T	E	P	O	C
26.	ME6148	Renewable Energy Technology	3	0	0	0	6	9
27.	ME6149	Fundamentals of Combustion	3	0	0	0	6	9
28.	ME6154	Design and Optimization of Energy Systems	3	0	0	0	6	9
29.	ME6156	Design of combustion engines	3	0	0	0	6	9
30.	ME6158	Engine systems and performance	3	0	0	0	6	9
31.	ME6160	Alternative Fuels	3	0	0	0	6	9
32.	ME6164	Laser Diagnostics in Engines	3	0	0	0	6	9
33.	ME6166	Combustion technology	3	0	0	0	6	9
34.	ME6168	Air-breathing engines	3	0	0	0	6	9
35.	ME6170	Theory of Fire Propagation	3	0	0	0	6	9
36.	ME7120	Microscale Fluid Flow and Machinery	3	0	0	0	6	9
37.	ME7121	Heat and Mass Transfer in Porous Media	3	0	0	0	6	9
38.	ME8120	Computational Fluid Dynamics of Turbomachinery	3	0	0	0	6	9

Branch Code: ME18
M.Tech. in MECHANICAL ENGINEERING
STREAM: MECHANICAL DESIGN
2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	ME5201	Computational methods in engineering	3	1	0	0	6	10
2	ME5203	Advanced mechanics of solids	3	0	0	0	6	9
3	ME5205	Theory of vibration	3	0	0	0	6	9
4	ME5207	Design with advanced materials	3	0	0	0	6	9
5		Professional elective 1	3	0	0	0	6	9
6	ME5281	Mechanical design lab	0	0	0	3	0	3
7	GN5003	Personal and Professional Growth	1	0	0	0	2	0
		Credits for semester 1						49

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	ME5204	Finite element analysis	3	0	0	0	6	9
2		Professional elective 2	3	0	0	0	6	9
3		Professional elective 3	3	0	0	0	6	9
4		Professional elective 4	3	0	0	0	6	9
5		Professional free elective	3	0	0	0	6	9
6	ME5280	Design practice using CAD tools	1	0	0	3	2	6
		Credits for semester 2						51

Note: (1) Student must register for at least three out of the four electives during the second semester
(2) Student can opt to do professional elective 1 in the third semester

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	ME7491	Project Phase I	0	0	0	0	20	20
		Total Credits						20

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	ME7492	Project Phase II	0	0	0	0	35	35
		Total Credits :						35

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	ME7493	Project Phase III	0	0	0	0	40	40
		Total Credits :						40

Semester	1	2	Summer	3	4	Total
Credits	49	51	20	35	40	195

Ratio of elective-credits to total-credits (excluding project credits): 45%

LIST OF ELECTIVES

S.No	Course No	Course Name	L	T	E	P	O	C
1	CT7000	Composite Materials Science	3	0	0	0	6	9
2	CT7120	Modeling and Equipment Des for Comp Proc	3	0	0	0	6	9
3	ID5020	Multi-body Dynamics and Applications	3	0	0	0	6	9
4	ID6010	Constitutive Modeling in Continuum Mechanics	3	0	0	0	6	9
5	ID7010	Advanced Finite Element Analysis	3	0	0	0	6	9
6	ME6750	Gear Design	3	0	0	0	6	9
7	ME6760	Design of Mechanical Transmission Elements	3	0	0	0	6	9
8	ME6770	Design of Pressure vessels and Piping	3	0	0	0	6	9
9	ME6780	Design Synthesis	3	0	0	0	6	9
10	ME6810	Transmission Mechanisms and Manipulators	3	0	0	0	6	9
11	ME6840	Design for Manufacture and Assembly	3	0	0	0	6	9
12	ME6850	Product Reliability	3	0	0	0	6	9
13	ME6870	CAD/CAM for product design	3	0	0	0	6	9
14	ME7020	Robotics and Robot applications	3	0	0	0	6	9
15	ME7120	Sensors for Intelligent Manufacturing and Condition Monitoring	3	0	0	0	6	9
16	ME7300	Friction and Wear in Machinery	3	0	0	0	6	9
17	ME7400	Mechatronic Systems	3	0	0	0	6	9
18	ME7430	Oil Hydraulics and Pneumatic Systems	3	0	0	0	6	9
19	ME7470	Industrial Instrumentation	3	0	0	0	6	9
20	ME7500	Measurement Systems	3	0	0	0	6	9
21	ME7640	Tribo Design and Analysis	3	0	0	0	6	9
22	ME7660	Nonlinear Solid Mechanics	3	0	0	0	6	9
23	ME7680	Optimization Methods for Mechanical Design	3	0	0	0	6	9
24	ME7710	Advanced Vibration and Acoustics	3	0	0	0	6	9
25	ME7740	Structural Health and Integrity Monitoring	3	0	0	0	6	9
26	ME7820	Rotor Dynamics	3	0	0	0	6	9
27	ME7830	Random Vibrations	3	0	0	0	6	9
28	ME7840	Signal Processing in Mechanical systems	3	0	0	0	6	9
29	ME7850	Modal Analysis of Mechanical systems	3	0	0	0	6	9
30	ME7860	Tribo-Instrumentation	3	0	0	0	6	9
31	ME7870	Diagnostic Maintenance	3	0	0	0	6	9
32	ME7880	Vehicular Vibration	3	0	0	0	6	9
33	ME7890	Advanced Applied Finite Element	3	0	0	0	6	9
34	ME7910	Acoustics and Noise Control	3	0	0	0	6	9
35	ME7920	Applied Finite Element	3	0	0	0	6	9
36	ME7930	Chaotic Vibrations	3	0	0	0	6	9
37	ME 7190	Introduction to Fracture Mechanics	3	0	0	0	6	9
38	ME6012	Mechanics of Human Movement	3	0	0	0	6	9
39	ME6710	Theory of Mechanisms	3	0	0	0	6	9
40	ME6720	Failure Analysis and Design	3	0	0	0	6	9
41	ME6016	Mechanics of Thin Films for Microsystem Design	3	0	0	0	6	9
42	ME6003	Variational Principles in Mechanics	3	0	0	0	6	9
43	ME6820	Fundamentals of Engineering Design	3	0	0	0	6	9
44	ME6015	Elastic waves and ultrasonics	3	0	0	0	6	9
45	ID6070	Mechanics of Viscoelastic materials	3	0	0	0	6	9
46	ME8001	Mechanics of Mixtures	3	0	0	0	6	9
47	ME7023	Foundations of computational materials modelling	3	0	0	0	6	9

Any other elective with the approval of the Faculty Advisor/Guide

Branch Code: ME32
M.Tech. in MECHANICAL ENGINEERING
STREAM: MANUFACTURING ENGINEERING
2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	ME5301	Advanced materials processing and characterization	3	0	0	0	6	9
2	ME5303	Computer aided design in manufacturing	3	0	0	0	6	9
3	ME5305	Computer numerical control and adaptive control	3	0	0	0	6	9
4	ME5201	Computational methods in engineering	3	1	0	0	6	10
5		Professional elective 1	3	0	0	0	6	9
6	ME5381	Basic manufacturing lab	0	0	0	4	0	4
7	GN5003	Personal and Professional Growth	1	0	0	0	2	0
Credits for semester 1								50

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	ME5300	Metrology and computer aided design	3	0	0	0	6	9
2	ME5302	Sensors for intelligent manufacturing and condition monitoring	3	0	0	0	6	9
3		Professional elective 2	3	0	0	0	6	9
4		Professional elective 3	3	0	0	0	6	9
5		Professional elective 4	3	0	0	0	6	9
6	ME5380	Manufacturing and precision engineering lab	0	0	0	4	0	4
Credits for semester 2								49

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	ME7591	Project Phase I	0	0	0	0	20	20
Total Credits								20

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	ME7592	Project Phase II	0	0	0	0	35	35
Total Credits :								35

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	ME7593	Project Phase III	0	0	0	0	40	40
Total Credits :								40

Semester	I	II	Summer	III	IV	Total
Credits	50	49	20	35	40	194

Ratio of elective-credits to total-credits (excluding project credits): 36.4%

LIST OF ELECTIVES

Electives I and II - EVEN Semester

S.No	Course No	Course Name	L	T	E	P	O	C
1	ME6320	Mechatronic Systems	3	0	0	0	6	9
2	ME6320	Micro Manufacturing Technology	3	0	0	0	6	9
3	ME6321	Robotics and Robot Applications	3	0	0	0	6	9
4	ME6323	Production System Design & Control	3	0	0	0	6	9
5	ME6324	Artificial Intelligence in Manufacturing	3	0	0	0	6	9
6	ME6326	Machine Vision and its Applications	3	0	0	0	6	9
7	ME6329	Flexible Manufacturing Systems	3	0	0	0	6	9
8	ME6332	Management of Finance, Marketing and Personnel	3	0	0	0	6	9
9	ME7420	Manufacturing Methods in Precision Engineering	3	0	0	0	6	9

Electives III and IV - ODD Semester

S.No	Course No	Course Name	L	T	E	P	O	C
1	MA6310	Operations Research I	3	0	0	0	6	9
2	ME6331	Treatment of Materials	3	0	0	0	6	9
3	ME6333	Metal Removal Processes	3	0	0	0	6	9
4	MM5610	Metal Forming Processes	3	0	0	0	6	9
5	PH6470	Applied Optics	3	0	0	0	6	9

Branch Code: MM1

M.Tech. in METALLURGICAL & MATERIALS ENGINEERING 2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	MM5024	Numerical methods for Metallurgists	3	0	0	0	6	9
2	MM5028	Advanced Materials Characterisation Laboratory	0	0	0	3	0	3
3	MM5050	Thermodynamics & Kinetics	3	0	0	0	6	9
4	MM5160	Mechanical Behaviour of Materials	3	0	0	0	6	9
5	DPE1	Department Elective 1	3	0	0	0	6	9
6	DPE2	Department Elective 2	3	0	0	0	6	9
7	GN5003	Personal and Professional Growth	1	0	0	0	2	0
		Total Credits :						48

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	MM5020	Modern Techniques of Material Characterisation	3	0	0	0	6	9
2	MM5480	Advanced Phase Transformations	3	0	0	0	6	9
3	DEP4	Free Elective/Department Elective 3	3	0	0	0	6	9
4	DPE5	Department Elective 4	3	0	0	0	6	9
5	DPE6	Department Elective 5	3	0	0	0	6	9
7	DPL1	Department Elective Lab	0	0	0	3	0	3
		Total Credits :						48

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	MM5090*	Project during Summer Break	0	0	0	0	20	20*
		Total Credits						20

** Project (MM5090*) grade will be assigned in 4th semester*

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	MM5090+	Project	0	0	0	0	40	40*
4		Total Credits :						40

** Project (MM5090+) grade will be assigned in 4th semester*

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	MM5090	Project	0	0	0	0	40	40
		Total Credits :						40

Semester	I	II	Summer	III	IV	Total
Credits	48	48	20	40	40	196

NOTE

- The elective lab course will be chosen from
 1. Metal Forming Laboratory (MM5660)
 2. Materials joining laboratory (MM5770),
 3. Non Destructive Testing Lab (MM5190)

LIST OF ELECTIVES

S.No	Course No	Course Name	L	T	E	P	O	C
1	MM5001	Composite materials	3	0	0	0	6	9
2	MM5010	Advanced engineering materials	3	0	0	0	6	9
3	MM5011	Modelling of Transport Phenomena in Multi-Phase Systems	3	0	0	0	6	9
4	MM5012	Welding Processes	3	0	0	0	6	9
5	MM5013	Textures in Materials	3	0	0	0	6	9
6	MM5015	Introduction to Multi-Scale Modeling of Materials	3	0	0	0	6	9
7	MM5017	Electronic materials, devices, and fabrication	3	0	0	0	6	9
8	MM5018	Thin and thick film metallization in electronics	3	0	0	0	6	9
9	MM5021	Deformation and Failure of Materials at Elevated Temperatures	3	0	0	0	6	9
10	MM5023	Iron and Steel Making Technology	3	0	0	0	6	9
11	MM5025	Physical Metallurgy of Ferrous Alloys	3	0	0	0	6	9
12	MM5026	Special Topics in Iron and Steel Technology	3	0	0	0	6	9
13	MM5030	Materials in renewable energy technologies	3	0	0	0	6	9
14	MM5040	Defects in materials	3	0	0	0	6	9
15	MM5120	Heat Treatment Technology	3	0	0	0	6	9
16	MM5130	Materials for Extreme Environment	3	0	0	0	6	9
17	MM5140	Metallurgical Failure Analysis	3	0	0	0	6	9
18	MM5180	Non Destructive Evaluation	3	0	0	0	6	9
19	MM5190	Non Destructive Testing Lab	0	0	0	3	0	3
20	MM5210	X-ray Diffraction Techniques	3	0	0	0	6	9
21	MM5240	Electron Diffraction and Microscopy	3	0	0	0	6	9
22	MM5250	Additive Manufacturing	3	0	0	0	6	9
23	ID6103	Practical Transmission Electron Microscopy	1	0	0	6	2	9
24	MM5290	Stability of Microstructures	3	0	0	0	6	9
25	MM5320	Corrosion Engineering	3	0	0	0	6	9
26	MM5330	Surface Degradation Processes	3	0	0	0	6	9
27	MM5340	Surface Engineering	3	0	0	0	6	9
28	MM5380	Transport Phenomena in Metallurgical Processes	3	0	0	0	6	9
29	MM5410	Ceramic Science & Technology	3	0	0	0	6	9
30	MM5420	Advanced Ceramics	3	0	0	0	6	9
31	MM5430	Advanced Powder Processing	3	0	0	0	6	9
32	MM5460	Physical Ceramics	3	0	0	0	6	9
33	MM5520	Solidification Phenomena	3	0	0	0	6	9
34	MM5610	Metal Forming Processes	3	0	0	0	6	9
35	MM5630	Plasticity & Plastic Deformation	3	0	0	0	6	9
36	MM5640	Sheet Metal Forming	3	0	0	0	6	9
37	MM5650	Press Tools for Metal Forming	3	0	0	0	6	9
38	MM5660	Metal Forming Laboratory	0	0	0	3	0	3
39	MM5680	Smart Materials	3	0	0	0	6	9
40	MM5700	Topics in Nanomaterials	3	0	0	0	6	9
41	MM5740	Welding Metallurgy	3	0	0	0	6	9
42	MM5750	Welding Application Technology	3	0	0	0	6	9
43	MM5760	Advanced Topics in Joining of Materials	3	0	0	0	6	9
44	MM5770	Materials joining laboratory	0	0	0	3	0	3
45	MM6010	Computational Materials Thermodynamics	3	0	0	0	6	9
46	MM5041	Medical Materials	3	0	0	0	6	9
47	MM6001	Brittle Fracture and Indentation Mechanics	3	0	0	0	6	9

Any other course permitted by the Department can be added to this list of electives.

Branch Code: OE7
M.Tech. in OCEAN STRUCTURE
2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	OE5050	Ocean Structures and Materials	3	0	0	0	6	9
2	OE5030	Wave Hydrodynamics	3	0	0	1	6	10
3	OE5070	Statics and Dynamics of Marine Vehicles	3	0	0	1	6	10
4	OE6200	Design of Offshore Structures	3	1	0	0	6	10
5	OE5200	Dynamics of Ocean Structures	3	0	0	0	6	9
6	OE5110	Experimental Methods and measurements	3	0	0	2	6	11
7	GN5003	Personal and Professional Growth	1	0	0	0	2	0
Total Credits :								59

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	OE5400	Port and Harbour Structures	3	0	0	0	6	9
2	OE5500	FEM Applied to Ocean Engineering	3	0	0	0	6	9
3	DPE1	Department Elective 1	3	0	0	0	6	9
4	DPE2	Department Elective 2	3	0	0	0	6	9
5	DPE3	Department Elective 3	3	0	0	0	6	9
6	OE5020	Design Project **	0	0	0	0	2	0
Total Credits :								45

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	OE6901	MTech Ocean Structure Project - Phase I	0	0	0	0	20	20
2	OE5020	Design Project	0	0	0	0	2	4
Total Credits								24

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	OE5012	Deep Sea Technology	3	0	0	0	6	9
2	DEP4	Department Elective 4	3	0	0	0	6	9
3	OE6902	MTech Ocean Structure Project - Phase II	0	0	0	0	20	20
Total Credits :								38

** Project (OE6900+) grade will be assigned in 4th semester*

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	OE6903	MTech Ocean Structure Project - Phase III	0	0	0	0	40	40
Total Credits :								40

Semester	I	II	Summer	III	IV	Total
Credits	59	45	24	38	40	206

* Credits for OE6901 will be awarded at the end of IV semester

** Credits for OE5020 will be awarded at the end of Summer term.

LIST OF ELECTIVES

OE5230	Foundations of Offshore structures	3	1	0	0	6	10
OE5300	Dynamics of Floating Bodies	3	0	0	0	6	9
OE5320	Nonlinear Problem in Ocean Engineering	3	0	0	0	6	9
OE5330	Advanced Marine Structures	3	0	0	0	6	9
OE5450	Numerical Techniques in Ocean Hydrodynamics	3	0	3	0	6	12
OE5800	Coastal Engineering	3	0	0	0	6	9
PE6090	HSE Management in Petroleum and Offshore Engineering	3	0	0	0	6	9
OE6002	Installation of Offshore Structures	3	0	0	0	6	9
OE6004	Numerical Modeling of Offshore Structures	2	0	0	3	4	9
OE6001	Materials and Fabrication of Offshore Structures	3	1	0	0	6	10
OE6005	Reliability of Offshore Structures	3	0	0	0	6	9
OE5970	Structural Health monitoring	3	0	0	0	6	9
OE5410	Advanced steel design	3	0	0	0	6	9
OE6008	Design, Construction and Operation of LNG Carriers and Terminals	4	0	0	0	8	12
OE6060	Stochastic structural dynamics applied to ocean engineering	3	0	0	0	6	9
ELECTIVES - OTHER DEPARTMENTS							
AM6570	Flow Induced Vibration	3	0	0	0	6	9
CE5720	Stability of Structures	3	0	0	0	6	9
MM5320	Corrosion Engineering	3	0	0	0	6	9
AS5820	Analysis of Plates and Shells	3	0	0	0	6	9
AS5860	Composite Structures	3	0	0	0	6	9
CE5630	Advanced theory and design of Concrete structures	3	1	0	0	6	10

Branch Code: OE5
M.Tech. in OCEAN TECHNOLOGY
2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	OE5010	Oceanography	3	0	0	1	6	10
2	OE5030	Wave Hydrodynamics	3	0	0	1	6	10
3	OE6200	Design of Offshore Structures	3	1	0	0	6	10
4	OE5070	Statistics and Dynamics of Marine Vehicle	3	0	0	1	6	10
5	OE5110	Experimental Methods & Measurements	3	0	0	2	6	11
6	DPE1	Department Elective 1	3	0	0	0	6	9
7	GN5003	Personal and Professional Growth	1	0	0	0	2	0
Total Credits :								60

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	OE5080	Marine Instrumentation	3	0	0	0	6	9
2	OE5340	Ocean Env. Policy & Coastal Zone Mgmt.	3	0	0	0	6	9
3	OE5341	Marine Survey and Informatics	3	0	0	0	6	9
4	OE5170	Ocean Acoustics	3	0	0	0	6	9
5	DPE2	Department Elective 2	3	0	0	0	6	9
6	DPE3	Department Elective 3	3	0	0	0	6	9
Total Credits :								54

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	OE5190	Practical training	0	0	0	0	16	16
Total Credits								16

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	OE6911	MTech Ocean Technology Project - Phase I	0	0	0	0	16	16*
2	DPE4	Department Elective 4	3	0	0	0	6	9
3	DPE5	Department Elective 5	3	0	0	0	6	9
Total Credits :								34

** Project (OE6901*) grade will be assigned in 4th semester*

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	OE6912	MTech Ocean Technology Project - Phase II	0	0	0	0	40	40
Total Credits :								40

Semester	I	II	Summer	III	IV	Total
Credits	60	54	16	34	40	204

LIST OF DEPARTMENT ELECTIVES

S.No	Course No	Course Name	L	T	E	P	O	C
1	OE5200	Dynamics of Ocean Structures	3	0	0	0	6	9
2	OE5210	Port Planning and Development	3	0	0	0	6	9
3	OE5300	Dynamics of Floating Bodies	3	0	0	0	6	9
4	OE5310	Guidance & Control of Marine Vehicles	3	0	0	0	6	9
5	OE5320	Nonlinear Problem in Ocean Engineering	3	0	0	0	6	9
6	OE5330	Advanced Marine Structures	3	0	0	0	6	9
7	OE5340	Ocean Environmental Policy & Coastal Zone Mgmt	3	0	0	0	6	9
8	OE5400	Port and Harbour Structures	3	0	0	0	6	9
9	OE5450	Numerical Techniques in Ocean Hydrodynamics	3	0	3	0	6	12
10	OE5500	FEM applied to Ocean Engineering	3	0	0	0	6	9
11	OE5600	Advanced Wave Dynamics	3	0	0	0	6	9
12	OE5800	Coastal Engineering	3	0	0	0	6	9
13	OE6200	Design of Offshore Structures	3	1	0	0	6	10
14	OE6300	Plated Structures and Shells	3	0	0	0	6	9
15	OE6980	Comp. Aid. Surface Dev. for Marine Vehicles	3	1	1	0	6	11
16	OE6990	Advanced Marine Vehicles	3	0	0	0	6	9
17	OE6020	Meshfree methods applied to hydrodynamics	3	0	3	0	6	12
18	PE6020	Drilling Technology	3	0	0	1	6	10
19	PE6090	HSE Management in Petroleum and Offshore Engg	3	1	0	0	6	10
20	PE6320	Subsea Engineering for oil and gas fields	3	0	0	0	6	9
21	OE 5050	Ocean Structures and Materials	3	0	0	0	6	9
22	OE 6002	Installation of Offshore Structures	3	0	0	0	6	9
23	OE 6004	Numerical Modeling of Offshore Structures	2	0	0	3	4	9
24	OE 6001	Materials and Fabrication of Offshore Structures	3	1	0	0	6	10
ELECTIVES - OTHER DEPARTMENTS								
25	AM6570	Flow Induced Vibration	3	0	0	0	6	9
26	ME7910	Acoustics & Noise Control	3	0	0	0	6	9
27	ME7360	Theory of Vibration	3	0	0	0	6	9
28	CH6020	Computational Fluid Dynamics	3	0	0	0	6	9
29	CE5230	Applied Fluid Mechanics	3	0	0	0	6	9
30	CE5720	Stability of Structures	3	0	0	0	6	9
31	MM5180	Non-Destructive Evaluation	3	0	0	0	6	9
32	MM5320	Corrosion Engineering	3	0	0	0	6	9
33	ID5020	Multibody dynamics and applications	3	0	0	0	6	9
34	AS 5820	Analysis of Plates and Shells	3	0	0	0	6	9
35	AS 5850	Finite Element Analysis	3	0	0	0	6	9
36	AS 5860	Composite Structures	3	0	0	0	6	9
37	AS5870	Energy Methods in Structural Analysis	3	0	0	0	6	9
38	AS5920	Dynamics of Elastic Systems	3	0	0	0	6	9
39	AS5960	Advanced Strength of Materials	3	0	0	0	6	9
40	AS5970	Structural Dynamics and Aeroelasticity	3	0	0	0	6	9
41	AM5116	Structural Control	3	0	0	0	6	9
42	AM5650	Nonlinear Vibrations	3	0	0	0	6	9
43	AM5570	Introduction to Turbulence	3	0	0	0	6	9
44	AM5340	Stochastic Processes in Structural Mechanics	3	0	0	0	6	9
45	AM5290	Dynamics of Structures	3	0	0	0	6	9
46	AM5600	Computational Techniques in Applied Mechanics	3	0	0	0	6	9
47	AM5610	Measurements in Mechanics	3	0	0	0	6	9
48	AM5390	Advanced Structural Mechanics	3	0	0	0	6	9
49	AM5530	Advanced Fluid Mechanics	3	0	0	0	6	9
50	AM5117	Analytical Methods in Mechanics	3	0	0	0	6	9
51	AM 5620	Theory of Plates and Shells	3	0	0	0	6	9

S.No	Course No	Course Name	L	T	E	P	O	C
52	AM5630	Foundation of Computational Fluid Dynamic	3	0	0	0	6	9
53	ME 6800	Finite Element Analysis	3	0	0	0	6	9
54	ME 7360	Theory of Vibration	3	0	0	0	6	9
55	ME6000	Computational Methods in Engineering	3	0	0	0	6	9
56	CE5620	Structural Dynamics	3	1	0	0	6	10
57	CE6780	Advanced Mechanics of Structures	3	1	0	0	6	10
58	CE5610	Finite Element Analysis	3	1	0	0	8	12

Branch Code: PE1
M.Tech. in PETROLEUM ENGINEERING
2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	PE6030	Reservoir Engineering	3	0	0	0	6	9
2	PE6050	Oil and Gas Exploration	3	0	0	0	6	9
3	PE6180	Natural Gas Engineering	3	1	0	0	6	10
4	DPE1	Department Elective 1	3	0	0	0	6	9
5	DPE2	Department Elective 2	3	0	0	0	6	9
6	GN5003	Personal and Professional Growth	1	0	0	0	2	0
Total Credits :								46

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	PE6031	Reservoir Simulation	3	0	0	0	6	9
2	PE6040	Seismic data acquisition, Processing and Interpretation	3	0	0	0	6	9
3	PE6312	Enhanced Oil Recovery	3	0	0	0	6	9
4	DPE3	Department Elective 3	3	0	0	0	6	9
5	DPE4	Department Elective 4	3	0	0	0	6	9
6	DPE5	Department Elective 5	3	0	0	0	6	9
Total Credits :								54

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	PE6201	MTech Petroleum Engineering Project - Phase I	0	0	0	0	20	20

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	PE6202	MTech Petroleum Engineering Project - Phase II	0	0	0	0	40	40
Total Credits :								40

** Project (PE6200) grade will be assigned in 4th semester*

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	PE6203	MTech Petroleum Engineering Project - Phase III	0	0	0	0	40	40
Total Credits :								40

Semester	I	II	Summer	III	IV	Total
Credits	46	54	20	40	40	200

LIST OF DEPARTMENT ELECTIVES

List of Electives for Semester I and II	
FOUR Electives (DPE1, DPE2, DPE3& DP4) need to be selected from this basket	
PE6090	HSE Management in Petroleum & Offshore Engg
PE6060	Offshore Oil and Gas Production Systems
PE6317	Applied Hydrodynamics in Petroleum Exploration and Production
PE6313	Applied Scientific Computing in Ocean and Petroleum Engineering
PE6010	Petroleum Geology
OE5450	Numerical Techniques in Ocean Hydrodynamics
PE6320	Sub Sea Engineering for Oil and Gas Fields
PE6314	Drilling Fluid Design and Analysis
PE5020	Environmental Impacts of Petroleum Exploration and Production
PE6311	Well logging and formation evaluation
OE6020	Meshfree methods applied to hydrodynamics
OE5650	Marine Corrosion Engineering
AM5530	Advanced Fluid Mechanics
ME6000	Computational Methods in Engineering
OE5012	Deep Sea Technology
PE5030	Artificial Lift Technologies for Oil and Gas Production

Branch Code: PH2

M.Tech. in FUNCTIONAL MATERIALS AND NANOTECHNOLOGY 2022 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	PH5011	Science and Technology of Solid state	3	1	0	0	6	10
2	PH6022	Introduction to nanoscience	3	0	0	0	6	9
3	PH5310	Synthesis and Characterization of Functional Materials	3	0	0	0	6	9
4	PH5320	Techniques of Characterization of Materials and Physical Measurements	3	0	0	0	6	9
5	PH5330	Laboratory for Synthesis and characterization of Functional Materials	0	0	0	6	2	8
6	GN5003	Personal and Professional Growth	1	0	0	0	2	0
		Total Credits :	12	1	0	6	26	45

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	PH6011	Nanomaterials and nanotechnology	3	0	0	0	6	9
2	PH6012	Fundamentals of Semiconductor Physics and Devices	3	0	0	0	6	9
3	PH6013	Functional Materials, Sensors and Transducers	3	0	0	0	6	9
4		Elective 1	3	0	0	0	6	9
5	PH5350	Laboratory for Physical Property Measurement and Transducer / Sensor Element Characteristics of Functional Materials	0	0	0	9	3	12
		Total Credits :	12	0	0	9	27	48

SUMMER

S.No	Course No	Course Name	L	T	E	P	O	C
1	PH5360*	Project	0	0	0	0	25	25
		Total Credits						25

* Project (PH5360*) grade will be assigned in 4th semester

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	PH5360+	Project	0	0	0	0	20	20
2		Elective 2	3	0	0	0	6	9
3		Elective 3	3	0	0	0	6	9
		Total						38

* Project (PH5360+) grade will be assigned in 4th semester

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	PH5360	Project	0	0	0	0	40	40
2	PH5380	Seminar	0	0	0	3	0	3
		Total						43

Semester	I	II	Summer	III	IV	Total
Credits	45	48	25	38	43	199