ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS
B.E. CIVIL ENGINEERING
REGULATIONS – 2017
CHOICE BASED CREDIT SYSTEM

GRAMME EDUCATIONAL OBJECTIVES (PEOs) :

. To prepare students for successful careers in Civil Engineering field that meets the needs of Indian and multinational companies.

I. To develop the confidence and ability among students to synthesize data and technical concepts and thereby apply it in real world problems.

II. To develop students to use modern techniques, skill and mathematical engineering tools for solving problems in Civil Engineering.

IV. To provide students with a sound foundation in mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyse engineering problems and to prepare them for graduate studies.

V. To promote students to work collaboratively on multi-disciplinary projects and make them engage in life-long learning process throughout their professional life.

OGRAMME OUTCOMES (POs):

successful completion of the programme,

1. Graduates will demonstrate knowledge of mathematics, science and engineering.
2. Graduates will demonstrate an ability to identify, formulate and solve engineering problems.
3. Graduate will demonstrate an ability to design and conduct experiments, analyze and interpret data.
4. Graduates will demonstrate an ability to design a system, component or process as per needs and specifications.
5. Graduates will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks.
6. Graduate will demonstrate skills to use modern engineering tools, software and equipment to analyze problems.
7. Graduates will demonstrate knowledge of professional and ethical responsibilities.
8. Graduate will be able to communicate effectively in both verbal and written form.
9. Graduate will show the understanding of impact of engineering solutions on the society and also will be aware of contemporary issues.
10. Graduate will develop confidence for self education and ability for life-long learning.

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HOD (civil)

PEOs & POs

The B.E. Civil Engineering Program outcomes leading to the achievement of the objectives are summarized in the following Table.

Programme Educational Objectives	Programme Outcomes									
	a	b	c	d	e	f	g	h	i	j
I	X	X		X	X					
II		X	X							
III				X			X			
IV	X				X					
V						X		X	X	X

		Highway Engineering		✓	✓	✓	✓			✓		
		Professional Elective II										
		Highway Engineering Laboratory								✓		
		Irrigation and Environmental Engineering Drawing										
		Professional Communication										
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
YEAR 4	SEM 7	Estimation, Costing and Valuation Engineering	✓	✓				✓	✓			✓
		Railways, Airports, Docks and Harbour Engineering		✓		✓			✓		✓	✓
		Structural Design and Drawing	✓	✓	✓	✓		✓				✓
		Professional Elective III										
		Open Elective II*										
		Creative and Innovative Project (Activity Based - Subject Related)		✓		✓			✓			✓
		Industrial Training (4 weeks During VI semester–Summer)				✓			✓	✓		✓
	SEM 8	Professional Elective IV										
		Professional Elective V										
		Project Work		✓		✓			✓			✓

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		Interpersonal Skills / Listening and Speaking											
	SEM 4	Numerical Methods										✓	✓
		Construction Techniques and Practices		✓			✓		✓				✓
		Strength of Materials II	✓	✓	✓	✓	✓						✓
		Applied Hydraulic Engineering	✓	✓		✓			✓	✓	✓	✓	✓
		Concrete Technology	✓	✓		✓			✓	✓	✓	✓	✓
		Soil Mechanics	✓	✓					✓	✓	✓	✓	✓
		Strength of Materials Laboratory	✓	✓	✓	✓	✓						✓
		Hydraulic Engineering Laboratory	✓		✓		✓	✓	✓	✓	✓	✓	✓
		Advanced Reading and Writing											✓
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	
YEAR 3	SEM 5	Design of Reinforced Cement Concrete Elements	✓	✓	✓	✓	✓						✓
		Foundation Engineering		✓		✓			✓		✓	✓	✓
		Structural Analysis I	✓	✓	✓	✓	✓				✓	✓	✓
		Water Supply Engineering			✓	✓	✓	✓			✓		
		Open Elective- I*											
		Professional Elective I											
		Water and Waste Water Analysis Laboratory		✓		✓			✓				✓
		Soil Mechanics Laboratory			✓		✓	✓					
		Survey Camp (2 weeks–During V Semester)			✓	✓					✓		
													✓
	SEM 6	Design of Steel Structural Elements	✓	✓	✓	✓	✓						✓
		Structural Analysis II	✓	✓	✓	✓	✓				✓	✓	
		Irrigation Engineering	✓	✓		✓							
		Wastewater Engineering	✓	✓		✓							

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						✓				✓		
YEAR 1	SEM 1	Communicative English										
		Engineering Mathematics – I	✓									
		Engineering Physics	✓	✓	✓	✓	✓	✓				
		Engineering Chemistry	✓	✓	✓		✓	✓	✓			
		Problem Solving and Python Programming	✓	✓			✓	✓	✓			
		Engineering Graphics	✓	✓	✓		✓	✓	✓		✓	✓
		Problem Solving and Python Programming Laboratory	✓	✓			✓	✓	✓			
		Physics and Chemistry Laboratory	✓	✓			✓	✓	✓			
										✓		
	SEM 2	Technical English				✓						
		Engineering Mathematics – II	✓									
		Physics for Civil Engineering	✓	✓	✓	✓	✓	✓				
		Basic Electrical and Electronics Engineering										
		Environmental Science and Engineering							✓		✓	
		Engineering Mechanics	✓	✓	✓		✓	✓	✓		✓	✓
		Engineering Practices Laboratory	✓	✓				✓	✓			
		Computer Aided Building Drawing										
			PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
YEAR 2	SEM 3	Transforms and Partial Differential Equations										✓
		Engineering Geology		✓	✓		✓		✓			✓
		Construction Materials		✓	✓		✓		✓			✓
		Strength of Materials I	✓	✓	✓	✓	✓					✓
		Fluid Mechanics	✓	✓		✓			✓	✓	✓	✓
		Surveying		✓	✓		✓		✓			✓
		Surveying Laboratory										
		Construction Materials Laboratory										

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SUMMARY

Subject Area	Credits per Semester								Credits Total
	I	II	III	IV	V	VI	VII	VIII	
HS	4	7							11
BS	12	7	4	4					27
ES	9	9	3						21
PC		2	16	19	17	20	10		84
PE					3	3	3	6	15
OE					3		3		6
EEC			1	1	2	1	4	10	19
Total	25	25	24	24	25	24	20	16	183
Non-Credit/Mandatory									

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CIVIL ENGINEERING
REGULATIONS – 2017
CHOICE BASED CREDIT SYSTEM
OPEN ELECTIVES (Offered By Other Branches)

SEMESTER V OPEN ELECTIVE - I

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	OME551	Energy Conservation and Management	OE	3	3	0	0	3
2.	OAI551	Environment and Agriculture	OE	3	3	0	0	3
3.	OCH551	Industrial Nanotechnology	OE	3	3	0	0	3
4.	OAI553	Production Technology of Agricultural machinery	OE	3	3	0	0	3
5.	ORO551	Renewable Energy Sources	OE	3	3	0	0	3
6.	OAN551	Sensors and Transducers	OE	3	3	0	0	3
7.	OCS551	Software Engineering	OE	3	3	0	0	3
8.	OME552	Vibration and Noise Control	OE	3	3	0	0	3

SEMESTER VII OPEN ELECTIVE - II

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	OAI751	Agricultural Finance, Banking and Co-operation	OE	3	3	0	0	3
2.	OGI751	Climate Change and Its Impact	OE	3	3	0	0	3
3.	OGI752	Fundamentals of Planetary Remote Sensing	OE	3	3	0	0	3
4.	OEN751	Green Building Design	OE	3	3	0	0	3
5.	OME754	Industrial Safety	OE	3	3	0	0	3
6.	OCS752	Introduction to C Programming	OE	3	3	0	0	3
7.	OIE751	Robotics	OE	3	3	0	0	3
8.	OML753	Selection of Materials	OE	3	3	0	0	3
9.	OML751	Testing of Materials	OE	3	3	0	0	3
10.	OTT752	Textile effluent treatments	OE	3	3	0	0	3

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CHOICE BASED CREDIT SYSTEM
I TO VIII SEMESTERS CURRICULA & SYLLABI

SEMESTER I

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	HS8151	Communicative English	HS	4	4	0	0	4
2.	MA8151	Engineering Mathematics – I	BS	4	4	0	0	4
3.	PH8151	Engineering Physics	BS	3	3	0	0	3
4.	CY8151	Engineering Chemistry	BS	3	3	0	0	3
5.	GE8151	Problem Solving and Python Programming	ES	3	3	0	0	3
6.	GE8152	Engineering Graphics	ES	6	2	0	4	4
PRACTICALS								
7.	GE8161	Problem Solving and Python Programming Laboratory	ES	4	0	0	4	2
8.	BS8161	Physics and Chemistry Laboratory	BS	4	0	0	4	2
			TOTAL	31	19	0	12	25

SEMESTER II

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	HS8251	Technical English	HS	4	4	0	0	4
2.	MA8251	Engineering Mathematics – II	BS	4	4	0	0	4
3.	PH8201	Physics For Civil Engineering	BS	3	3	0	0	3
4.	BE8251	Basic Electrical and Electronics Engineering	ES	3	3	0	0	3
5.	GE8291	Environmental Science and Engineering	HS	3	3	0	0	3
6.	GE8292	Engineering Mechanics	ES	5	3	2	0	4
PRACTICALS								
7.	GE8261	Engineering Practices Laboratory	ES	4	0	0	4	2
8.	CE8211	Computer Aided Building Drawing	PC	4	0	0	4	2
			TOTAL	30	20	2	8	25

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SEMESTER VII

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	CE8701	Estimation, Costing and Valuation Engineering	PC	3	3	0	0	3
2.	CE8702	Railways, Airports, Docks and Harbour Engineering	PC	3	3	0	0	3
3.	CE8703	Structural Design and Drawing	PC	5	3	0	2	4
4.		Professional Elective III	PE	3	3	0	0	3
5.		Open Elective II*	OE	3	3	0	0	3
PRACTICALS								
6.	CE8711	Creative and Innovative Project (Activity Based - Subject Related)	EEC	4	0	0	4	2
7.	CE8712	Industrial Training (4 weeks During VI Semester – Summer)	EEC	0	0	0	0	2
			TOTAL	21	15	0	6	20

SEMESTER VIII

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.		Professional Elective IV	PE	3	3	0	0	3
2.		Professional Elective V	PE	3	3	0	0	3
PRACTICALS								
3.	CE8811	Project Work	EEC	20	0	0	20	10
			TOTAL	26	6	0	20	16

TOTAL NO. OF CREDITS: 183

*Course from the curriculum of other UG Programmes.

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SEMESTER III

o	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
EORY								
	MA8353	Transforms and Partial Differential Equations	BS	4	4	0	0	4
	CE8301	Strength of Materials I	PC	3	3	0	0	3
	CE8302	Fluid Mechanics	PC	3	3	0	0	3
	CE8351	Surveying	PC	3	3	0	0	3
	CE8391	Construction Materials	PC	3	3	0	0	3
	CE8392	Engineering Geology	ES	3	3	0	0	3
ACTICALS								
	CE8311	Construction Materials Laboratory	PC	4	0	0	4	2
3.	CE8361	Surveying Laboratory	PC	4	0	0	4	2
9.	HS8381	Interpersonal Skills / Listening and Speaking	EEC	2	0	0	2	1
			TOTAL	29	19	0	10	24

SEMESTER IV

.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
HEORY								
1.	MA8491	Numerical Methods	BS	4	4	0	0	4
2.	CE8401	Construction Techniques and Practices	PC	3	3	0	0	3
3.	CE8402	Strength of Materials II	PC	3	3	0	0	3
4.	CE8403	Applied Hydraulic Engineering	PC	3	3	0	0	3
5.	CE8404	Concrete Technology	PC	3	3	0	0	3
6.	CE8491	Soil Mechanics	PC	3	3	0	0	3
PRACTICALS								
7.	CE8481	Strength of Materials Laboratory	PC	4	0	0	4	2
8.	CE8461	Hydraulic Engineering Laboratory	PC	4	0	0	4	2
9.	HS8461	Advanced Reading and Writing	EEC	2	0	0	2	1
			TOTAL	29	19	0	10	24

HUMANITIES AND SOCIAL SCIENCES (HS)

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	HS8151	Communicative English	HS	4	4	0	0	4
2.	HS8251	Technical English	HS	4	4	0	0	4
3.	GE8291	Environmental Science and Engineering	HS	3	3	0	0	3

BASIC SCIENCES (BS)

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	MA8151	Engineering Mathematics – I	BS	4	4	0	0	4
2.	PH8151	Engineering Physics	BS	3	3	0	0	3
3.	CY8151	Engineering Chemistry	BS	3	3	0	0	3
4.	BS8161	Physics and Chemistry Laboratory	BS	4	0	0	4	2
5.	MA8251	Engineering Mathematics – II	BS	4	4	0	0	4
6.	PH8201	Physics for Civil Engineering	BS	3	3	0	0	3
7.	MA8353	Transforms and Partial Differential Equations	BS	4	4	0	0	4
8.	MA8491	Numerical Methods	BS	4	4	0	0	4

ENGINEERING SCIENCES (ES)

S.No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	GE8151	Problem Solving and Python Programming	ES	3	3	0	0	3
2.	GE8152	Engineering Graphics	ES	6	2	0	4	4
3.	GE8161	Problem Solving and Python Programming Laboratory	ES	4	0	0	4	2
4.	BE8251	Basic Electrical and Electronics Engineering	ES	3	3	0	0	3
5.	GE8292	Engineering Mechanics	ES	5	3	2	0	4
6.	GE8261	Engineering Practices Laboratory	ES	4	0	0	4	2
7.	CE8392	Engineering Geology	ES	3	3	0	0	3

PROFESSIONAL CORE (PC)

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	CE8211	Computer Aided Building Drawing	PC	4	0	0	4	2
2.	CE8391	Construction Materials	PC	3	3	0	0	3
3.	CE8301	Strength of Materials I	PC	3	3	0	0	3
4.	CE8302	Fluid Mechanics	PC	3	3	0	0	3
5.	CE8351	Surveying	PC	3	3	0	0	3

SEMESTER VII
ELECTIVE – III

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	CE8006	Pavement Engineering	PE	3	3	0	0	3
2.	CE8007	Traffic Engineering and Management	PE	3	3	0	0	3
3.	CE8008	Transport and Environment	PE	3	3	0	0	3
4.	CE8009	Industrial Structures	PE	3	3	0	0	3
5.	CE8010	Environmental and Social Impact Assessment	PE	3	3	0	0	3
6.	CE8011	Design of Prestressed Concrete Structures	PE	3	3	0	0	3
7.	CE8012	Construction Planning and Scheduling	PE	3	3	0	0	3
8.	EN8591	Municipal Solid Waste Management	PE	3	3	0	0	3
9.	GE8077	Total Quality Management	PE	3	3	0	0	3
10.	GE8072	Foundation Skills In Integrated Product Development	PE	3	3	0	0	3

SEMESTER VIII
ELECTIVE – IV

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	CE8013	Coastal Engineering	PE	3	3	0	0	3
2.	CE8014	Participatory Water Resources Management	PE	3	3	0	0	3
3.	CE8015	Integrated Water Resources Management	PE	3	3	0	0	3
4.	CE8016	Groundwater Engineering	PE	3	3	0	0	3
5.	CE8017	Water Resources Systems Engineering	PE	3	3	0	0	3
6.	CE8018	Geo-Environmental Engineering	PE	3	3	0	0	3
7.	CE8091	Hydrology and Water Resources Engineering	PE	3	3	0	0	3
8.	GE8076	Professional Ethics in Engineering	PE	3	3	0	0	3

SEMESTER VIII
ELECTIVE – V

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	CE8019	Computer Aided Design of Structures	PE	3	3	0	0	3
2.	CE8020	Maintenance, Repair and Rehabilitation of Structures	PE	3	3	0	0	3
3.	CE8021	Structural Dynamics and Earthquake Engineering	PE	3	3	0	0	3
4.	CE8022	Prefabricated Structures	PE	3	3	0	0	3
5.	CE8023	Bridge Engineering	PE	3	3	0	0	3
6.	GE8073	Fundamentals of Nanoscience	PE	3	3	0	0	3

SEMESTER V

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	CE8501	Design of Reinforced Cement Concrete Elements	PC	5	3	2	0	4
2.	CE8502	Structural Analysis I	PC	3	3	0	0	3
3.	EN8491	Water Supply Engineering	PC	3	3	0	0	3
4.	CE8591	Foundation Engineering	PC	3	3	0	0	3
5.		Professional Elective I	PE	3	3	0	0	3
6.		Open Elective I*	OE	3	3	0	0	3
PRACTICALS								
7.	CE8511	Soil Mechanics Laboratory	PC	4	0	0	4	2
8.	CE8512	Water and Waste Water Analysis Laboratory	PC	4	0	0	4	2
9.	CE8513	Survey Camp (2 weeks –During IV Semester)	EEC	0	0	0	0	2
			TOTAL	**28**	**18**	**2**	**8**	**25**

SEMESTER VI

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	CE8601	Design of Steel Structural Elements	PC	5	3	2	0	4
2.	CE8602	Structural Analysis II	PC	3	3	0	0	3
3.	CE8603	Irrigation Engineering	PC	3	3	0	0	3
4.	CE8604	Highway Engineering	PC	3	3	0	0	3
5.	EN8592	Wastewater Engineering	PC	3	3	0	0	3
6.		Professional Elective II	PE	3	3	0	0	3
PRACTICALS								
7.	CE8611	Highway Engineering Laboratory	PC	4	0	0	4	2
8.	CE8612	Irrigation and Environmental Engineering Drawing	PC	4	0	0	4	2
9.	HS8581	Professional Communication	EEC	2	0	0	2	1
			TOTAL	**30**	**18**	**2**	**10**	**24**

6.	CE8481	Strength of Materials Laboratory	PC	4	0	0	4	2
7.	CE8361	Surveying Laboratory	PC	4	0	0	4	2
8.	CE8311	Construction Materials Laboratory	PC	4	0	0	4	2
9.	CE8401	Construction Techniques and Practices	PC	3	3	0	0	3
10.	CE8402	Strength of Materials II	PC	3	3	0	0	3
11.	CE8403	Applied Hydraulic Engineering	PC	3	3	0	0	3
12.	CE8404	Concrete Technology	PC	3	3	0	0	3
13.	CE8491	Soil Mechanics	PC	3	3	0	0	3
14.	CE8461	Hydraulic Engineering Laboratory	PC	4	0	0	4	2
15.	CE8501	Design of Reinforced Cement Concrete Elements	PC	5	3	2	0	4
16.	CE8502	Structural Analysis I	PC	3	3	0	0	3
17.	CE8511	Soil Mechanics Laboratory	PC	4	0	0	4	2
18.	CE8512	Water and Waste Water Analysis Laboratory	PC	4	0	0	4	2
19.	CE8591	Foundation Engineering	PC	3	3	0	0	3
20.	CE8601	Design of Steel Structural Elements	PC	5	3	2	0	4
21.	CE8602	Structural Analysis II	PC	3	3	0	0	3
22.	CE8603	Irrigation Engineering	PC	3	3	0	0	3
23.	CE8604	Highway Engineering	PC	3	3	0	0	3
24.	CE8611	Highway Engineering Laboratory	PC	4	0	0	4	2
25.	CE8612	Irrigation and Environmental Engineering Drawing	PC	4	0	0	4	2
26.	EN8592	Wastewater Engineering	PC	3	3	0	0	3
27.	EN8491	Water Supply Engineering	PC	3	3	0	0	3
28.	CE8701	Estimation, Costing and Valuation Engineering	PC	3	3	0	0	3
29.	CE8702	Railways, Airports, Docks and Harbour Engineering	PC	3	3	0	0	3
30.	CE8703	Structural Design and Drawing	PC	5	3	0	2	4

3712 INDUSTRIAL TRAINING L T P C (4 Weeks During VI Semester – Summer)
0 2

JECTIVE:

To train the students in field work so as to have a firsthand knowledge of practical blems in carrying out engineering tasks. To develop skills in facing and solving the field blems.

RATEGY:

The students individually undertake training in reputed civil engineering companies for specified duration. At the end of the training, a report on the work done will be prepared and sented. The students will be evaluated through a viva-voce examination by a team of rnal staff.

ITCOMES:

the end of the course the student will be able to understand

he intricacies of implementation textbook knowledge into practice

he concepts of developments and implementation of new techniques

CE8811 PROJECT WORK L T P C 0 0 20 10

OBJECTIVE:

To develop the ability to solve a specific problem right from its identification and literature eview till the successful solution of the same. To train the students in preparing project reports nd to face reviews and viva voce examination.

STRATEGY:

The student works on a topic approved by the head of the department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction. The student will be evaluated based on the report and the viva voce examination by a team of examiners including one external examiner.

TOTAL: 300 PERIODS

OUTCOME:

On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS
B.E. COMPUTER SCIENCE AND ENGINEERING
REGULATIONS – 2017
CHOICE BASED CREDIT SYSTEM

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

1. To enable graduates to pursue higher education and research, or have a successful career in industries associated with Computer Science and Engineering, or as entrepreneurs. To ensure that graduates will have the ability and attitude to adapt to emerging technological changes.

PROGRAM OUTCOMES POs:

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

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11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OBJECTIVES (PSOs)

To analyze, design and develop computing solutions by applying foundational concepts of Computer Science and Engineering.

To apply software engineering principles and practices for developing quality software for scientific and business applications.

To adapt to emerging Information and Communication Technologies (ICT) to innovate ideas and solutions to existing/novel problems.

Mapping of POs/PSOs to PEOs

Contribution 1: Reasonable 2:Significant 3:Strong

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POs	PEOs	
	1 Graduates will pursue higher education and research, or have a successful career in industries associated with Computer Science and Engineering, or as entrepreneurs.	2 Graduates will have the ability and attitude to adapt to emerging technological changes
1 **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	3	1
2 **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	3	1
3 **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	3	2
4 **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	3	2
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	2	3
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	2	2

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	2	1
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	3	1
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	3	2
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	3	2
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	2	2
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	1	3

PSOs		
1. Analyze, design and develop computing solutions by applying foundational concepts of computer science and engineering.	3	1
2. Apply software engineering principles and practices for developing quality software for scientific and business applications.	3	1
3. Adapt to emerging information and communication technologies (ICT) to innovate ideas and solutions to existing/novel problems.	1	3

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MAPPING OF COURSE OUTCOMES WITH PROGRAMME OUTCOMES

A broad relation between the Course Outcomes and Programme Outcomes is given in the following table

	Course Title	Programme Outcome (PO)											
		1	2	3	4	5	6	7	8	9	10	11	12
SEMESTER I	Communicative English								√	√	√		√
	Engineering Mathematics - I	√	√	√						√			
	Engineering Physics	√	√	√									
	Engineering Chemistry	√	√	√									
	Problem Solving and Python Programming	√	√	√									
	Engineering Graphics	√	√	√		√			√	√	√		√
	Problem Solving and Python Programming Laboratory	√	√	√		√			√	√	√		√
	Physics and Chemistry Laboratory	√	√	√					√	√	√		
SEMESTER II	Technical English								√	√	√		√
	Engineering Mathematics II	√	√	√						√			
	Physics for Information Science	√	√	√									
	Basic Electrical, Electronics and Measurement Engineering	√	√	√									
	Environmental Science and Engineering	√	√	√				√	√	√	√		√
	Programming in C	√	√	√					√	√	√		√
	Engineering Practices Laboratory	√	√	√	√	√	√		√	√	√		√
	C Programming Laboratory	√	√	√					√	√	√		√

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		PROGRAMME OUTCOME (PO)											
	COURSE TITLE	1	2	3	4	5	6	7	8	9	10	11	12
YEAR II SEMESTER III	Discrete Mathematics	√	√	√						√			
	Digital Principles and Design	√	√	√									
	Data Structures	√	√	√									
	Object Oriented Programming	√	√	√									
	Communication Engineering	√	√	√									
	Data Structures Laboratory	√	√	√					√	√	√		√
	Object Oriented Programming Laboratory	√	√	√					√	√	√		√
	Digital Systems Laboratory	√	√	√			√		√	√	√		√
	Interpersonal Skills/Listening &Speaking								√	√	√		√
YEAR II SEMESTER IV	Probability and Queueing Theory	√	√	√						√	√		√
	Computer Architecture	√	√	√									
	Database Management Systems	√	√	√									
	Design and Analysis of Algorithms	√	√	√						√	√		√
	Operating Systems	√	√	√									
	Software Engineering	√	√	√		√	√		√	√	√		√
	Database Management Systems Laboratory	√	√	√					√	√	√		√
	Operating Systems Laboratory	√	√	√					√	√	√		√
	Advanced Reading and Writing								√	√	√		√

YEAR III	SEMESTER V	Algebra and Number Theory	√	√	√						√			
		Computer Networks	√	√	√									
		Microprocessors and Microcontrollers	√	√	√									
		Theory of Computation	√	√	√									
		Object Oriented Analysis and Design	√	√	√			√						
		Open Elective I												
		Microprocessors and Microcontrollers Laboratory	√	√	√					√	√	√		√
		Object Oriented Analysis and Design Laboratory	√	√	√		√	√		√	√	√		√
		Networks Laboratory	√	√	√					√	√	√		√
	SEMESTER VI	Internet Programming	√	√	√					√	√	√		√
		Artificial Intelligence	√	√	√									
		Mobile Computing	√	√	√					√	√	√		√
		Compiler Design	√	√	√									
		Distributed Systems	√	√	√									
		Professional Elective I												
		Internet Programming Laboratory	√	√	√		√			√	√	√		√
		Mobile Application Development Laboratory	√	√	√		√	√		√	√	√		√
		Mini Project	√	√	√	√	√	√	√	√	√	√	√	√
		Professional Communication						√				√		√
YEAR IV	SEMESTER VII	Principles of Management	√	√	√								√	
		Cryptography and Network Security	√	√	√									
		Cloud Computing	√	√	√									
		Open Elective II												

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		Professional Elective II												
		Professional Elective III												
		Cloud Computing Laboratory	√	√	√		√			√	√	√		√
		Security Laboratory	√	√	√		√			√	√	√		√
	SEMESTER VIII	Professional Elective IV												
		Professional Elective V												
		Project Work	√	√	√	√	√	√	√	√	√	√	√	√

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PROFESSIONAL ELECTIVES

SEM	COURSE TITLE	PROGRAMME OUTCOME (PO)											
		1	2	3	4	5	6	7	8	9	10	11	12
VI	Data Warehousing and Data Mining	√	√	√									
	Software Testing	√	√	√		√				√	√		
	Embedded Systems	√	√	√									
	Agile Methodologies	√	√	√									
	Graph Theory and Applications-	√	√	√									
	Intellectual Property Rights						√	√	√	√	√	√	√
	Digital Signal Processing	√	√	√									
VII	Big Data Analytics	√	√	√		√				√	√		
	Machine Learning Techniques	√	√	√		√				√	√		
	Computer Graphics and Multimedia	√	√	√									
	Software Project Management	√	√	√			√		√	√	√	√	√
	Internet of Things	√	√	√									
	Service Oriented Architecture	√	√	√									
	Total Quality Management	√	√	√								√	
	Multi-core Architectures and Programming	√	√	√									
	Human Computer Interaction	√	√	√									
	C# and .Net Programming	√	√	√		√					√	√	
	Wireless Adhoc and Sensor Networks	√	√	√									
	Advanced Topics on Databases	√	√	√									
	Foundation Skills in Integrated Product Development	√	√	√									
	Human Rights	√	√	√									
	Disaster Management	√	√	√					√				
VIII	Digital Image Processing	√	√	√									
	Social Network Analysis	√	√	√									
	Information Security	√	√	√						√			
	Software Defined Networks	√	√	√									
	Cyber Forensics	√	√	√						√			
	Soft Computing	√	√	√									
	Professional Ethics in Engineering							√	√	√	√	√	√
	Information Retrieval Techniques	√	√	√									
	Green Computing	√	√	√									
	GPU Architecture and Programming	√	√	√									
	Natural Language Processing	√	√	√									
	Parallel Algorithms	√	√	√									
	Speech Processing	√	√	√									
	Fundamentals of Nanoscience	√	√	√									

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AFFILIATED INSTITUTIONS
B.E. COMPUTER SCIENCE AND ENGINEERING
REGULATIONS – 2017
CHOICE BASED CREDIT SYSTEM
I - VIII SEMESTERS CURRICULA AND SYLLABI

SEMESTER I

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	HS8151	Communicative English	HS	4	4	0	0	4
2.	MA8151	Engineering Mathematics - I	BS	4	4	0	0	4
3.	PH8151	Engineering Physics	BS	3	3	0	0	3
4.	CY8151	Engineering Chemistry	BS	3	3	0	0	3
5.	GE8151	Problem Solving and Python Programming	ES	3	3	0	0	3
6.	GE8152	Engineering Graphics	ES	6	2	0	4	4
PRACTICALS								
7.	GE8161	Problem Solving and Python Programming Laboratory	ES	4	0	0	4	2
8.	BS8161	Physics and Chemistry Laboratory	BS	4	0	0	4	2
			TOTAL	31	19	0	12	25

SEMESTER II

Sl.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	HS8251	Technical English	HS	4	4	0	0	4
2.	MA8251	Engineering Mathematics - II	BS	4	4	0	0	4
3.	PH8252	Physics for Information Science	BS	3	3	0	0	3
4.	BE8255	Basic Electrical, Electronics and Measurement Engineering	ES	3	3	0	0	3
5.	GE8291	Environmental Science and Engineering	HS	3	3	0	0	3
6.	CS8251	Programming in C	PC	3	3	0	0	3
PRACTICALS								
7.	GE8261	Engineering Practices Laboratory	ES	4	0	0	4	2
8.	CS8261	C Programming Laboratory	PC	4	0	0	4	2
			TOTAL	28	20	0	8	24

SEMESTER III

Sl No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	MA8351	Discrete Mathematics	BS	4	4	0	0	4
2	CS8351	Digital Principles and System Design	ES	4	4	0	0	4
3	CS8391	Data Structures	PC	3	3	0	0	3
4	CS8392	Object Oriented Programming	PC	3	3	0	0	3
5	EC8395	Communication Engineering	ES	3	3	0	0	3
PRACTICALS								
6	CS8381	Data Structures Laboratory	PC	4	0	0	4	2
7	CS8383	Object Oriented Programming Laboratory	PC	4	0	0	4	2
8	CS8382	Digital Systems Laboratory	ES	4	0	0	4	2
9	HS8381	Interpersonal Skills/Listening &Speaking	EEC	2	0	0	2	1
			TOTAL	31	17	0	14	24

SEMESTER IV

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	MA8402	Probability and Queueing Theory	BS	4	4	0	0	4
2.	CS8491	Computer Architecture	PC	3	3	0	0	3
3.	CS8492	Database Management Systems	PC	3	3	0	0	3
4.	CS8451	Design and Analysis of Algorithms	PC	3	3	0	0	3
5.	CS8493	Operating Systems	PC	3	3	0	0	3
6.	CS8494	Software Engineering	PC	3	3	0	0	3
PRACTICALS								
7.	CS8481	Database Management Systems Laboratory	PC	4	0	0	4	2
8.	CS8461	Operating Systems Laboratory	PC	4	0	0	4	2
9.	HS8461	Advanced Reading and Writing	EEC	2	0	0	2	1
			TOTAL	29	19	0	10	24

SEMESTER V

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	MA8551	Algebra and Number Theory	BS	4	4	0	0	4
2	CS8591	Computer Networks	PC	3	3	0	0	3
3	EC8691	Microprocessors and Microcontrollers	PC	3	3	0	0	3
4	CS8501	Theory of Computation	PC	3	3	0	0	3
5	CS8592	Object Oriented Analysis and Design	PC	3	3	0	0	3
6		Open Elective I	OE	3	3	0	0	3
PRACTICALS								
7	EC8681	Microprocessors and Microcontrollers Laboratory	PC	4	0	0	4	2
8	CS8582	Object Oriented Analysis and Design Laboratory	PC	4	0	0	4	2
9	CS8581	Networks Laboratory	PC	4	0	0	4	2
			TOTAL	31	19	0	12	25

SEMESTER VI

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	CS8651	Internet Programming	PC	3	3	0	0	3
2.	CS8691	Artificial Intelligence	PC	3	3	0	0	3
3.	CS8601	Mobile Computing	PC	3	3	0	0	3
4.	CS8602	Compiler Design	PC	5	3	0	2	4
5.	CS8603	Distributed Systems	PC	3	3	0	0	3
6.		Professional Elective I	PE	3	3	0	0	3
PRACTICALS								
7.	CS8661	Internet Programming Laboratory	PC	4	0	0	4	2
8.	CS8662	Mobile Application Development Laboratory	PC	4	0	0	4	2
9.	CS8611	Mini Project	EEC	2	0	0	2	1
10.	HS8581	Professional Communication	EEC	2	0	0	2	1
			TOTAL	32	18	0	14	25

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SEMESTER VII

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	MG8591	Principles of Management	HS	3	3	0	0	3
2	CS8792	Cryptography and Network Security	PC	3	3	0	0	3
3	CS8791	Cloud Computing	PC	3	3	0	0	3
4		Open Elective II	OE	3	3	0	0	3
5		Professional Elective II	PE	3	3	0	0	3
6		Professional Elective III	PE	3	3	0	0	3
PRACTICALS								
7.	CS8711	Cloud Computing Laboratory	PC	4	0	0	4	2
8.	IT8761	Security Laboratory	PC	4	0	0	4	2
			TOTAL	26	18	0	8	22

SEMESTER VIII

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.		Professional Elective IV	PE	3	3	0	0	3
2.		Professional Elective V	PE	3	3	0	0	3
PRACTICALS								
3.	CS8811	Project Work	EEC	20	0	0	20	10
			TOTAL	26	6	0	20	16

TOTAL NO. OF CREDITS: 185

HUMANITIES AND SOCIAL SCIENCES (HS)

SI. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	HS8151	Communicative English	HS	4	4	0	0	4
2.	HS8251	Technical English	HS	4	4	0	0	4
3.	GE8291	Environmental Science and Engineering	HS	3	3	0	0	3
4.	MG8591	Principles of Management	HS	3	3	0	0	3

BASIC SCIENCES (BS)

SI. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	MA8151	Engineering Mathematics I	BS	4	4	0	0	4
2.	PH8151	Engineering Physics	BS	3	3	0	0	3
3.	CY8151	Engineering Chemistry	BS	3	3	0	0	3
4.	BS8161	Physics and Chemistry Laboratory	BS	4	0	0	4	2
5.	MA8251	Engineering Mathematics II	BS	4	4	0	0	4
6.	PH8252	Physics for Information Science	BS	3	3	0	0	3
7.	MA8351	Discrete Mathematics	BS	4	4	0	0	4
8.	MA8402	Probability and Queueing Theory	BS	4	4	0	0	4
9.	MA8551	Algebra and Number Theory	BS	4	4	0	0	4

ENGINEERING SCIENCES (ES)

SI. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	GE8151	Problem Solving and Python Programming	ES	3	3	0	0	3
2.	GE8152	Engineering Graphics	ES	6	2	0	4	4
3.	GE8161	Problem Solving and Python Programming Laboratory	ES	4	0	0	4	2
4.	BE8255	Basic Electrical, Electronics and Measurement Engineering	ES	3	3	0	0	3
5.	GE8261	Engineering Practices Laboratory	ES	4	0	0	4	2
6.	CS8351	Digital Principles and System Design	ES	4	4	0	0	4
7.	EC8395	Communication Engineering	ES	3	3	0	0	3
8.	CS8382	Digital Systems Laboratory	ES	4	0	0	4	2

PROFESSIONAL CORE (PC)

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1	CS8251	Programming in C	PC	3	3	0	0	3
2	CS8261	C Programming Laboratory	PC	4	0	0	4	2
3	CS8391	Data Structures	PC	3	3	0	0	3
4	CS8392	Object Oriented Programming	PC	3	3	0	0	3
5	CS8381	Data Structures Laboratory	PC	4	0	0	4	2
6	CS8383	Object Oriented Programming Laboratory	PC	4	0	0	4	2
7	CS8491	Computer Architecture	PC	3	3	0	0	3
8	CS8492	Database Management Systems	PC	3	3	0	0	3
9.	CS8451	Design and Analysis of Algorithms	PC	3	3	0	0	3
10.	CS8493	Operating Systems	PC	3	3	0	0	3
11.	CS8494	Software Engineering	PC	3	3	0	0	3
12.	CS8481	Database Management Systems Laboratory	PC	4	0	0	4	2
13.	CS8461	Operating Systems Laboratory	PC	4	0	0	4	2
14.	CS8591	Computer Networks	PC	3	3	0	0	3
15.	EC8691	Microprocessors and Microcontrollers	PC	3	3	0	0	3
16.	CS8501	Theory of Computation	PC	3	3	0	0	3
17.	CS8592	Object Oriented Analysis and Design	PC	3	3	0	0	3
18.	EC8681	Microprocessors and Microcontrollers Laboratory	PC	4	0	0	4	2
19.	CS8582	Object Oriented Analysis and Design Laboratory	PC	4	0	0	4	2
20.	CS8581	Networks Laboratory	PC	4	0	0	4	2
21.	CS8651	Internet Programming	PC	3	3	0	0	3
22.	CS8691	Artificial Intelligence	PC	3	3	0	0	3
23.	CS8601	Mobile Computing	PC	3	3	0	0	3
24.	CS8602	Compiler Design	PC	5	3	0	2	4
25.	CS8603	Distributed Systems	PC	3	3	0	0	3
26.	CS8661	Internet Programming Laboratory	PC	4	0	0	4	2
27.	CS8662	Mobile Application Development Laboratory	PC	4	0	0	4	2
28.	CS8792	Cryptography and Network Security	PC	3	3	0	0	3
29.	CS8791	Cloud Computing	PC	3	3	0	0	3
30.	CS8711	Cloud Computing Laboratory	PC	4	0	0	4	2
31.	IT8761	Security Laboratory	PC	4	0	0	4	2

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PROFESSIONAL ELECTIVES (PE)

SEMESTER VI
ELECTIVE - I

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	CS8075	Data Warehousing and Data Mining	PE	3	3	0	0	3
2.	IT8076	Software Testing	PE	3	3	0	0	3
3.	IT8072	Embedded Systems	PE	3	3	0	0	3
4.	CS8072	Agile Methodologies	PE	3	3	0	0	3
5.	CS8077	Graph Theory and Applications-	PE	3	3	0	0	3
6.	IT8071	Digital Signal Processing	PE	3	3	0	0	3
7.	GE8075	Intellectual Property Rights	PE	3	3	0	0	3

SEMESTER VII
ELECTIVE - II

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	CS8091	Big Data Analytics	PE	3	3	0	0	3
2.	CS8082	Machine Learning Techniques	PE	3	3	0	0	3
3.	CS8092	Computer Graphics and Multimedia	PE	3	3	0	0	3
4.	IT8075	Software Project Management	PE	3	3	0	0	3
5.	CS8081	Internet of Things	PE	3	3	0	0	3
6.	IT8074	Service Oriented Architecture	PE	3	3	0	0	3
7.	GE8077	Total Quality Management	PE	3	3	0	0	3

SEMESTER VII
ELECTIVE - III

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	CS8083	Multi-core Architectures and Programming	PE	3	3	0	0	3
2.	CS8079	Human Computer Interaction	PE	3	3	0	0	3
3.	CS8073	C# and .Net Programming	PE	3	3	0	0	3
4.	CS8088	Wireless Adhoc and Sensor Networks	PE	3	3	0	0	3
5.	CS8071	Advanced Topics on Databases	PE	3	3	0	0	3
6.	GE8072	Foundation Skills in Integrated Product Development	PE	3	3	0	0	3
7.	GE8074	Human Rights	PE	3	3	0	0	3
8.	GE8071	Disaster Management	PE	3	3	0	0	3

SEMESTER VIII
ELECTIVE - IV

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	EC8093	Digital Image Processing	PE	3	3	0	0	3
2.	CS8085	Social Network Analysis	PE	3	3	0	0	3
3.	IT8073	Information Security	PE	3	3	0	0	3
4.	CS8087	Software Defined Networks	PE	3	3	0	0	3
5.	CS8074	Cyber Forensics	PE	3	3	0	0	3
6.	CS8086	Soft Computing	PE	3	3	0	0	3
7.	GE8076	Professional Ethics in Engineering	PE	3	3	0	0	3

SEMESTER VIII
ELECTIVE - V

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	CS8080	Information Retrieval Techniques	PE	3	3	0	0	3
2.	CS8078	Green Computing	PE	3	3	0	0	3
3.	CS8076	GPU Architecture and Programming	PE	3	3	0	0	3
4.	CS8084	Natural Language Processing	PE	3	3	0	0	3
5.	CS8001	Parallel Algorithms	PE	3	3	0	0	3
6.	IT8077	Speech Processing	PE	3	3	0	0	3
7.	GE8073	Fundamentals of Nanoscience	PE	3	3	0	0	3

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	HS8381	Interpersonal Skills/Listening & Speaking	EEC	2	0	0	2	1
2.	HS8461	Advanced Reading and Writing	EEC	2	0	0	2	1
3.	CS8611	Mini Project	EEC	2	0	0	2	1
4.	HS8581	Professional Communication	EEC	2	0	0	2	1
5.	CS8811	Project Work	EEC	20	0	0	20	10

JCT College of Engineering & Technology Pichanur CBE - 105

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SUMMARY

S.NO.	SUBJECT AREA	CREDITS AS PER SEMESTER								CREDITS TOTAL	Percentage
		I	II	III	IV	V	VI	VII	VIII		
1.	HS	4	7					3		14	7.60%
2.	BS	12	7	4	4	4				31	16.8%
3.	ES	9	5	9						23	12.5%
4.	PC		5	10	19	18	20	10		82	44.5%
5.	PE						3	6	6	15	8.15%
6.	OE					3		3		6	3.3%
7.	EEC			1	1		2		10	14	7.65%
	Total	25	24	24	24	25	25	22	16	185	
8.	Non Credit / Mandatory										

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PROFESSIONAL ELECTIVES

SEM	COURSE TITLE	PROGRAMME OUTCOME (PO)											
		1	2	3	4	5	6	7	8	9	10	11	12
VI	Data Warehousing and Data Mining	√	√	√									
	Software Testing	√	√	√		√				√	√		
	Embedded Systems	√	√	√									
	Agile Methodologies	√	√	√									
	Graph Theory and Applications-	√	√	√									
	Intellectual Property Rights						√	√	√	√	√	√	√
	Digital Signal Processing	√	√	√									
VII	Big Data Analytics	√	√	√		√				√	√		
	Machine Learning Techniques	√	√	√		√				√	√		
	Computer Graphics and Multimedia	√	√	√									
	Software Project Management	√	√	√			√		√	√	√	√	√
	Internet of Things	√	√	√									
	Service Oriented Architecture	√	√	√									
	Total Quality Management	√	√	√								√	
	Multi-core Architecturesand Programming	√	√	√									
	Human Computer Interaction	√	√	√									
	C# and .Net Programming	√	√	√		√					√	√	
	Wireless Adhoc and Sensor Networks	√	√	√									
	Advanced Topics on Databases	√	√	√									
	Foundation Skills in IntegratedProduct Development	√	√	√									
	Human Rights	√	√	√						√			
	Disaster Management	√	√	√									
VIII	Digital Image Processing	√	√	√									
	Social Network Analysis	√	√	√							√		
	Information Security	√	√	√									
	Software Defined Networks	√	√	√							√		
	Cyber Forensics	√	√	√									
	Soft Computing									√	√	√	√
	Professional Ethics in Engineering	√	√	√									
	Information Retrieval Techniques	√	√	√									
	Green Computing	√	√	√									
	GPU Architecture and Programming	√	√	√									
	Natural Language Processing	√	√	√									
	Parallel Algorithms	√	√	√									
	Speech Processing	√	√	√									
	Fundamentals of Nano Science	√	√	√									

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1.3.2

ANNA UNIVERSITY CHENNAI AFFILIATED

B.E. COMPUTER SCIENCE AND ENGINEERIG
REGULATIONS 2017

CHOICE BASED CREDIT SYSTEM

OPEN ELECTIVE-I

SL. NO.	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	OCE551	Air Pollution and ControlEngineering	OE	3	3	0	0	3
2.	OMD551	Basic of BiomedicalInstrumentation	OE	3	3	0	0	3
3.	OBT552	BasicsofBioinformatics	OE	3	3	0	0	3
4.	OBM551	BioChemistry	OE	3	3	0	0	3
5.	OTL552	DigitalAudioEngineering	OE	3	3	0	0	3
6.	OME551	Energy Conservation andManagement	OE	3	3	0	0	3
7.	OBT553	FundamentalsofNutrition	OE	3	3	0	0	3
8.	OCE552	Geographic InformationSystem	OE	3	3	0	0	3
9.	OPY551	HerbalTechnology	OE	3	3	0	0	3
10.	OMD552	HospitalWaste Management	OE	3	3	0	0	3
11.	OCH551	IndustrialNanotechnology	OE	3	3	0	0	3
12.	OBT551	IntroductiontoBioenergyandBiofuels	OE	3	3	0	0	3
13.	OME553	IndustrialSafetyEngineering	OE	3	3	0	0	3
14.	OEI551	Logic and Distributed ControlSystems	OE	3	3	0	0	3
15.	OBM552	MedicalPhysics	OE	3	3	0	0	3
16.	OML552	Microscopy	OE	3	3	0	0	3
17.	OBT554	PrinciplesofFoodPreservation	OE	3	3	0	0	3
18.	OMF551	ProductDesign and Development	OE	3	3	0	0	3
19.	OAN551	SensorsandTransducers	OE	3	3	0	0	3
20.	OTL551	Space Time WirelessCommunication	OE	3	3	0	0	3
21.	OEC552	SoftComputing	OE	3	3	0	0	3
22.	OTL553	Telecommunication NetworkManagement	OE	3	3	0	0	3
23.	OMD553	TelehealthTechnology	OE	3	3	0	0	3
24.	OTL554	WaveletsanditsApplications	OE	3	3	0	0	3
25.	OIM551	WorldClassManufacturing	OE	3	3	0	0	3

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Electives 1.5.2

SEMESTER VII

OPEN ELECTIV II

SL NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	OAI751	Agricultural Finance, Bankingand Co-operation	OE	3	3	0	0	3
2.	OEE751	Basic Circuit Theory	OE	3	3	0	0	3
3.	OBM751	Basics of Human Anatomyand Physiology	OE	3	3	0	0	3
4.	OGI751	Climate Change and its Impact	OE	3	3	0	0	3
5.	OPY751	Clinical Trials	OE	3	3	0	0	3
6.	OEC751	Electronic Devices	OE	3	3	0	0	3
7.	OML752	Electronic Materials	OE	3	3	0	0	3
8.	OCH752	Energy Technology	OE	3	3	0	0	3
9.	OCE751	Environmental and Social Impact Assessment	OE	3	3	0	0	3
10.	OGI752	Fundamentals of Planetary Remote Sensing	OE	3	3	0	0	3
11.	OEN751	Green Building Design	OE	3	3	0	0	3
12.	OBM752	Hospital Management	OE	3	3	0	0	3
13.	OEE752	Introduction to Renewable Energy Systems	OE	3	3	0	0	3
14.	OBT753	Introduction of Cell Biology	OE	3	3	0	0	3
15.	OMF751	Lean Six Sigma	OE	3	3	0	0	3
16.	OAN751	Low Cost Automation	OE	3	3	0	0	3
17.	OEC754	Medical Electronics	OE	3	3	0	0	3
18.	OEC756	MEMS and NEMS	OE	3	3	0	0	3
19.	OBT752	Microbiology	OE	3	3	0	0	3
20.	OCH751	Process Modeling and Simulation	OE	3	3	0	0	3
21.	OIE751	Robotics	OE	3	3	0	0	3
22.	OEC753	Signals and Systems	OE	4	4	0	0	4
23.	OME752	Supply Chain Management	OE	3	3	0	0	3
24.	OME753	Systems Engineering	OE	3	3	0	0	3
25.	OTL751	Telecommunication System Modeling and Simulation	OE	3	3	0	0	3
26.	OCY751	Waste Water Treatment	OE	3	3	0	0	3

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OPEN ELECTIVES(Offered by Other Branches)

SEMESTER V

OPEN ELECTIVE - I

SL. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	OCE551	Air Pollution and Control Engineering	OE	3	3	0	0	3
2.	OMD551	Basic of Biomedical Instrumentation	OE	3	3	0	0	3
3.	OBM551	Bio Chemistry	OE	3	3	0	0	3
4.	OIT552	Cloud Computing	OE	3	3	0	0	3
5.	OIT551	Database Management Systems	OE	3	3	0	0	3
6.	OTL552	Digital Audio Engineering	OE	3	3	0	0	3
7.	OME551	Energy Conservation and Management	OE	3	3	0	0	3
8.	OBT553	Fundamentals of Nutrition	OE	3	3	0	0	3
9.	OCE552	Geographic Information System	OE	3	3	0	0	3
10.	OPY551	Herbal Technology	OE	3	3	0	0	3
11.	OMD552	Hospital Waste Management	OE	3	3	0	0	3
12.	OCH551	Industrial Nanotechnology	OE	3	3	0	0	3
13.	OBT551	Introduction to Bioenergy and Biofuels	OE	3	3	0	0	3
14.	OEI551	Logic and Distributed Control Systems	OE	3	3	0	0	3
15.	OBM552	Medical Physics	OE	3	3	0	0	3
16.	OML552	Microscopy	OE	3	3	0	0	3
17.	OEI552	SCADA System and Applications Management	OE	3	3	0	0	3
18.	OBT554	Principles of Food Preservation	OE	3	3	0	0	3
19.	OMF551	Product Design and Development	OE	3	3	0	0	3
20.	ORO551	Renewable Energy Sources	OE	3	3	0	0	3
21.	OCS551	Software Engineering	OE	3	3	0	0	3
22.	OTL551	Space Time Wireless Communication	OE	3	3	0	0	3
23.	OTL553	Telecommunication Network Management	OE	3	3	0	0	3
24.	OMD553	Telehealth Technology	OE	3	3	0	0	3
25.	OTL554	Wavelets and its Applications	OE	3	3	0	0	3
26.	OIM551	World Class Manufacturing	OE	3	3	0	0	3

SEMESTER VII

OPEN ELECTIVE - II

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	OAI751	Agricultural Finance, Banking and Co-operation	OE	3	3	0	0	3
2.	OBM751	Basics of Human Anatomy and Physiology	OE	3	3	0	0	3
3.	OGI751	Climate Change and its Impact	OE	3	3	0	0	3
4.	OPY751	Clinical Trials	OE	3	3	0	0	3
5.	OCS751	Data Structures and Algorithms	OE	3	3	0	0	3
6.	OME751	Design of Experiments	OE	3	3	0	0	3
7.	OCH752	Energy Technology	OE	3	3	0	0	3
8.	OCE751	Environmental and Social Impact Assessment	OE	3	3	0	0	3
9.	OGI752	Fundamentals of Planetary Remote Sensing	OE	3	3	0	0	3
10.	OEN751	Green Building Design	OE	3	3	0	0	3
11.	OBM752	Hospital Management	OE	3	3	0	0	3
12.	OME754	Industrial Safety	OE	3	3	0	0	3
13.	OCS752	Introduction to C Programming	OE	3	3	0	0	3
14.	OBT753	Introduction of Cell Biology	OE	3	3	0	0	3
15.	OMF751	Lean Six Sigma	OE	3	3	0	0	3
16.	OAN751	Low Cost Automation	OE	3	3	0	0	3
17.	OBT752	Microbiology	OE	3	3	0	0	3
18.	OMV751	Marine Vehicles	OE	3	3	0	0	3
19.	OAE752	Principles of Flight Mechanics	OE	3	3	0	0	3
20.	OIE751	Robotics	OE	3	3	0	0	3
21.	OME752	Supply Chain Management	OE	3	3	0	0	3
22.	OME753	Systems Engineering	OE	3	3	0	0	3
23.	OTL751	Telecommunication System Modeling and Simulation	OE	3	3	0	0	3
24.	OML751	Testing of Materials	OE	3	3	0	0	3
25.	OIC751	Transducer Engineering	OE	3	3	0	0	3
26.	OCY751	Waste Water Treatment	OE	3	3	0	0	3

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PROFESSIONAL ELECTIVES (PE)
SEMESTER V
ELECTIVE I

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	CS8392	Object Oriented Programming	PE	3	3	0	0	3
2.	EC8073	Medical Electronics	PE	3	3	0	0	3
3.	CS8493	Operating Systems	PE	3	3	0	0	3
4.	EC8074	Robotics and Automation	PE	3	3	0	0	3
5.	EC8075	Nano Technology and Applications	PE	3	3	0	0	3
6.	GE8074	Human Rights	PE	3	3	0	0	3
7.	GE8077	Total Quality Management	PE	3	3	0	0	3

SEMESTER VI
ELECTIVE II

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	CS8792	Cryptography and Network Security	PE	3	3	0	0	3
2.	EC8091	Advanced Digital Signal Processing	PE	3	3	0	0	3
3.	EC8001	MEMS and NEMS	PE	3	3	0	0	3
4	EC8002	Multimedia Compression and Communication	PE	3	3	0	0	3
5.	EC8003	CMOS Analog IC Design	PE	3	3	0	0	3
6.	EC8004	Wireless Networks	PE	3	3	0	0	3
7.	GE8075	Intellectual Property Rights	PE	3	3	0	0	3

SEMESTER VII
ELECTIVE III

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	EC8092	Advanced Wireless Communication	PE	3	3	0	0	3
2.	EC8071	Cognitive Radio	PE	3	3	0	0	3
3.	GE8072	Foundation Skills in Integrated Product Development	PE	3	3	0	0	3
4.	CS8082	Machine Learning Techniques	PE	3	3	0	0	3
5.	EC8005	Electronics Packaging and Testing	PE	3	3	0	0	3
6.	EC8006	Mixed Signal IC Design	PE	3	3	0	0	3
7.	GE8071	Disaster Management	PE	3	3	0	0	3

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SEMESTER VIII
ELECTIVE IV

Sl.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	EC8072	Electro Magnetic Interference and Compatibility	PE	3	3	0	0	3
2.	EC8007	Low power SoC Design	PE	3	3	0	0	3
3.	EC8008	Photonic Networks	PE	3	3	0	0	3
4.	EC8009	Compressive Sensing	PE	3	3	0	0	3
5.	EC8093	Digital Image Processing	PE	3	3	0	0	3
6.	GE8076	Professional Ethics in Engineering	PE	3	3	0	0	3

SEMESTER VIII
ELECTIVE V

Sl.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	EC8010	Video Analytics	PE	3	3	0	0	3
2.	EC8011	DSP Architecture and Programming	PE	3	3	0	0	3
3.	EC8094	Satellite Communication	PE	3	3	0	0	3
4.	CS8086	Soft Computing	PE	3	3	0	0	3
5.	IT8006	Principles of Speech Processing	PE	3	3	0	0	3
6.	GE8073	Fundamentals of Nano Science	PE	3	3	0	0	3

***Professional Electives are grouped according to elective number as was done previously.**

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	HS8381	Interpersonal Skills/Listening & Speaking	EEC	2	0	0	2	1
2.	EC8611	Technical Seminar	EEC	2	0	0	2	1
3.	HS8581	Professional Communication	EEC	2	0	0	2	1
4.	EC8811	Project Work	EEC	20	0	0	20	10

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Pichanur CSE - 105

JCT

JCT COLLEGE OF ENGINEERING AND TECHNOLOGY
COIMBATORE – 641105

NBA NAAC A

Department of Electrical and Electronics Engineering

Choice Based Credit System – Elective List

S. No.	Year	Semester	Elective type	Subject code	Subject title
1	III	V	Open elective 1	OMD551	Basics of biomedical instrumentation
2		VI	Professional elective 1	GE8075	Intellectual property rights
3			Professional elective 2	EE8005	Special electrical machines
4	IV	VII	Open elective 2	OCS752	Introduction to c programming
5			Professional elective 3	EI8075	Fibre optics and laser instrumentation
6			Professional elective 4	EE8010	Power systems transients
7		VIII	Professional elective 5	EE8015	Electric energy generation, utilization and conservation
8			Professional elective 6	EE8018	Microcontroller based system design

JCT College of Engineering & Technology Pichanur CBE - 105

HOD/EEE

Dr.K.GEETHA, M.E.,Ph.D.,
Head of the Department
Department of Electrical & Electronics Engg
JCT College of Engineering and Technology
Coimbatore - 641 105.

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ANNA UNIVERSITY, CHENNAI
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B.E. ELECTRICAL AND ELECTRONICS ENGINEERING
REGULATIONS – 2017
CHOICE BASED CREDIT SYSTEM

Educational Objectives

Bachelor of Electrical and Electronics Engineering curriculum is designed to prepare the graduates having attitude and knowledge to

1. Have successful technical and professional careers in their chosen fields such as circuit theory, Field theory, control theory and computational platforms.
2. Engross in life long process of learning to keep themselves abreast of new developments in the field of Electronics and their applications in power engineering.

Programme Outcomes

The graduates will have the ability to

a. Apply the Mathematical knowledge and the basics of Science and Engineering to solve the problems pertaining to Electronics and Instrumentation Engineering.
b. Identify and formulate Electrical and Electronics Engineering problems from research literature and be ability to analyze the problem using first principles of Mathematics and Engineering Sciences.
c. Come out with solutions for the complex problems and to design system components or process that fulfill the particular needs taking into account public health and safety and the social, cultural and environmental issues.
d. Draw well-founded conclusions applying the knowledge acquired from research and research methods including design of experiments, analysis and interpretation of data and synthesis of information and to arrive at significant conclusion.
e. Form, select and apply relevant techniques, resources and Engineering and IT tools for Engineering activities like electronic prototyping, modeling and control of systems and also being conscious of the limitations.
f. Understand the role and responsibility of the Professional Electrical and Electronics Engineer and to assess societal, health, safety issues based on the reasoning received from the contextual knowledge.
g. Be aware of the impact of professional Engineering solutions in societal and environmental contexts and exhibit the knowledge and the need for Sustainable Development.
h. Apply the principles of Professional Ethics to adhere to the norms of the engineering practice and to discharge ethical responsibilities.
i. Function actively and efficiently as an individual or a member/leader of different teams and multidisciplinary projects.
j. Communicate efficiently the engineering facts with a wide range of engineering community and others, to understand and prepare reports and design documents; to make effective presentations and to frame and follow instructions.
k. Demonstrate the acquisition of the body of engineering knowledge and insight and Management Principles and to apply them as member / leader in teams and multidisciplinary environments.
l. Recognize the need for self and life-long learning, keeping pace with technological challenges in the broadest sense.

PEO \PO	a	b	c	d	e	f	g	h	i	j	k	l
1	✓	✓	✓	✓	✓	✓	✓					
2	✓	✓	✓	✓	✓	✓		✓		✓		✓

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JCT College of Engineering & Technology
Pichanur
CBE - 105.

SEMESTER	NAME OF THE SUBJECT	PROGRAM OUTCOMES											
		a	b	c	d	e	f	g	h	i	j	k	l
	THEORY												
SEM I	Communicative English									✓	✓		✓
	Engineering Mathematics - I	✓	✓			✓							✓
	Engineering Physics	✓	✓	✓		✓		✓					✓
	Engineering Chemistry	✓	✓	✓		✓							✓
	Problem Solving and Python Programming	✓	✓	✓	✓	✓							✓
	Engineering Graphics			✓	✓								
	PRACTICAL												
	Problem Solving and Python Programming Laboratory	✓		✓	✓	✓	✓				✓		✓
	Physics and Chemistry Laboratory	✓	✓										
	THEORY												
SEM II	Technical English									✓	✓		✓
	Engineering Mathematics - II	✓	✓	✓		✓							✓
	Physics For Electronics Engineering	✓	✓	✓		✓		✓					✓
	Basic Civil and Mechanical Engineering				✓		✓						
	Circuit Theory	✓	✓	✓	✓	✓							✓
	Environmental Science and Engineering	✓	✓			✓	✓	✓	✓				✓
	PRACTICALS												
	Engineering Practices Laboratory	✓		✓	✓	✓	✓				✓		
	Electric Circuits Lab	✓		✓	✓	✓	✓				✓		✓
	THEORY												
SEM III	Transforms and Partial Differential Equations	✓	✓			✓							✓
	Digital Logic Circuits				✓	✓							
	Electromagnetic Theory	✓	✓	✓	✓	✓					✓		✓
	Electrical Machines – I	✓	✓	✓	✓	✓					✓		

	Electron Devices and Circuits	✓	✓	✓	✓	✓							✓
	Power Plant Engineering			✓	✓	✓		✓	✓	✓			
	PRACTICALS												
	Electronics Laboratory	✓			✓	✓						✓	✓
	Electrical Machines Laboratory - I	✓			✓	✓						✓	✓
	THEORY												
SEM IV	Numerical Methods	✓	✓	✓									✓
	Electrical Machines – II	✓	✓	✓	✓	✓		✓					✓
	Transmission and Distribution	✓	✓	✓	✓	✓		✓					✓
	Measurements and Instrumentation	✓	✓	✓	✓	✓							✓
	Linear Integrated Circuits and Applications	✓	✓	✓		✓							
	Control Systems	✓	✓	✓	✓	✓							✓
	PRACTICALS												
	Electrical Machines Lab II	✓	✓	✓	✓	✓							✓
	Linear and Digital Integrated Circuits Laboratory	✓		✓	✓						✓	✓	✓
	Technical Seminar									✓	✓	✓	
	THEORY												
SEM V	Power System Analysis	✓	✓	✓	✓	✓		✓					✓
	Microprocessors and Microcontrollers	✓		✓		✓			✓	✓		✓	✓
	Power Electronics	✓	✓	✓	✓	✓		✓					
	Digital Signal Processing	✓	✓	✓	✓	✓		✓					✓
	Object Oriented Programming			✓	✓	✓							✓
	Open Elective I												
	PRACTICALS												
	Control and Instrumentation Laboratory			✓	✓	✓	✓			✓	✓		

	Professional Communication									✓	✓	✓	
	Object Oriented Programming Laboratory			✓	✓	✓							✓
	THEORY												
SEM VI	Solid State Drives	✓	✓	✓	✓	✓		✓					
	Protection and Switchgear	✓	✓	✓	✓	✓		✓					✓
	Embedded Systems												
	Professional Elective I												
	Professional Elective II												
	PRACTICALS												
	Power Electronics and Drives Laboratory	✓		✓	✓						✓	✓	✓
	Microprocessors and Microcontrollers Laboratory	✓		✓	✓						✓	✓	✓
	Mini Project	✓		✓	✓						✓	✓	✓
	THEORY												
SEM VII	High Voltage Engineering	✓	✓	✓	✓	✓		✓					✓
	Power System Operation and Control	✓	✓	✓	✓	✓		✓					✓
	Renewable Energy Systems	✓	✓	✓	✓	✓		✓					✓
	Open Elective II												
	Professional Elective III												
	Professional Elective IV												
	PRACTICALS												
	Power System Simulation Laboratory	✓		✓	✓						✓	✓	✓
	Renewable Energy Systems Laboratory	✓		✓	✓						✓	✓	✓
SEM VIII	**THEORY**												
	Professional Elective V												

	Professional Elective VI												
	PRACTICALS												
	Project Work	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

PROFESSIONAL ELECTIVE

SL.NO.	NAME OF THE SUBJECT	PROGRAM OUTCOMES											
		a	b	c	d	e	f	g	h	i	j	k	l
	THEORY												
ELECTIVE – I	Advanced Control System		✓	✓					✓	✓			
	Visual Languages and Applications	✓	✓		✓	✓							
	Design of Electrical Apparatus	✓		✓	✓	✓		✓					
	Power Systems Stability				✓	✓							
	Modern Power Converters	✓		✓	✓	✓		✓					
	Intellectual Property Rights								✓		✓		✓
ELECTIVE – II	Principles of Robotics	✓		✓		✓							
	Special Electrical Machines	✓		✓	✓	✓			✓				
	Power Quality	✓		✓	✓	✓			✓				✓
	EHVAC Transmission	✓		✓	✓	✓			✓				✓
	Communication Engineering												
ELECTIVE – III	Disaster Management	✓		✓		✓	✓					✓	✓
	Human Rights			✓	✓	✓	✓						
	Operations Research	✓	✓	✓					✓	✓			✓
	Probability and Statistics												
	Fibre Optics and Laser Instrumentation	✓	✓			✓						✓	✓
	Foundation Skills in Integrated Product Development												

ELECTIVE – IV	System Identification and Adaptive Control	✓	✓	✓		✓							
	Computer Architecture	✓		✓		✓							
	Control of Electrical Drives	✓		✓		✓			✓				✓
	VLSI Design	✓	✓	✓			✓	✓					
	Power Systems Transients		✓		✓	✓							
	Total Quality Management		✓			✓	✓	✓	✓	✓	✓		
ELECTIVE – V	Flexible AC Transmission Systems	✓	✓	✓		✓					✓		✓
	Soft Computing Techniques	✓		✓		✓							
	Power Systems Dynamics	✓		✓		✓							
	SMPS and UPS	✓		✓		✓							
	Electric Energy Generation, Utilization and Conservation	✓	✓	✓	✓	✓		✓					✓
	Professional Ethics in Engineering	✓	✓		✓			✓				✓	✓
	Principals of Management					✓	✓			✓			
ELECTIVE – VI	Energy Management and Auditing		✓			✓	✓	✓	✓	✓	✓		
	Data Structures					✓	✓			✓			
	High Voltage Direct Current Transmission	✓	✓	✓					✓	✓			✓
	Microcontroller Based System Design	✓	✓	✓					✓	✓			✓
	Smart Grid	✓	✓	✓					✓	✓			✓
	Biomedical Instrumentation	✓		✓	✓	✓	✓						
	Fundamentals of Nano Science												

PRINCIPAL
JCT College of Engineering and Technology
PICHANUR, COIMBATORE - 641 105.

ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS
B.E. ELECTRICAL AND ELECTRONICS ENGINEERING
REGULATIONS – 2017
CHOICE BASED CREDIT SYSTEM
OPEN ELECTIVES (Offered by Other Branches)

V SEMESTER
OPEN ELECTIVE I

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	OCY551	Advanced Engineering Chemistry	OE	3	3	0	0	3
2.	OCE551	Air Pollution and Control Engineering	OE	3	3	0	0	3
3.	OAT551	Automotive Systems	OE	3	3	0	0	3
4.	OIT551	Database Management Systems	OE	3	3	0	0	3
5.	OIT552	Cloud Computing	OE	3	3	0	0	3
6.	OMF551	Product Design and Development	OE	3	3	0	0	3
7.	OAN551	Sensors and Transducers	OE	3	3	0	0	3
8.	OME552	Vibration and Noise Control	OE	3	3	0	0	3
9.	OMD551	Basics of Biomedical Instrumentation	OE	3	3	0	0	3

VII SEMESTER
OPEN ELECTIVE II

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	OBT751	Analytical Methods and Instrumentation	OE	3	3	0	0	3
2.	OME751	Design of Experiments	OE	3	3	0	0	3
3.	OCS752	Introduction to C Programming	OE	3	3	0	0	3
4.	OCH751	Process Modeling and Simulation	OE	3	3	0	0	3
5.	OEC753	Signals and Systems	OE	4	4	0	0	4
6.	OML751	Testing of Materials	OE	3	3	0	0	3

JCT College of Engineering & Technology Pichanur CBE - 105.

PRINCIPAL
JCT College of Engineering and Technology
PICHANUR, COIMBATORE - 641 105.

OMD551 **BASICS OF BIOMEDICAL INSTRUMENTATION** L T P C 3 0 0 3

OBJECTIVES:

- To study about the different bio potential and its propagation
- To understand the different types of electrodes and its placement for various recording
- To study the design of bio amplifier for various physiological recording
- To learn the different measurement techniques for non-physiological parameters.
- To familiarize the different biochemical measurements.

CO-PO MAPPING:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1				✓		✓					
CO2				✓		✓					
CO3	✓	✓	✓	✓	✓	✓					
CO4			✓	✓	✓	✓					
CO5			✓	✓	✓	✓					

UNIT I BIO POTENTIAL GENERATION AND ELECTRODES TYPES 9

Origin of bio potential and its propagation. Types of electrodes - surface, needle and micro electrodes and their equivalent circuits. Recording problems - measurement with two electrodes

UNIT II BIOSIGNAL CHARACTERISTICS AND ELECTRODECONFIGURATIONS 9

Biosignals characteristics – frequency and amplitude ranges. ECG – Einthoven's triangle, standard 12 lead system. EEG – 10-20 electrode system, unipolar, bipolar and average mode. EMG– unipolar and bipolar mode.

UNIT III SIGNAL CONDITIONING CIRCUITS 9

Need for bio-amplifier - differential bio-amplifier, impedance matching circuit, isolation amplifiers, Power line interference, Right leg driven ECG amplifier, Band pass filtering

UNIT IV MEASUREMENT OF NON-ELECTRICALPARAMETERS 10

Temperature, respiration rate and pulse rate measurements. Blood Pressure: indirect methods - Auscultatory method, direct methods: electronic manometer, Systolic, diastolic pressure, Blood flow and cardiac output measurement: Indicator dilution, and dye dilution method, ultrasound blood flow measurement.

UNIT V BIO-CHEMICAL MEASUREMENT 8

Blood gas analyzers and Non-Invasive monitoring, colorimeter, Sodium Potassium Analyser, spectrophotometer, blooo cell counter, auto analyzer (simplified schematic description).

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

CO1: To Learn the different bio potential and its propagation.

CO2: To get Familiarize the different electrode placement for various physiological recording

CO3: Students will be able design bio amplifier for various physiological recording

CO4: Students will understand various technique non electrical physiological measurements

CO5: Understand the different biochemical measurements

TEXT BOOKS:

1. Leslie Cromwell, "Biomedical Instrumentation and measurement", Prentice hall of India, New Delhi, 2007.
2. John G. Webster, "Medical Instrumentation Application and Design", John Wiley and sons, New York, 2004. (Units I, II & V)

REFERENCES:

1. Myer Kutz, "Standard Handbook of Biomedical Engineering and Design", McGraw Hill Publisher, 2003.
2. Khandpur R.S, "Handbook of Biomedical Instrumentation", Tata McGraw-Hill, New Delhi, 2003.(Units II & IV)
3. Joseph J. Carr and John M. Brown, "Introduction to Biomedical Equipment Technology", Pearson Education, 2004.

GE8075 **INTELLECTUAL PROPERTY RIGHTS** L T P C
3 0 0 3

OBJECTIVE:

- To give an idea about IPR, registration and its enforcement.

UNIT I INTRODUCTION 9

Introduction to IPRs, Basic concepts and need for Intellectual Property - Patents, Copyrights, Geographical Indications, IPR in India and Abroad – Genesis and Development – the way from WTO to WIPO –TRIPS, Nature of Intellectual Property, Industrial Property, technological Research, Inventions and Innovations – Important examples of IPR.

UNIT II REGISTRATION OF IPRs 10

Meaning and practical aspects of registration of Copy Rights, Trademarks, Patents, Geographical Indications, Trade Secrets and Industrial Design registration in India and Abroad

UNIT III AGREEMENTS AND LEGISLATIONS 10

International Treaties and Conventions on IPRs, TRIPS Agreement, PCT Agreement, Patent Act of India, Patent Amendment Act, Design Act, Trademark Act, Geographical Indication Act.

9

UNIT IV DIGITAL PRODUCTS AND LAW

Digital Innovations and Developments as Knowledge Assets – IP Laws, Cyber Law and Digital Content Protection – Unfair Competition – Meaning and Relationship between Unfair Competition and IP Laws – Case Studies.

7

UNIT V ENFORCEMENT OF IPRs

Infringement of IPRs, Enforcement Measures, Emerging issues – Case Studies.

TOTAL:45 PERIODS

OUTCOME:

- Ability to manage Intellectual Property portfolio to enhance the value of the firm.

TEXT BOOKS

1. V. Scople Vinod, Managing Intellectual Property, Prentice Hall of India pvt Ltd, 2012
2. S. V. Satakar, "Intellectual Property Rights and Copy Rights, Ess Ess Publications, New Delhi, 2002

REFERENCES:

1. Deborah E. Bouchoux, "Intellectual Property: The Law of Trademarks, Copyrights, Patents and Trade Secrets", Cengage Learning, Third Edition, 2012.
2. Prabuddha Ganguli,"Intellectual Property Rights: Unleashing the Knowledge Economy", McGraw Hill Education, 2011.
3. Edited by Derek Bosworth and Elizabeth Webster, The Management of Intellectual Property, Edward Elgar Publishing Ltd., 2013.

EE8005 SPECIAL ELECTRICAL MACHINES

L	T	P	C
3	0	0	3

OBJECTIVES:

To impart knowledge on the following Topics

- Construction, principle of operation, control and performance of stepping motors.
- Construction, principle of operation, control and performance of switched reluctance motors.
- Construction, principle of operation, control and performance of permanent magnet brushless D.C. motors.
- Construction, principle of operation and performance of permanent magnet synchronous motors.
- Construction, principle of operation and performance of other special Machines.

UNIT I STEPPER MOTORS 9

Constructional features –Principle of operation –Types – Torque predictions – Linear Analysis – Characteristics – Drive circuits – Closed loop control – Concept of lead angle - Applications.

UNIT II SWITCHED RELUCTANCE MOTORS (SRM) 9

Constructional features –Principle of operation- Torque prediction–Characteristics Steady state performance prediction – Analytical Method – Power controllers – Control of SRM drive- Sensor less operation of SRM – Applications.

UNIT III PERMANENT MAGNET BRUSHLESS D.C. MOTORS 9

Fundamentals of Permanent Magnets- Types- Principle of operation- Magnetic circuit analysis- EMF and Torque equations- Power Converter Circuits and their controllers - Characteristics and control- Applications.

UNIT IV PERMANENT MAGNET SYNCHRONOUS MOTORS (PMSM) 9

Constructional features -Principle of operation – EMF and Torque equations - Sine wave motor with practical windings - Phasor diagram - Power controllers – performance characteristics -Digital controllers – Applications.

UNIT V OTHER SPECIAL MACHINES 9

Constructional features – Principle of operation and Characteristics of Hysteresis motor-Synchronous Reluctance Motor–Linear Induction motor-Repulsion motor- Applications.

OUTCOMES: **TOTAL : 45 PERIODS**

- Ability to analyze and design controllers for special Electrical Machines.
- Ability to acquire the knowledge on construction and operation of stepper motor.
- Ability to acquire the knowledge on construction and operation of stepper switched reluctance motors.
- Ability to construction, principle of operation, switched reluctance motors.
- Ability to acquire the knowledge on construction and operation of permanent magnet brushless D.C. motors.
- Ability to acquire the knowledge on construction and operation of permanent magnet synchronous motors.
- Ability to select a special Machine for a particular application.

TEXT BOOKS:

- K.Venkataratnam, 'Special Electrical Machines', Universities Press (India) Private Limited, 2008.
- T. Kenjo, 'Stepping Motors and Their Microprocessor Controls', Clarendon Press London, 1984
- E.G. Janardanan, 'Special electrical machines', PHI learning Private Limited, Delhi, 2014.

REFERENCES

1. R.Krishnan, 'Switched Reluctance Motor Drives – Modeling, Simulation, Analysis, Design and Application', CRC Press, New York, 2001.
2. T. Kenjo and S. Nagamori, 'Permanent Magnet and Brushless DC Motors', Clarendon Press, London, 1988.
3. T.J.E.Miller,'Brushless Permanent-Magnet and Reluctance Motor Drives', Oxford University Press, 1989.
4. R.Srinivasan, 'Special Electrical Machines', Lakshmi Publications, 2013.

OCS752 **INTRODUCTION TO C PROGRAMMING**

L	T	P	C
3	0	0	3

OBJECTIVES

- To develop C Programs using basic programming constructs
- To develop C programs using arrays and strings
- To develop applications in C using functions and structures

UNIT I INTRODUCTION 9

Structure of C program – Basics: Data Types – Constants –Variables - Keywords – Operators: Precedence and Associativity - Expressions - Input/Output statements, Assignment statements – Decision-making statements - Switch statement - Looping statements – Pre-processor directives - Compilation process – Exercise Programs: Check whether the required amount can be withdrawn based on the available amount – Menu-driven program to find the area of different shapes – Find the sum of even numbers

Text Book: Reema Thareja (Chapters 2,3)

UNIT II ARRAYS 9

Introduction to Arrays – One dimensional arrays: Declaration – Initialization - Accessing elements – Operations: Traversal, Insertion, Deletion, Searching - Two dimensional arrays: Declaration – Initialization - Accessing elements – Operations: Read – Print – Sum – Transpose – Exercise Programs: Print the number of positive and negative values present in the array – Sort the numbers using bubble sort - Find whether the given Is matrix is diagonal or not.

Text Book: Reema Thareja (Chapters 5)

UNIT III STRINGS 9

Introduction to Strings - Reading and writing a string - String operations (without using built-in string functions): Length – Compare – Concatenate – Copy – Reverse – Substring – Insertion – Indexing – Deletion – Replacement – Array of strings – Introduction to Pointers – Pointer operators – Pointer arithmetic - Exercise programs: To find the frequency of a character in a string - To find the number of vowels, consonants and white spaces in a given text - Sorting the names.

Text Book: Reema Thareja (Chapters 6 & 7)

UNIT IV FUNCTIONS 9

Introduction to Functions – Types: User-defined and built-in functions - Function prototype - Function definition - Function call - Parameter passing: Pass by value - Pass by reference - Built-in functions (string functions) – Recursive functions – Exercise programs: Calculate the total amount of power consumed by 'n' devices (passing an array to a function) – Menu-driven program to count the numbers which are divisible by 3, 5 and by both (passing an array to a function) – Replace the punctuations from a given sentence by the space character (passing an array to a function)

Text Book: Reema Thareja (Chapters 4)

UNIT V STRUCTURES 9

Introduction to structures – Declaration – Initialization – Accessing the members – Nested Structures – Array of Structures – Structures and functions – Passing an entire structure – Exercise programs: Compute the age of a person using structure and functions (passing a structure to a function) – Compute the number of days an employee came late to the office by considering his arrival time for 30 days (Use array of structures and functions)

Text Book: Reema Thareja (Chapters 8)

TOTAL:45 PERIODS

OUTCOMES

Upon completion of this course, the students will be able to

- Develop simple applications using basic constructs
- Develop applications using arrays and strings
- Develop applications using functions and structures

TEXT BOOK

1. Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2016

REFERENCES:

1. Kernighan, B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2006
2. Paul Deitel and Harvey Deitel, "C How to Program", Seventh edition, Pearson Publication
3. Juneja, B. L and Anita Seth, "Programming in C", CENGAGE Learning India pvt. Ltd., 2011
4. Pradip Dey, Manas Ghosh, "Fundamentals of Computing and Programming in C", First Edition, Oxford University Press, 2009

EI8075 FIBRE OPTICS AND LASER INSTRUMENTS LT P C 3 0 0 3

AIM:

To contribute to the knowledge of Fibre optics and Laser Instrumentation and its Industrial andMedical Application.

COURSE OBJECTIVES

- To expose the students to the basic concepts of optical fibres and their properties.
- To provide adequate knowledge about the Industrial applications of optical fibres.
- To expose the students to the Laser fundamentals.
- To provide adequate knowledge about Industrial application of lasers.
- To provide adequate knowledge about holography and Medical applications of Lasers.

UNIT I OPTICAL FIBRES AND THEIR PROPERTIES 9

Construction of optical fiber cable: Guiding mechanism in optical fiber and Basic component of optical fiber communication, –Principles of light propagation through a fibre: Total internal reflection, Acceptance angle (θa), Numerical aperture and Skew mode, –Different types of fibres and their properties: Single and multimode fibers and Step index and graded index fibers,– fibrecharacteristics: Mechanical characteristics and Transmission characteristics, – Absorption losses – Scattering losses – Dispersion – Connectors and splicers –Fibre termination – Optical sources: Light Emitting Diode (LED), – Optical detectors: PIN Diode.

UNIT II INDUSTRIAL APPLICATION OF OPTICAL FIBRES 9

Fibre optic sensors: Types of fiber optics sensor, Intrinsic sensor- Temperature/ Pressure sensor, Extrinsic sensors, Phase Modulated Fibre Optic Sensor and Displacementsensor (Extrinsic Sensor) – Fibre optic instrumentation system: Measurement of attenuation (by cut back method), Optical domain reflectometers, Fiber Scattering loss Measurement, Fiber Absorption Measurement, Fiber dispersion measurements, End reflection method and Near field scanning techniques – Different types of modulators: Electro-optic modulator (EOM) –Interferometric method of measurement of length – Moire fringes – Measurement of pressure, temperature, current, voltage, liquid level and strain.

UNIT III LASER FUNDAMENTALS 9

Fundamental characteristics of lasers – Level Lasers: Two-Level Laser, Three Level Laser, Quasi Three and four level lasers – Properties of laser: Monochromaticity, Coherence, Divergence and Directionality and Brightness –Laser modes – Resonator configuration – Q-switching and mode locking – Cavity damping – Types of lasers; – Gas lasers, solid lasers, liquid lasers and semiconductor lasers.

UNIT IV INDUSTRIAL APPLICATION OF LASERS 9

Laser for measurement of distance, Laser for measurement of length, Laser for measurement of velocity, Laser for measurement of acceleration, Laser for measurement of current, voltage and Laser for measurement of Atmospheric Effect: Types of LIDAR, Construction And Working, and LIDAR Applications – Material processing: Laser instrumentation for material processing, Powder Feeder, Laser Heating, Laser Welding, Laser Melting, Conduction Limited Melting and Key Hole Melting – Laser trimming of material: Process Of Laser Trimming, Types Of Trim, Construction And Working Advantages – Material Removal and vaporization: Process Of Material Removal.

UNIT V HOLOGRAM AND MEDICAL APPLICATIONS 9

Holography: Basic Principle, Holography vs. photography, Principle Of Hologram Recording, Condition For Recording A Hologram, Reconstructing and viewing the holographic image– Holography for non-destructive testing – Holographic components – Medical applications of lasers, laser-Tissue Interactions Photochemical reactions, Thermalisation, collisional relaxation, Types of Interactions and Selecting an Interaction Mechanism – Laser instruments for surgery, removal of tumors of vocal cards, brain surgery, plastic surgery, gynaecology and oncology.

TOTAL : 45 PERIODS

COURSE OUTCOMES (COs):

1. Understand the principle, transmission, dispersion and attenuation characteristics of opticalfibers
2. Apply the gained knowledge on optical fibers for its use as communication medium and as sensor as well which have important applications in production, manufacturing industrial and biomedical applications.
3. Understand laser theory and laser generation system.
4. Students will gain ability to apply laser theory for the selection of lasers for a specific Industrial and medical application.

TEXT BOOKS:

1. J.M. Senior, 'Optical Fibre Communication – Principles and Practice', Prentice Hall of India,1985.
2. J. Wilson and J.F.B. Hawkes, 'Introduction to Opto Electronics', Prentice Hall of India, 2001.
3. Eric Udd, William B., and Spillman, Jr., "Fiber Optic Sensors: An Introduction for Engineers and Scientists ", John Wiley & Sons, 2011.

REFERENCES:

1. G. Keiser, 'Optical Fibre Communication', McGraw Hill, 1995.
2. M. Arumugam, 'Optical Fibre Communication and Sensors', Anuradha Agencies, 2002.
3. John F. Ready, "Industrial Applications of Lasers", Academic Press, Digitized in 2008.

EE8010	POWER SYSTEMS TRANSIENTS	L	T	P	C
		3	0	0	3

OBJECTIVES: To impart knowledge about the following topics:

- Generation of switching transients and their control using circuit – theoretical concept.
- Mechanism of lighting strokes and the production of lighting surges.
- Propagation, reflection and refraction of travelling waves.
- Voltage transients caused by faults, circuit breaker action, load rejection on integrated power system.

UNIT I INTRODUCTION AND SURVEY 9

Review and importance of the study of transients - causes for transients. RL circuit transient with sine wave excitation - double frequency transients - basic transforms of the RLC circuit transients. Different types of power system transients - effect of transients on power systems – role of the study of transients in system planning.

UNIT II SWITCHING TRANSIENTS 9

Over voltages due to switching transients - resistance switching and the equivalent circuit for interrupting the resistor current - load switching and equivalent circuit - waveforms for transient voltage across the load and the switch - normal and abnormal switching transients. Current suppression - current chopping - effective equivalent circuit. Capacitance switching - effect of source regulation - capacitance switching with a restrike, with multiple restrikes. Illustration for multiple restriking transients - ferro resonance.

UNIT III LIGHTNING TRANSIENTS 9

Review of the theories in the formation of clouds and charge formation - rate of charging of thunder clouds – mechanism of lightning discharges and characteristics of lightning strokes – model for lightning stroke - factors contributing to good line design - protection using ground wires - tower footing resistance - Interaction between lightning and power system.

UNIT IV TRAVELING WAVES ON TRANSMISSION LINE COMPUTATION OF TRANSIENTS 9

Computation of transients - transient response of systems with series and shunt lumped parameters and distributed lines. Traveling wave concept - step response - Bewely's lattice diagram - standing waves and natural frequencies - reflection and refraction of travelling waves.

UNIT V TRANSIENTS IN INTEGRATED POWER SYSTEM 9

The short line and kilometric fault - distribution of voltages in a power system - Line dropping and load rejection - voltage transients on closing and reclosing lines - over voltage induced by faults -switching surges on integrated system Qualitative application of EMTP for transient computation.

OUTCOMES: **TOTAL : 45 PERIODS**

- Ability to understand and analyze switching and lightning transients.
- Ability to acquire knowledge on generation of switching transients and their control.
- Ability to analyze the mechanism of lighting strokes.
- Ability to understand the importance of propagation, reflection and refraction of travelling waves.
- Ability to find the voltage transients caused by faults.
- Ability to understand the concept of circuit breaker action, load rejection on integrated power system.

TEXT BOOKS:

1. Allan Greenwood, 'Electrical Transients in Power Systems', Wiley Inter Science, New York, 2nd Edition, 1991.
2. Pritindra Chowdhari, "Electromagnetic transients in Power System", John Wiley and Sons Inc., Second Edition, 2009.
3. C.S. Indulkar, D.P.Kothari, K. Ramalingam, 'Power System Transients – A statistical approach', PHI Learning Private Limited, Second Edition, 2010.

REFERENCES

1. M.S.Naidu and V.Kamaraju, 'High Voltage Engineering', McGraw Hill, Fifth Edition, 2013.
2. R.D. Begamudre, 'Extra High Voltage AC Transmission Engineering', Wiley Eastern Limited, 1986.
3. Y.Hase, Handbook of Power System Engineering," Wiley India, 2012.
4. J.L.Kirtley, "Electric Power Principles, Sources, Conversion, Distribution and use," Wiley, 2012.
5. Akihiro ametani," Power System Transient theory and applications", CRC press, 2013.

EE8015	ELECTRIC ENERGY GENERATION, UTILIZATION AND CONSERVATION	L	T	P	C
		3	0	0	3

OBJECTIVES:

To impart knowledge on the following Topics

- To study the generation, conservation of electrical power and energy efficient equipments.
- To understand the principle, design of illumination systems and energy efficiency lamps.
- To study the methods of industrial heating and welding.
- To understand the electric traction systems and their performance.

UNIT I ILLUMINATION 9

Importance of lighting – properties of good lighting scheme – laws of illumination – photometry - types of lamps – lighting calculations – basic design of illumination schemes for residential, commercial, street lighting, factory lighting and flood lighting – LED lighting and energy efficient lamps.

UNIT II REFRIGERATION AND AIR CONDITIONING 9

Refrigeration-Domestic refrigerator and water coolers - Air-Conditioning-Various types of air-conditioning system and their applications, smart air conditioning units - Energy Efficient motors: Standard motor efficiency, need for efficient motors, Motor life cycle, Direct Savings and payback analysis, efficiency evaluation factor.

UNIT III HEATING AND WELDING

Role of electric heating for industrial applications – resistance heating – induction heating – dielectric heating - electric arc furnaces. Brief introduction to electric welding – welding generator, welding transformer and the characteristics. 9

UNIT IV TRACTION

Merits of electric traction – requirements of electric traction system – supply systems – mechanics of train movement – traction motors and control – braking – recent trends in electric traction. 9

UNIT V DOMESTIC UTILIZATION OF ELECTRICAL ENERGY

Domestic utilization of electrical energy – House wiring. Induction based appliances, Online and OFF line UPS, Batteries - Power quality aspects – nonlinear and domestic loads – Earthing – Domestic, Industrial and Substation. 9

OUTCOMES: **TOTAL : 45 PERIODS**

- To understand the main aspects of generation, utilization and conservation.
- To identify an appropriate method of heating for any particular industrial application.
- To evaluate domestic wiring connection and debug any faults occurred.
- To construct an electric connection for any domestic appliance like refrigerator as well as to design a battery charging circuit for a specific household application.

- To realize the appropriate type of electric supply system as well as to evaluate the performance of a traction unit.
- To understand the main aspects of Traction.

TEXT BOOKS:

1. Wadhwa, C.L. "Generation, Distribution and Utilization of Electrical Energy", New Age International Pvt. Ltd, 2003.
2. Dr. Uppal S.L. and Prof. S. Rao, 'Electrical Power Systems', Khanna Publishers, New Delhi, 15th Edition, 2014.
3. Energy Efficiency in Electric Utilities, BEE Guide Book, 2010

REFERENCES

1. Partab.H, "Art and Science of Utilisation of Electrical Energy", Dhanpat Rai and Co, New Delhi, 2004.
2. Openshaw Taylor.E, "Utilization of Electrical Energy in SI Units", Orient Longman Pvt. Ltd, 2003.
3. Gupta.J.B, "Utilization of Electric Power and Electric Traction", S.K.Kataria and Sons, 2002.
4. Cleaner Production – Energy Efficiency Manual for GERIAP, UNEP, Bangkok prepared by National Productivity Council.

EE8018	MICROCONTROLLER BASED SYSTEM DESIGN	L	T	P	C
		3	0	0	3

OBJECTIVES: To impart knowledge about the following topics:

- Architecture of PIC microcontroller
- Interrupts and timers
- Peripheral devices for data communication and transfer
- Functional blocks of ARM processor
- Architecture of ARM processors

UNIT I INTRODUCTION TO PIC MICROCONTROLLER 9

Introduction to PIC Microcontroller–PIC 16C6x and PIC16C7x Architecture–IC16cxx–Pipelining - Program Memory considerations – Register File Structure - Instruction Set - Addressing modes – Simple Operations.

UNIT II INTERRUPTS AND TIMER 9

PIC micro controller Interrupts- External Interrupts-Interrupt Programming–Loop time subroutine Timers-Timer Programming– Front panel I/O-Soft Keys– State machines and key switches– Display of Constant and Variability strings.

UNIT III PERIPHERALS AND INTERFACING 9

I^2C Bus for Peripherals Chip Access– Bus operation-Bus subroutines– Serial EEPROM–Analog to Digital Converter–UART-Baud rate selection–Data handling circuit–Initialization - LCD and keyboard Interfacing -ADC, DAC, and Sensor Interfacing.

UNIT IV INTRODUCTION TO ARM PROCESSOR 9

Architecture –ARM programmer's model –ARM Development tools- Memory Hierarchy – ARM Assembly Language Programming–Simple Examples–Architectural Support for

Operating systems.

UNIT V ARM ORGANIZATION 9

3-Stage Pipeline ARM Organization– 5-Stage Pipeline ARM Organization–ARM Instruction Execution- ARM Implementation– ARM Instruction Set– ARM coprocessor Interface– Architectural support for High Level Languages – Embedded ARM Applications.

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to understand and apply computing platform and software for engineering problems.
- Ability to understand the concepts of Architecture of PIC microcontroller
- Ability to acquire knowledge on Interrupts and timers.
- Ability to understand the importance of Peripheral devices for data communication.
- Ability to understand the basics of sensor interfacing
- Ability to acquire knowledge in Architecture of ARM processors

TEXT BOOKS:

1. Peatman,J.B., "Design with PIC Micro Controllers"PearsonEducation,3rdEdition, 2004.
2. Furber,S., "ARM System on Chip Architecture" Addison Wesley trade Computer Publication, 2000.

REFERENCES

1. Mazidi, M.A.,"PIC Microcontroller" Rollin Mckinlay, Danny causey ,Prentice Hall of India, 2007.

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B.TECH FOOD TECHNOLOGY

REGULATION 2017

CHOICE BASED CREDIT SYSTEM

PROFESSIONAL ELECTIVES (PE)

PROFESSIONAL ELECTIVE I, SEMESTER V

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	FD8001	Biology and Chemistry of Food Flavours	PE	3	3	0	0	3
2.	FD8002	Pulse and Oil Seed Technology	PE	3	3	0	0	3
3.	FD8003	Traditional Foods	PE	3	3	0	0	3
4.	GE8071	Disaster Management	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE II, SEMESTER VI

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	FD8004	Process Economics and Industrial Management	PE	3	3	0	0	3
2.	FD8005	Functional Foods and Nutraceuticals	PE	3	3	0	0	3
3.	FD8006	Food Toxicology and Allergy	PE	3	3	0	0	3
4.	FD8007	Spices and Plantation Technology	PE	3	3	0	0	3
5.	GE8075	Intellectual Property Rights	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE III, SEMESTER VI

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	FD8008	Food Process Equipment Design	PE	3	3	0	0	3
2.	FD8009	Cereal Technology	PE	3	3	0	0	3
3.	GE8076	Professional Ethics in Engineering	PE	3	3	0	0	3
4.	BT8091	Instrumentation and Process Control	PE	3	3	0	0	3
5.	BT8071	Biological Spectroscopy	PE	3	3	0	0	3

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PROFESSIONAL ELECTIVE IV, SEMESTER VI

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	FD8010	Meat, Fish and Poultry Processing Technology	PE	3	3	0	0	3
2.	GE8073	Fundamentals of Nanoscience	PE	3	3	0	0	3
3.	FD8011	Food Plant Design	PE	3	3	0	0	3
4.	FD8012	Speciality Foods	PE	3	3	0	0	3
5.	FD8013	Entrepreneurship	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE V, SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	FD8014	Beverage Technology	PE	3	3	0	0	3
2.	FD8015	Post Harvest Technology	PE	3	3	0	0	3
3.	FD8016	Milling Technology	PE	3	3	0	0	3
4.	FD8017	Creativity, Innovation and New Food Product Development	PE	3	3	0	0	3
5.	BT8751	Downstream Processing	PE	3	3	0	0	3
6.	GE8074	Human Rights	PE	3	3	0	0	3
7.	GE8072	Foundation Skills in Integrated Product Development	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE VI, SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	FD8018	Management of Food Waste	PE	3	3	0	0	3
2.	FD8019	Food Safety Management Systems	PE	3	3	0	0	3
3.	FD8020	Genetic Engineering and Genetically Modified Foods	PE	3	3	0	0	3
4.	FD8021	Storage Engineering	PE	3	3	0	0	3
5.	FD8022	Technology of Fat and Oil	PE	3	3	0	0	3
6.	FD8023	Emerging Technologies in Food Processing	PE	3	3	0	0	3
7.	GE8077	Total Quality Management	PE	3	3	0	0	3

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SUBJECT AREAWISE DETAILS

HUMANITIES AND SOCIAL SCIENCES (HS)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	HS8151	Communicative English	HS	4	4	0	0	4
2.	HS8251	Technical English	HS	4	4	0	0	4
3.	GE8291	Environmental Science and Engineering	HS	3	3	0	0	3

BASIC SCIENCES (BS)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	MA8151	Engineering Mathematics I	BS	4	4	0	0	4
2.	PH8151	Engineering Physics	BS	3	3	0	0	3
3.	CY8151	Engineering Chemistry	BS	3	3	0	0	3
4.	BS8161	Physics and Chemistry Laboratory	BS	4	0	0	4	2
5.	MA8251	Engineering Mathematics II	BS	4	4	0	0	4
6.	PH8254	Physics of Materials	BS	3	3	0	0	3
7.	MA8353	Transforms and Partial Differential Equations	BS	4	4	0	0	4
8.	MA8391	Probability and Statistics	BS	4	4	0	0	4

ENGINEERING SCIENCES (ES)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	GE8151	Problem Solving and Python Programming	ES	3	3	0	0	3
2.	GE8152	Engineering Graphics	ES	6	2	0	4	4
3.	GE8161	Problem Solving and Python Programming Laboratory	ES	4	0	0	4	2
4.	BE8252	Basic Civil and Mechanical Engineering	ES	4	4	0	0	4
5.	GE8261	Engineering Practices Laboratory	ES	4	0	0	4	2

PROFESSIONAL CORE (PC)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	BT8291	Microbiology	PC	3	3	0	0	3
2.	FD8201	Biochemistry	PC	3	3	0	0	3
3.	BT8261	Biochemistry Laboratory	PC	4	0	0	4	2
4.	FD8301	Introduction to Food Processing	PC	3	3	0	0	3
5.	FD8302	Food Process Calculations	PC	4	3	2	0	4
6.	FD8303	Food Microbiology	PC	3	3	0	0	3
7.	FD8304	Principles of Fluid Mechanics	PC	4	3	2	0	4

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8.	FD8305	Food Chemistry and Nutrition	PC	3	3	0	0	3
9.	FD8311	Food Microbiology Laboratory	PC	4	0	0	4	2
10.	FD8312	Food Chemistry and Nutrition Laboratory	PC	4	0	0	4	2
11.	FD8401	Food Analysis	PC	3	3	0	0	3
12.	FD8491	Fundamentals of Heat and Mass Transfer	PC	4	3	2	0	4
13.	FD8402	Thermodynamics	PC	3	3	0	0	3
14.	FD8403	Unit Operations for Food Industries	PC	3	3	0	0	3
15.	FD8411	Food Analysis Laboratory	PC	4	0	0	4	2
16.	FD8412	Unit Operations Laboratory	PC	4	0	0	4	2
17.	FD8501	Food Additives	PC	3	3	0	0	3
18.	FD8502	Biochemical Engineering for Food Technologists	PC	4	4	0	0	4
19.	FD8503	Refrigeration and Cold Chain Management	PC	3	3	0	0	3
20.	FD8504	Food Processing and Preservation	PC	3	3	0	0	3
21.	FD8511	Food Processing and Preservation Laboratory	PC	4	0	0	4	2
22.	FD8512	Biochemical Engineering Laboratory	PC	4	0	0	4	2
23.	FD8601	Food Process Engineering and Economics	PC	3	3	0	0	3
24.	FD8602	Baking and Confectionary	PC	3	3	0	0	3
		Technology						
25.	FD8603	Fruits and Vegetable Processing Technology	PC	3	3	0	0	3
26.	FD8611	Fruits and Vegetable Processing Technology Laboratory	PC	4	0	0	4	2
27.	FD8612	Baking and Confectionary Technology Laboratory	PC	4	0	0	4	2
28.	FD8701	Dairy Process Technology	PC	3	3	0	0	3
29.	FD8702	Food Safety, Quality and Regulation	PC	3	3	0	0	3
30.	FD8703	Food Packaging Technology	PC	3	3	0	0	3
31.	FD8711	Testing of Packaging Materials Laboratory	PC	4	0	0	4	2
32.	FD8712	Dairy Process Technology Laboratory	PC	4	0	0	4	2

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EMPLOYABILITY ENHANCEMENT COURSES (EEC)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	HS8381	Interpersonal Skills/Listening and Speaking	EEC	2	0	0	2	1
2.	HS8461	Advanced Reading And Writing	EEC	2	0	0	2	1
3.	HS8581	Professional Communication	EEC	2	0	0	2	1
4.	FD8811	Project Work	EEC	20	0	0	20	10

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CHOICE BASED CREDIT SYSTEM

OPEN ELECTIVES (Offered by other Branches)

OPEN ELECTIVE I, SEMESTER V

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	OCY551	Advanced Engineering Chemistry	OE	3	3	0	0	3
2.	OCE551	Air Pollution and Control Engineering	OE	3	3	0	0	3
3.	OAT551	Automotive Systems	OE	3	3	0	0	3
4.	OIC551	Biomedical Instrumentation	OE	3	3	0	0	3
5.	OIT552	Cloud Computing	OE	3	3	0	0	3
6.	OEC551	Control System Engineering	OE	3	3	0	0	3
7.	OIT551	Database Management Systems	OE	3	3	0	0	3
8.	OME551	Energy Conservation and Management	OE	3	3	0	0	3
9.	OAI551	Environment and Agriculture	OE	3	3	0	0	3
10.	OCY552	Fuel Cell Chemistry	OE	3	3	0	0	3
11.	OCE552	Geographic Information System	OE	3	3	0	0	3
12.	OMD552	Hospital Waste Management	OE	3	3	0	0	3
13.	OCY553	Industrial Chemistry	OE	3	3	0	0	3
14.	OBM552	Medical physics	OE	3	0	0	0	3
15.	OML552	Microscopy	OE	3	3	0	0	3
16.	OAI552	Participatory Water Resources Management	OE	3	3	0	0	3
17.	OMF551	Product Design and Development	OE	3	3	0	0	3
18.	OAI553	Production Technology of Agricultural machinery	OE	3	3	0	0	3
19.	ORO551	Renewable Energy Sources	OE	3	3	0	0	3
20.	OAN551	Sensors and Transducers	OE	3	3	0	0	3
21.	OCS551	Software Engineering	OE	3	3	0	0	3
22.	OMD553	Telehealth Technology	OE	3	0	0	0	3

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OPEN ELECTIVE II, SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	OAI751	Agricultural Finance, Banking and Co-operation	OE	3	3	0	0	3
2.	OGI751	Climate Change and Its Impact	OE	3	3	0	0	3
3.	OCS751	Data Structures and Algorithms	OE	3	3	0	0	3
4.	OME751	Design of Experiments	OE	3	3	0	0	3
5.	OCE751	Environmental and Social Impact Assessment	OE	3	3	0	0	3
6.	OEN751	Green Building Design	OE	3	3	0	0	3
7.	OBM752	Hospital Management	OE	3	3	0	0	3
8.	OMT701	Industrial Robotics	OE	3	3	0	0	3
9.	OME754	Industrial Safety	OE	3	3	0	0	3
10.	OAI752	Integrated Water Resources Management	OE	3	3	0	0	3
11.	OMF751	Lean Six Sigma	OE	3	3	0	0	3
12.	OEC756	MEMS and NEMS	OE	3	3	0	0	3
13.	OCS752	Introduction to C Programming	OE	3	3	0	0	3
14.	OIE751	Robotics	OE	3	3	0	0	3
15.	OML753	Selection of Materials	OE	3	3	0	0	3
16.	OME752	Supply Chain Management	OE	3	3	0	0	3
17.	OML751	Testing of Materials	OE	3	3	0	0	3

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B. E. PETROCHEMICAL ENGINEERINGCHOICE BASED CREDIT SYSTEM

I TO VIII SEMESTERS (FULL TIME) CURRICULA AND SYLLABISEMESTER I

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	HS8151	Communicative English	HS	4	4	0	0	4
2.	MA8151	Engineering Mathematics–I	BS	4	4	0	0	4
3.	PH8151	Engineering Physics	BS	3	3	0	0	3
4.	CY8151	Engineering Chemistry	BS	3	3	0	0	3
5.	GE8151	Problem Solving and Python Programming	ES	3	3	0	0	3
6.	GE8152	Engineering Graphics	ES	6	2	0	4	4
PRACTICALS								
7.	GE8161	Problem Solving and PythonProgramming Laboratory	ES	4	0	0	4	2
8.	BS8161	Physics and Chemistry Laboratory	BS	4	0	0	4	2
TOTAL				**31**	**19**	**0**	**12**	**25**

SEMESTER II								
S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	HS8251	Technical English	HS	4	4	0	0	4
2.	MA8251	Engineering Mathematics–II	BS	4	4	0	0	4
3.	PH8254	Physics of Materials	BS	3	3	0	0	3
4.	CY8291	Organic Chemistry	BS	3	3	0	0	3
5.	BE8256	Basic Mechanical Engineering	ES	4	4	0	0	4
6.	PM8251	Industrial Chemical Technology	PC	3	3	0	0	3
PRACTICALS								
7.	CY8281	Organic Chemistry Laboratory	BS	4	0	0	4	2
8.	GE8261	Engineering Practices Laboratory	ES	4	0	0	4	2
			TOTAL	**29**	**21**	**0**	**8**	**25**

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SEMESTER III

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	MA8391	Probability and Statistics	BS	4	4	0	0	4
2.	GE8292	Engineering Mechanics	ES	5	3	2	0	4
3.	PM8351	Fluid Mechanics	PC	5	3	2	0	4
4.	PM8391	Materials Technology	ES	3	3	0	0	3
5.	CH8351	Process Calculations	PC	5	3	2	0	4
6.	EE8352	Principles of Electrical and Electronics Engineering	ES	3	3	0	0	3
PRACTICALS								
7.	EE8361	Electrical Engineering Laboratory	ES	4	0	0	4	2
8.	ME8362	Mechanical Engineering Laboratory	ES	4	0	0	4	2
			TOTAL	**33**	**19**	**6**	**8**	**26**

SEMESTER IV

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	PE8491	Chemical Engineering Thermodynamics	PC	3	3	0	0	3
2.	PM8451	Petroleum Exploration and Exploitation Techniques	PC	3	3	0	0	3
3.	CY8292	Chemistry for Technologists	BS	3	3	0	0	3
4.	PE8092	Natural Gas Engineering	PC	3	3	0	0	3
5.	CH8451	Mechanical Operations	PC	3	3	0	0	3
6.	PM8452	Petroleum Primary Processing Technology	PC	3	3	0	0	3
PRACTICALS								
7.	PE8461	Fluids and Solid Operations Laboratory	ES	4	0	0	4	2
8.	CH8281	Chemical Analysis Laboratory	BS	4	0	0	4	2
			TOTAL	**26**	**18**	**0**	**8**	**22**

SUBJECT AREAWISE DETAILS

HUMANITIES AND SOCIAL SCIENCES (HS)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	HS8151	Communicative English	HS	4	4	0	0	4
2.	HS8251	Technical English	HS	4	4	0	0	4
3.	GE8076	Professional Ethics in Engineering	HS	3	3	0	0	3
4.	GE8291	Environmental Science and Engineering	HS	3	3	0	0	3

BASIC SCIENCES (BS)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	MA8151	Engineering Mathematics I	BS	4	4	0	0	4
2.	PH8151	Engineering Physics	BS	3	3	0	0	3
3.	CY8151	Engineering Chemistry	BS	3	3	0	0	3
4.	BS8161	Physics and Chemistry Laboratory	BS	4	0	0	4	2
5.	MA8251	Engineering Mathematics II	BS	4	4	0	0	4
6.	PH8254	Physics of Materials	BS	3	3	0	0	3
7.	CY8291	Organic Chemistry	BS	3	3	0	0	3
8.	CY8281	Organic Chemistry Laboratory	BS	2	0	0	4	2
9.	MA8391	Probability and Statistics	BS	4	4	0	0	4
10.	CY8292	Chemistry for Technologists	BS	3	3	0	0	3
11.	CH8281	Chemical Analysis Laboratory	BS	4	0	0	4	2

ENGINEERING SCIENCES (ES)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	GE8151	Problem Solving and Python Programming	ES	3	3	0	0	3
2.	GE8152	Engineering Graphics	ES	6	2	0	4	4
3.	GE8161	Problem Solving and Python Programming Laboratory	ES	4	0	0	4	2
4.	BE8256	Basic Mechanical Engineering	ES	4	4	0	0	4
5.	GE8261	Engineering Practices Laboratory	ES	4	0	0	4	2
6.	GE8292	Engineering Mechanics	ES	5	3	2	0	4
7.	PM8391	Materials Technology	ES	3	3	0	0	3
8.	EE8352	Principles of Electrical and Electronics Engineering	ES	3	3	0	0	3
9.	EE8361	Electrical Engineering Laboratory	ES	4	0	0	4	2
10.	ME8362	Mechanical Engineering Laboratory	ES	4	0	0	4	2
11.	PE8461	Fluids and Solid operations Laboratory	ES	4	0	0	4	2

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SEMESTER V

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	CH8591	Heat Transfer	PC	5	3	2	0	4
2.	CH8551	Mass Transfer I	PC	3	3	0	0	3
3.	PE8091	Chemical Reaction Engineering	PC	3	3	0	0	3
4.	HS8581	Professional Communication	EEC	2	0	0	2	1
5.		Professional Elective I	PE	3	3	0	0	3
6.		Open Elective I*	OE	3	3	0	0	3
PRACTICALS								
7.	CH8561	Heat Transfer Laboratory	PC	4	0	0	4	2
8.	PM8561	Petrochemical Analysis Laboratory	PC	4	0	0	4	2
			TOTAL	**27**	**15**	**2**	**10**	**21**

* - Course from the curriculum of the other UG Programmes

SEMESTER VI

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	PM8651	Petroleum Secondary Processing Technology	PC	3	3	0	0	3
2.	CH8651	Mass Transfer II	PC	5	3	2	0	4
3.	PE8072	Catalytic Reaction Engineering	PC	3	3	0	0	3
4.	GE8076	Professional Ethics in Engineering	HS	3	3	0	0	3
5.	CH8653	Process Instrumentation, Dynamics and Control	PC	3	3	0	0	3
6.		Professional Elective II	PE	3	3	0	0	3
PRACTICALS								
7.	CH8781	Mass Transfer Laboratory	PC	4	0	0	4	2
8.	PE8661	Petroleum Testing Laboratory	PC	4	0	0	4	2
			TOTAL	**28**	**18**	**2**	**8**	**23**

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SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	PM8751	Process Equipment Design and Drawing	PC	5	3	0	2	4
2.	GE8291	Environmental Science and Engineering	HS	3	3	0	0	3
3.		Professional Elective III	PE	3	3	0	0	3
4.		Professional Elective IV	PE	3	3	0	0	3
5.		Professional Elective V	PE	3	3	0	0	3
6.		Open Elective II*	OE	3	3	0	0	3
PRACTICALS								
7.	PM8761	Reaction Engineering and Process Control Laboratory	PC	4	0	0	4	2
8.	PM8711	Internship	EEC	0	0	0	0	2
			TOTAL	**24**	**18**	**0**	**6**	**23**

* - Course from the curriculum of the other UG Programmes

SEMESTER VIII

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.		Professional Elective VI	PE	3	3	0	0	3
2.	PM8801	Pipeline and Welding Technology	PC	3	3	0	0	3
PRACTICALS								
3.	PM8811	Project Work	EEC	20	0	0	20	10
4.	PM8812	Seminar	EEC	4	0	0	4	2
			TOTAL	**30**	**6**	**0**	**24**	**18**

TOTAL CREDITS: 183

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PROFESSIONAL ELECTIVES

PROFESSIONAL ELECTIVE I, SEMESTER V

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	PM8078	Petrochemical Unit Processes	PE	3	3	0	0	3
2.	PM8075	Instrumentation and Instrumental Analysis	PE	3	3	0	0	3
3.	CH8094	Polymer Technology	PE	3	3	0	0	3
4.	PM8076	Non-Conventional hydrocarbon sources	PE	3	3	0	0	3
5.	GE8071	Disaster Management	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE II, SEMESTER VI

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	PM8073	Design of Pressure Vessels and Piping	PE	3	3	0	0	3
2.	PM8074	Drilling and Well Engineering	PE	3	3	0	0	3
3.	PM8080	Production Engineering	PE	3	3	0	0	3
4.	PE8071	Advanced Separation Techniques	PE	3	3	0	0	3
5.	GE8075	Intellectual Property Rights	PE	3	3	0	0	3
6.	CH8791	Transport Phenomena	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE III, SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	PM8082	Water Treatment and Management	PE	3	3	0	0	3
2.	CH8072	Fluidization Engineering	PE	3	3	0	0	3
3.	PM8071	Chemical Process Design	PE	3	3	0	0	3
4.	PE8073	Enhanced Oil Recovery	PE	3	3	0	0	3
5.	GE8074	Human Rights	PE	3	3	0	0	3
6.	CH8077	Process Modeling and Simulation	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE IV, SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	PM8079	Petroleum Process Equipment Auxiliaries	PE	3	3	0	0	3
2.	PE8074	Multicomponent Distillation	PE	3	3	0	0	3
3.	PE8075	Petroleum Corrosion Technology	PE	3	3	0	0	3
4.	PM8081	Refinery Process Design	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE V, SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	PE8079	Storage Transportation of Crude Oil and Natural gas	PE	3	3	0	0	3
2.	PE8078	Reservoir Characterization and Modeling	PE	3	3	0	0	3
3.	PM8077	Petrochemical Derivatives	PE	3	3	0	0	3
4.	GE8077	Total Quality Management	PE	3	3	0	0	3

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PROFESSIONAL ELECTIVE VI, SEMESTER VIII

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	PE8076	Petroleum Economics	PE	3	3	0	0	3
2.	PM8072	Design of Heat Exchangers	PE	3	3	0	0	3
3.	PE8093	Plant Safety and Risk Analysis	PE	3	3	0	0	3
4.	PC8071	Safety in Chemical Industries	PE	3	3	0	0	3
5.	GE8073	Fundamentals of Nano Science	PE	3	3	0	0	3

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SUBJECT AREAWISE DETAILS

HUMANITIES AND SOCIAL SCIENCES (HS)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	HS8151	Communicative English	HS	4	4	0	0	4
2.	HS8251	Technical English	HS	4	4	0	0	4
3.	GE8076	Professional Ethics in Engineering	HS	3	3	0	0	3
4.	GE8291	Environmental Science and Engineering	HS	3	3	0	0	3

BASIC SCIENCES (BS)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	MA8151	Engineering Mathematics I	BS	4	4	0	0	4
2.	PH8151	Engineering Physics	BS	3	3	0	0	3
3.	CY8151	Engineering Chemistry	BS	3	3	0	0	3
4.	BS8161	Physics and Chemistry Laboratory	BS	4	0	0	4	2
5.	MA8251	Engineering Mathematics II	BS	4	4	0	0	4
6.	PH8254	Physics of Materials	BS	3	3	0	0	3
7.	CY8291	Organic Chemistry	BS	3	3	0	0	3
8.	CY8281	Organic Chemistry Laboratory	BS	2	0	0	4	2
9.	MA8391	Probability and Statistics	BS	4	4	0	0	4
10.	CY8292	Chemistry for Technologists	BS	3	3	0	0	3
11.	CH8281	Chemical Analysis Laboratory	BS	4	0	0	4	2

ENGINEERING SCIENCES (ES)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	GE8151	Problem Solving and Python Programming	ES	3	3	0	0	3
2.	GE8152	Engineering Graphics	ES	6	2	0	4	4
3.	GE8161	Problem Solving and Python Programming Laboratory	ES	4	0	0	4	2
4.	BE8256	Basic Mechanical Engineering	ES	4	4	0	0	4
5.	GE8261	Engineering Practices Laboratory	ES	4	0	0	4	2
6.	GE8292	Engineering Mechanics	ES	5	3	2	0	4
7.	PM8391	Materials Technology	ES	3	3	0	0	3
8.	EE8352	Principles of Electrical and Electronics Engineering	ES	3	3	0	0	3
9.	EE8361	Electrical Engineering Laboratory	ES	4	0	0	4	2
10.	ME8362	Mechanical Engineering Laboratory	ES	4	0	0	4	2
11.	PE8461	Fluids and Solid operations Laboratory	ES	4	0	0	4	2

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PROFESSIONAL CORE (PC)

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	PM8251	Industrial Chemical Technology	PC	3	3	0	0	3
2.	PM8351	Fluid Mechanics	PC	5	3	2	0	4
3.	CH8351	Process Calculations	PC	5	3	2	0	4
4.	PE8491	Chemical Engineering Thermodynamics	PC	3	3	0	0	3
5.	PM8451	Petroleum Exploration and Exploitation Techniques	PC	3	3	0	0	3
6.	PE8092	Natural Gas Engineering	PC	3	3	0	0	3
7.	CH8451	Mechanical Operations	PC	3	3	0	0	3
8.	PM8452	Petroleum Primary Processing Technology	PC	3	3	0	0	3
9.	CH8591	Heat Transfer	PC	5	3	2	0	4
10.	CH8551	Mass Transfer I	PC	3	3	0	0	3
11.	PE8091	Chemical Reaction Engineering	PC	3	3	0	0	3
12.	CH8561	Heat Transfer Laboratory	PC	4	0	0	4	2
13.	PM8561	Petrochemical Analysis Laboratory	PC	4	0	0	4	2
14.	PM8651	Petroleum Secondary Processing Technology	PC	3	3	0	0	3
15.	CH8651	Mass Transfer II	PC	5	3	2	0	4
16.	PE8072	Catalytic Reaction Engineering	PC	3	3	0	0	3
17.	CH8781	Mass Transfer Laboratory	PC	4	0	0	4	2
18.	PE8661	Petroleum Testing Laboratory	PC	4	0	0	4	2
19.	CH8653	Process Instrumentation, Dynamics and control	PC	3	3	0	0	3
20.	PM8751	Process Equipment Design and Drawing	PC	5	3	0	2	4
21.	PM8761	Reaction Engineering and Process Control Laboratory	PC	4	0	0	4	2
22.	PM8801	Pipeline and welding Technology	PC	3	3	0	0	3

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	HS8581	Professional Communication	EEC	2	0	0	2	1
2.	PM8711	Internship	EEC	0	0	0	0	2
3.	PM8811	Project Work	EEC	20	0	0	20	10
4.	PM8812	Seminar	EEC	4	0	0	4	2

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SUMMARY

S. No.	Subject Area	Credits per Semester								Credits Total
		I	II	III	IV	V	VI	VII	VIII	
1.	HUMANITIES AND SOCIAL SCIENCES (HS)	4	4	0	0	0	3	3	0	14
2.	BASIC SCIENCE (BS)	12	12	4	5	0	0	0	0	33
3.	ENGINEERING SCIENCE (ES)	9	6	14	2	0	0	0	0	31
4.	PROFESSIONAL COURE (PC)	0	3	8	15	14	17	6	3	66
5.	EMPLOYABILITY ENHANCEMENT COURSES (EEC)	0	0	0	0	1	0	2	12	15
6.	PROFESSIONAL ELECTIVES (PE)	0	0	0	0	3	3	9	3	18
7.	OPEN ELECTIVES (OE)	0	0	0	0	3	0	3	0	6
	TOTAL	**25**	**25**	**26**	**22**	**21**	**23**	**23**	**18**	**183**

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ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS
B.E. PETROCHEMICAL ENGINEERING
REGULATIONS 2017
CHOICE BASED CREDIT SYSTEM
OPEN ELECTIVES (Offered by other Branches)

OPEN ELECTIVE I, SEMESTER V

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	OCE551	Air Pollution and Control Engineering	OE	3	3	0	0	3
2.	OIT552	Cloud Computing	OE	3	3	0	0	3
3.	OEC551	Control Systems Engineering	OE	3	3	0	0	3
4.	OIC501	Basic Control Theory	OE	3	3	0	0	3
5.	OME551	Energy Conservation and Management	OE	3	3	0	0	3
6.	OCY552	Fuel Cell Chemistry	OE	3	3	0	0	3
7.	OCE552	Geographic Information System	OE	3	3	0	0	3
8.	OMD552	Hospital Waste Management	OE	3	3	0	0	3
9.	OAI552	Participatory Water Resources Management	OE	3	3	0	0	3
10.	ORO551	Renewable Energy Sources	OE	3	3	0	0	3

OPEN ELECTIVE II, SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	OGI751	Climate Change and Its Impact	OE	3	3	0	0	3
2.	OME751	Design of Experiments	OE	3	3	0	0	3
3.	OCE751	Environmental and Social Impact Assessment	OE	3	3	0	0	3
4.	OAE751	Fundamentals of combustion	OE	3	3	0	0	3
5.	OEN751	Green Building Design	OE	3	3	0	0	3
6.	OME754	Industrial Safety	OE	3	3	0	0	3
7.	ORO751	Nano Computing	OE	3	3	0	0	3
8.	OML753	Selection of Materials	OE	3	3	0	0	3
9.	OML751	Testing of Materials	OE	3	3	0	0	3

1.2.1 Number of Programmes in which Choice Based Credit System (CBCS)/ elective course system has been implemented

Program Code	Program name	Year of Introduction	Status of implementation of CBCS / elective course system (Yes/No)	Year of implementation of CBCS / elective course system
209	B.E Petroleum Engineering	2017	yes	2021

ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS
REGULATIONS 2017
B. TECH. PETROLEUM ENGINEERING CHOICE BASED CREDIT SYSTEM

1. Programme Educational Objectives (PEOs)

Graduates of B. Tech. Petroleum Engineering will

I. Exhibit a professional attitude, effective communication skills, teamwork , multidisciplinary approach, ability to solve the problems encountered in petroleum sector.

II. Gain knowledge in basic sciences, mathematics, reservoir engineering and onshore & offshore petroleum engineering.

III. Have a knowledge and competency in Petrochemical Engineering complemented by the appropriate skills and attributes.

IV. Understand the theory and applications of analytical equipment used in industries for testing the quality of petroleum and its products.

V. Address to meet the world's ever-increasing demand for hydrocarbon fuel, and waste management.

2. Programme Outcomes (POs)

On successful completion of the programme,

I. Graduates will be able to demonstrate their knowledge professionally and shoulder ethical responsibilities.

II. Graduates will able be to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

III. Graduates will be able to identify, formulate, and solve engineering problems related to petroleum industry.

IV. Graduates will be capable to design experiments, analyze and interpret data.

V. Graduates will be able to meet the world's ever-increasing demand for hydrocarbon fuel, reservoir engineering and waste management.

VI. Graduates will be able to communicate effectively and work in interdisciplinary groups.

VII. Graduates will have knowledge to analyze petroleum products.

VIII. Graduates will understand the characteristics of source and reservoir engineering.

IX. Graduates will become familiar with environmentally sound exploration, evaluation and recovery of oil, gas and other fluids in the earth.

X. Graduates will Understand the pre requisites of onshore & offshore reservoir engineering.

3. PEOs / POs Mapping

Programme Educational Objectives	Programme Outcomes									
	I	II	III	IV	V	VI	VII	VIII	IX	X
I	✓	✓	✓			✓				✓
II			✓	✓			✓			
III	✓		✓	✓	✓		✓	✓	✓	✓
IV		✓	✓				✓			
V		✓					✓	✓	✓	

4. Semester Course wise PEOs mapping

YEAR	SEM	Course Title	I	II	III	IV	V	VI	VII	VIII	IX	X
YEAR I	SEM I	Communicative English		√							√	
		Engineering Mathematics I		√				√				√
		Engineering Physics				√						
		Engineering Chemistry				√	√					
		Problem Solving and Python Programming	√	√								√
		Engineering Graphics	√									
		Physics and Chemistry Laboratory				√	√					
		Problem Solving and Python Programming Laboratory	√	√								√
	SEM II	Technical English		√							√	
		Engineering Mathematics II		√				√				√
		Physics of Materials				√						
		Organic Chemistry				√	√					
		Basic Mechanical Engineering			√							
		Introduction to Petroleum Engineering			√				√	√		
		Organic Chemistry Laboratory			√	√		√				
		Engineering Practices Laboratory			√							
YEAR II	SEM III	Probability and Statistics		√				√				√
		Reservoir Rocks and Fluid Properties			√				√	√		
		Engineering Mechanics			√							
		Fluids and Solid Operations			√	√		√				
		Process Calculations			√	√		√				
		Principles of Electrical and Electronics Engineering			√	√						√
		Electrical Engineering Laboratory			√	√						√
		Mechanical Engineering Laboratory			√	√		√				
	SEM IV	Chemical Engineering Thermodynamics			√	√		√				
		Geophysics	√		√	√	√					
		Chemistry for Technologists				√	√					
		Fundamentals of Petroleum Geology	√		√		√					

		Health, Safety and Environmental Management in Petroleum Industries	√	√	√			√				
		Heat Transfer			√	√		√				
		Fluids and Solid operations Laboratory			√							
		Chemical Analysis Laboratory				√	√					
YEAR III	**SEM V**	Process Control and Instrumentation	√	√	√						√	
		Mass Transfer			√	√		√				
		Reservoir Engineering I			√				√	√		
		Professional Communication	√								√	
		Heat Transfer Laboratory			√	√		√				
		Geology Laboratory	√		√	√	√					
	SEM VI	Well Drilling Equipment and Operation			√				√	√		
		Well Logging			√				√	√		
		Reservoir Engineering II			√				√	√		
		Professional Ethics in Engineering	√		√		√					
		Drilling Fluids and Cementing Techniques			√				√	√	√	
		Mass Transfer Laboratory			√	√		√				
		Petroleum Testing Laboratory			√				√	√		
YEAR IV	**SEM VII**	Petroleum Production Engineering			√				√	√		
		Environmental Science and Engineering	√		√		√					
		Drilling Fluids and Cementing Techniques Laboratory			√	√		√	√	√		
		Internship	√								√	
	SEMVIII	Project	√	√						√		
		Seminar	√	√						√		

ANNA UNIVERSITY, CHENNAI AFFILIATED
INSTITUTIONS REGULATIONS 2017
B.TECH. PETROLEUM ENGINEERING CHOICE
BASED CREDIT SYSTEM
I TO VIII SEMESTERS (FULL TIME) CURRICULA
AND SYLLABI

SEMESTER I

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	HS8151	Communicative English	HS	4	4	0	0	4
2.	MA8151	Engineering Mathematics–I	BS	4	4	0	0	4
3.	PH8151	Engineering Physics	BS	3	3	0	0	3
4.	CY8151	Engineering Chemistry	BS	3	3	0	0	3
5.	GE8151	Problem Solving and Python Programming	ES	3	3	0	0	3
6.	GE8152	Engineering Graphics	ES	6	2	0	4	4
PRACTICALS								
7.	GE8161	Problem Solving and Python Programming Laboratory	ES	4	0	0	4	2
8.	BS8161	Physics and Chemistry Laboratory	BS	4	0	0	4	2
			TOTAL	**31**	**19**	**0**	**12**	**25**

SEMESTER II

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	HS8251	Technical English	HS	4	4	0	0	4
2.	MA8251	Engineering Mathematics–II	BS	4	4	0	0	4
3.	PH8254	Physics of Materials	BS	3	3	0	0	3
4.	CY8291	Organic Chemistry	BS	3	3	0	0	3
5.	BE8256	Basic Mechanical Engineering	ES	4	4	0	0	4
6.	PE8201	Introduction to Petroleum Engineering	PC	3	3	0	0	3
PRACTICALS								
7.	CY8281	Organic Chemistry Laboratory	BS	4	0	0	4	2
8.	GE8261	Engineering Practices Laboratory	ES	4	0	0	4	2
			TOTAL	**29**	**21**	**0**	**8**	**25**

SEMESTER III

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	MA8391	Probability and Statistics	BS	4	4	0	0	4
2.	PE8301	Reservoir Rocks and Fluid Properties	PC	3	3	0	0	3
3.	GE8292	Engineering Mechanics	ES	5	3	2	0	4
4.	PE8302	Fluids and Solid Operations	PC	5	3	2	0	4
5.	CH8351	Process Calculations	PC	5	3	2	0	4
6.	EE8352	Principles of Electrical and Electronics Engineering	ES	3	3	0	0	3
PRACTICALS								
7.	EE8361	Electrical Engineering Laboratory	ES	4	0	0	4	2
8.	ME8362	Mechanical Engineering Laboratory	ES	4	0	0	4	2
			TOTAL	**33**	**19**	**6**	**8**	**26**

SEMESTER IV

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	PE8491	Chemical Engineering Thermodynamics	PC	3	3	0	0	3
2.	PE8401	Geophysics	PC	3	3	0	0	3
3.	CY8292	Chemistry for Technologists	BS	3	3	0	0	3
4.	PE8402	Fundamentals of Petroleum Geology	PC	4	4	0	0	4
5.	PE8403	Health, Safety and Environmental Management in Petroleum Industries	PC	3	3	0	0	3
6.	CH8591	Heat Transfer	PC	5	3	2	0	4
PRACTICALS								
7.	PE8461	Fluids and Solid Operations Laboratory	ES	4	0	0	4	2
8.	CH8281	Chemical Analysis Laboratory	BS	4	0	0	4	2
			TOTAL	**29**	**19**	**2**	**8**	**24**

SEMESTER V

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	PE8501	Process Control and Instrumentation	PC	5	3	2	0	4
2.	PE8502	Mass Transfer	PC	5	3	2	0	4
3.	PE8503	Reservoir Engineering I	PC	4	4	0	0	4
4.		Professional Elective I	PE	3	3	0	0	3
5.		Open Elective I*	OE	3	3	0	0	3
PRACTICALS								
6.	CH8561	Heat Transfer Laboratory	PC	4	0	0	4	2
7.	PE8511	Geology Laboratory	PC	4	0	0	4	2
8.	HS8581	Professional Communication	EEC	2	0	0	2	1
			TOTAL	**30**	**16**	**4**	**10**	**23**

* - Course from the curriculum of the other UG Programmes

SEMESTER VI

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	PE8601	Well Drilling Equipment and Operation	PC	3	3	0	0	3
2.	PE8602	Well Logging	PC	4	4	0	0	4
3.	PE8603	Reservoir Engineering II	PC	4	4	0	0	4
4.	GE8076	Professional Ethics in Engineering	HS	3	3	0	0	3
5.	PE8604	Drilling Fluids and Cementing Techniques	PC	3	3	0	0	3
6.		Professional Elective II	PE	3	3	0	0	3
PRACTICALS								
7.	CH8781	Mass Transfer Laboratory	PC	4	0	0	4	2
8.	PE8661	Petroleum Testing Laboratory	PC	4	0	0	4	2
			TOTAL	**28**	**20**	**0**	**8**	**24**

SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	PE8701	Petroleum Production Engineering	PC	3	3	0	0	3
2.	GE8291	Environmental Science and Engineering	HS	3	3	0	0	3
3.		Professional Elective III	PE	3	3	0	0	3
4.		Professional Elective IV	PE	3	3	0	0	3
5.		Professional Elective V	PE	3	3	0	0	3
6.		Open Elective II*	OE	3	3	0	0	3
PRACTICALS								
7.	PE8711	Drilling Fluids and Cementing Techniques Laboratory	PC	4	0	0	4	2
8.	PE8712	Internship	EEC	0	0	0	0	2
			TOTAL	**22**	**18**	**0**	**4**	**22**

* - Course from the curriculum of the other UG Programmes

SEMESTER VIII

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.		Professional Elective VI	PE	3	3	0	0	3
PRACTICALS								
2.	PE8811	Project Work	EEC	20	0	0	20	10
3.	PE8812	Seminar	EEC	4	0	0	4	2
			TOTAL	**27**	**3**	**0**	**24**	**15**

TOTAL CREDITS : 184

PROFESSIONAL ELECTIVES

PROFESSIONAL ELECTIVE I, SEMESTER V

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	PE8091	Chemical Reaction Engineering	PE	3	3	0	0	3
2.	CH8075	Petroleum Refining and Petrochemicals	PE	3	3	0	0	3
3.	PE8092	Natural Gas Engineering	PE	3	3	0	0	3
4.	PE8001	Principles of Geochemistry	PE	3	3	0	0	3
5.	GE8071	Disaster Management	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE II, SEMESTER VI

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	PE8071	Advanced Separation Techniques	PE	3	3	0	0	3
2.	PE8002	Well Completion Testing and Work Over	PE	3	3	0	0	3
3.	PE8072	Catalytic Reaction Engineering	PE	3	3	0	0	3
4.	PE8003	Numerical Reservoir Simulation	PE	3	3	0	0	3
5.	GE8075	Intellectual Property Rights	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE III, SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	PE8004	Onshore and Offshore Engineering and Technology	PE	3	3	0	0	3
2.	PE8005	Petroleum Equipment Design	PE	3	3	0	0	3
3.	PE8073	Enhanced Oil Recovery	PE	3	3	0	0	3
4.	GE8074	Human Rights	PE	3	3	0	0	3
5.	GE8072	Foundation Skills in Integrated Product Development	PE	3	3	0	0	3

PROFESSIONAL ELECTIVEIV, SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	PE8006	Water Flooding and Enhanced Oil Recovery	PE	3	3	0	0	3
2.	PE8093	Plant Safety and Risk Analysis	PE	3	3	0	0	3
3.	PE8074	Multicomponent Distillation	PE	3	3	0	0	3
4.	CH8076	Piping and Instrumentation	PE	3	3	0	0	3
5.	GE8077	Total Quality Management	PE	3	3	0	0	3
6.	PE8007	Petroleum Transportation and Design	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE V, SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	PE8075	Petroleum Corrosion Technology	PE	3	3	0	0	3
2.	PE8008	Well Completion and Simulation	PE	3	3	0	0	3
3.	PE8079	Storage Transportation of Crude Oil and Natural Gas	PE	3	3	0	0	3

4.	PE8078	Reservoir Characterization and Modeling	PE	3	3	0	0	3

PROFESSIONAL ELECTIVEVI, SEMESTER VIII

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	PE8009	Oil Field Equipment Design and Drawing	PE	3	3	0	0	3
2.	PE8077	Process Economics	PE	3	3	0	0	3
3.	PE8076	Petroleum Economics	PE	3	3	0	0	3
4.	PE8010	Integrated Oil/Gas Field Evaluation	PE	3	3	0	0	3
5.	GE8073	Fundamentals of Nanoscience	PE	3	3	0	0	3

SUBJECT AREAWISE DETAILS

HUMANITIES AND SOCIAL SCIENCES (HS)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	HS8151	Communicative English	HS	4	4	0	0	4
2.	HS8251	Technical English	HS	4	4	0	0	4
3.	GE8076	Professional Ethics in Engineering	HS	3	3	0	0	3
4.	GE8291	Environmental Science and Engineering	HS	3	3	0	0	3

BASIC SCIENCES (BS)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	MA8151	Engineering Mathematics I	BS	4	4	0	0	4
2.	PH8151	Engineering Physics	BS	3	3	0	0	3
3.	CY8151	Engineering Chemistry	BS	3	3	0	0	3
4.	BS8161	Physics and Chemistry Laboratory	BS	4	0	0	4	2
5.	MA8251	Engineering Mathematics II	BS	4	4	0	0	4
6.	PH8254	Physics of Materials	BS	3	3	0	0	3
7.	CY8291	Organic Chemistry	BS	3	3	0	0	3
8.	CY8281	Organic Chemistry Laboratory	BS	2	0	0	4	2
9.	MA8391	Probability and Statistics	BS	4	4	0	0	4
10.	CY8292	Chemistry for Technologists	BS	3	3	0	0	3
11.	CH8281	Chemical Analysis Laboratory	BS	4	0	0	4	2

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	GE8151	Problem Solving and Python Programming	ES	3	3	0	0	3
2.	GE8152	Engineering Graphics	ES	4	2	0	4	4
3.	GE8161	Problem Solving and Python Programming Laboratory	ES	4	0	0	4	2
4.	BE8256	Basic Mechanical Engineering	ES	4	4	0	0	4
5.	GE8261	Engineering Practices Laboratory	ES	4	0	0	4	2
6.	GE8292	Engineering Mechanics	ES	5	3	2	0	4
7.	EE8352	Principles of Electrical and Electronics Engineering	ES	3	3	0	0	3
8.	EE8361	Electrical Engineering Laboratory	ES	4	0	0	4	2
9.	ME8362	Mechanical Engineering Laboratory	ES	4	0	0	4	2
10.	PE8461	Fluid and Solid operations Laboratory	ES	4	0	0	4	2

ENGINEERING SCIENCES (ES)

PROFESSIONAL CORE (PC)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	PE8201	Introduction to Petroleum Engineering	PC	3	3	0	0	3
2.	PE8301	Reservoir Rocks and Fluid Properties	PC	3	3	0	0	3
3.	PE8302	Fluids and Solid Operations	PC	5	3	2	0	4
4.	CH8351	Process Calculations	PC	5	3	2	0	4
5.	PE8491	Chemical Engineering Thermodynamics	PC	3	3	0	0	3
6.	PE8401	Geophysics	PC	3	3	0	0	3
7.	PE8402	Fundamentals of Petroleum Geology	PC	4	4	0	0	4
8.	PE8403	Health, Safety and Environmental Management in Petroleum Industries	PC	3	3	0	0	3
9.	CH8591	Heat Transfer	PC	5	3	2	0	4
10.	PE8501	Process Control and Instrumentation	PC	5	3	2	0	4
11.	PE8502	Mass Transfer	PC	5	3	2	0	4
12.	PE8503	Reservoir Engineering I	PC	4	4	0	0	4
13.	CH8561	Heat Transfer Laboratory	PC	4	0	0	4	2
14.	PE8511	Geology Laboratory	PC	4	0	0	4	2

15.	PE8601	Well Drilling Equipment and Operation	PC	3	3	0	0	3
16.	PE8602	Well Logging	PC	4	4	0	0	4
17.	PE8603	Reservoir Engineering II	PC	4	4	0	0	4
18.	CH8781	Mass Transfer Laboratory	PC	4	0	0	4	2
19.	PE8661	Petroleum Testing Laboratory	PC	4	0	0	4	2
20.	PE8604	Drilling Fluids and Cementing Techniques	PC	3	3	0	0	3
21.	PE8701	Petroleum Production Engineering	PC	3	3	0	0	3
22.	PE8711	Drilling Fluids and Cementing Techniques Laboratory	PC	4	0	0	4	2

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	HS8581	Professional Communication	EEC	2	0	0	2	1
2.	PE8712	Internship	EEC	0	0	0	0	2
3.	PE8811	Project Work	EEC	20	0	0	20	10
4.	PE8812	Seminar	EEC	4	0	0	4	2

SUMMARY

S. No.	SUBJECT AREA	CREDITS PER SEMESTER								CREDITS TOTAL
		I	II	III	IV	V	VI	VII	VIII	
1.	HUMANITIES AND SOCIAL SCIENCES (HS)	4	4	0	0	0	3	3	0	**14**
2.	BASIC SCIENCE (BS)	12	12	4	5	0	0	0	0	**33**
3.	ENGINEERING SCIENCE (ES)	9	6	11	2	0	0	0	0	**28**
4.	PROFESSIONAL COURE (PC)	0	3	11	17	16	18	5	0	**70**
5.	EMPLOYABILITY ENHANCEMENT COURSES(EEC)	0	0	0	0	1	0	2	12	**15**
6.	PROFESSIONAL ELECTIVES (PE)	0	0	0	0	3	3	9	3	**18**
7.	OPEN ELECTIVES (OE)	0	0	0	0	3	0	3	0	**6**
	TOTAL	**25**	**25**	**26**	**24**	**23**	**24**	**22**	**15**	**184**

HS8151	COMMUNICATIVE ENGLISH	L	T	P	C
OBJECTIVES:		**4**	**0**	**0**	**4**

- To develop the basic reading and writing skills of first year engineering and technology students.
- To help learners develop their listening skills, which will, enable them listen to lectures and comprehend them by asking questions; seeking clarifications.
- To help learners develop their speaking skills and speak fluently in real contexts.
- To help learners develop vocabulary of a general kind by developing their reading skills

UNIT I SHARING INFORMATION RELATED TO ONESELF/FAMILY& FRIENDS 12

Reading- short comprehension passages, practice in skimming-scanning and predicting- **Writing**- completing sentences- - developing hints. **Listening**- short texts- short formal and informal conversations. **Speaking-** introducing oneself - exchanging personal information- **Language development**- Wh- Questions- asking and answering-yes or no questions- parts of speech. **Vocabulary development-**- prefixes- suffixes- articles.- count/ uncount nouns.

UNIT II GENERAL READING AND FREE WRITING 12

Reading - comprehension-pre-reading-post reading- comprehension questions (multiple choice questions and /or short questions/ open-ended questions)-inductive reading- short narratives and descriptions from newspapers including dialogues and conversations (also used as short Listening texts)- register- **Writing** – paragraph writing- topic sentence- main ideas- free writing, short narrative descriptions using some suggested vocabulary and structures –**Listening**- telephonic conversations. **Speaking –** sharing information of a personal kind—greeting – taking leave- **Language development** – prepositions, conjunctions **Vocabulary development-** guessing meanings of words in context.

UNIT III GRAMMAR AND LANGUAGE DEVELOPMENT 12

Reading- short texts and longer passages (close reading) **Writing-** understanding text structure- use of reference words and discourse markers-coherence-jumbled sentences **Listening** – listening to longer texts and filling up the table- product description- narratives from different sources. **Speaking**- asking about routine actions and expressing opinions. **Language development**- degrees of comparison- pronouns- direct vs indirect questions- **Vocabulary development –** single word substitutes- adverbs.

UNIT IV READING AND LANGUAGE DEVELOPMENT 12

Reading- comprehension-reading longer texts- reading different types of texts- magazines **Writing**- letter writing, informal or personal letters-e-mails-conventions of personal email- **Listening**- listening to dialogues or conversations and completing exercises based on them. **Speaking-** speaking about oneself- speaking about one's friend- **Language development-** Tenses- simple present-simple past- present continuous and past continuous- **Vocabulary development**- synonyms-antonyms-

phrasal verbs

UNIT V EXTENDED WRITING **12**

Reading- longer texts- close reading –**Writing**- brainstorming -writing short essays **–** developing an outline- identifying main and subordinate ideas- dialogue writing-**Listening** – listening to talks-conversations- **Speaking –** participating in conversations- short group conversations-**Language development**-modal verbs- present/ past perfect tense - **Vocabulary development**-collocations-fixed and semi-fixed expressions

TOTAL: 60 PERIODS

OUTCOMES: At the end of the course, learners will be able to:

- Read articles of a general kind in magazines and newspapers.
- Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
- Comprehend conversations and short talks delivered in English
- Write short essays of a general kind and personal letters and emails in English.

TEXT BOOKS:

1. Board of Editors. **Using English** A Coursebook for Undergarduate Engineers and Technologists**.** Orient BlackSwan Limited, Hyderabad: 2015
2. Richards, C. Jack. **Interchange Students' Book-2** New Delhi: CUP, 2015.

REFERENCES

1 Bailey, Stephen. **Academic Writing: A practical guide for students**. New York: Rutledge,2011.

2 Comfort, Jeremy, et al. **Speaking Effectively : Developing Speaking Skillsfor BusinessEnglish.** Cambridge University Press, Cambridge: Reprint 2011

3 Dutt P. Kiranmai and RajeevanGeeta. **Basic Communication Skills,** Foundation Books: 2013

4 Means,L. Thomas and Elaine Langlois. **English & Communication For Colleges.** CengageLearning ,USA: 2007

5 Redston, Chris &Gillies Cunningham **Face2Face** (Pre-intermediate Student's Book& Workbook) Cambridge University Press, New Delhi: 2005

MA8151 ENGINEERING MATHEMATICS – I **L T P C**
4 0 0 4

OBJECTIVES :

- The goal of this course is to achieve conceptual understanding and to retain the best traditions of traditional calculus. The syllabus is designed to provide the basic tools of calculus mainly for the purpose of modelling the engineering problems mathematically and obtaining solutions. This is a foundation course which mainly deals with topics such as single variable and multivariable calculus and plays an important role in the understanding of science, engineering, economics and computer science, among other disciplines.

UNIT I DIFFERENTIAL CALCULUS 12

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules - Maxima and Minima of functions of one variable.

UNIT II FUNCTIONS OF SEVERAL VARIABLES 12

Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

UNIT III INTEGRAL CALCULUS 12

Definite and Indefinite integrals - Substitution rule - Techniques of Integration - Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals.

UNIT IV MULTIPLE INTEGRALS 12

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals.

UNIT V DIFFERENTIAL EQUATIONS 12

Higher order linear differential equations with constant coefficients - Method of variation of parameters – Homogenous equation of Euler's and Legendre's type – System of simultaneous linear differential equations with constant coefficients - Method of undetermined coefficients.

TOTAL : 60 PERIODS

OUTCOMES :

After completing this course, students should demonstrate competency in the following skills:

- Use both the limit definition and rules of differentiation to differentiate functions.
- Apply differentiation to solve maxima and minima problems.
- Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
- Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
- Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.
- Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
- Apply various techniques in solving differential equations.

TEXT BOOKS :

1.Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2014.

2.James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 7th Edition, New Delhi, 2015. [For Units I & III - Sections 1.1, 2.2, 2.3, 2.5, 2.7(Tangents problems only), 2.8, 3.1 to 3.6, 3.11, 4.1, 4.3, 5.1(Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem), 5.5, 7.1 - 7.4 and 7.8].

UNIT V **9**

Evaluation of well completions-placement of casing, liners and well tubing. Evaluation, performance of horizontal wells. Evaluation of acidization treatments.

TOTAL: 45 PERIODS

OUTCOME:

•Students will be able to understand the different evaluation methods of oil/gas fields and reserves.

TEXT BOOKS:

1.Katz D.L.et al., Natural Gas Engineering (Production & storage), McGraw-Hill, Singapore.
2.Standard Handbook of Petroleum and Natural Gas Engineering. 2nd Edition. William C Lyons, Gary C Plisga. Gulf Professional Publishing.
3.Mc.Cray. A.W and Cole.F.W. 'Oil Well Drilling Technology' University of Oklahoma Press, Norman 1959.

GE8073 FUNDAMENTALS OF NANOSCIENCE **L T P C**
3 0 0 3

OBJECTIVE:

•To learn about basis of nanomaterial science, preparation method, types and application

UNIT I INTRODUCTION 8

Nanoscale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering-Classifications of nanostructured materials- nano particles- quantum dots, nanowires-ultra-thinfilms-multilayered materials. Length Scales involved and effect on properties: Mechanical, Electronic, Optical, Magnetic and Thermal properties. Introduction to properties and motivation for study (qualitative only).

UNIT II GENERAL METHODS OF PREPARATION 9

Bottom-up Synthesis-Top-down Approach: Co-Precipitation, Ultrasonication, Mechanical Milling, Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Sputtering, Evaporation, Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE.

UNIT III NANOMATERIALS 12

Nanoforms of Carbon - Buckminster fullerene- graphene and carbon nanotube, Single wall carbon Nanotubes (SWCNT) and Multi wall carbon nanotubes (MWCNT)- methods of synthesis(arc-growth, laser ablation, CVD routes, Plasma CVD), structure-property Relationships applications-Nanometal oxides-ZnO, TiO2,MgO, ZrO2, NiO, nanoalumina, CaO, AgTiO2, Ferrites, Nanoclays-functionalization and applications-Quantum wires, Quantum dots-preparation, properties and applications.

UNIT IV CHARACTERIZATION TECHNIQUES 9

X-ray diffraction technique, Scanning Electron Microscopy - environmental techniques, Transmission Electron Microscopy including high-resolution imaging, Surface Analysis techniques-AFM, SPM, STM, SNOM, ESCA, SIMS-Nanoindentation.

UNIT V APPLICATIONS 7

NanoInfoTech: Information storage- nanocomputer, molecular switch, super chip, nanocrystal, Nanobiotechlogy: nanoprobes in medical diagnostics and biotechnology, Nano medicines, Targetted drug delivery, Bioimaging - Micro Electro Mechanical Systems (MEMS), Nano Electro

Mechanical Systems (NEMS)- Nanosensors, nano crystalline silver for bacterial inhibition, Nanoparticles for sunbarrier products - In Photostat, printing, solar cell, battery.

TOTAL: 45 PERIODS

OUTCOMES:

- Will familiarize about the science of nanomaterials
- Will demonstrate the preparation of nanomaterials
- Will develop knowledge in characteristic nanomaterial

TEXT BOOKS:

1.A.S. Edelstein and R.C. Cammearata, eds., "Nanomaterials: Synthesis, Properties and Applications", Institute of Physics Publishing, Bristol and Philadelphia, 1996.

2.N John Dinardo, "Nanoscale Charecterisation of surfaces & Interfaces", 2nd edition, Weinheim Cambridge, Wiley-VCH, 2000.

REFERENCES:

1.G Timp, "Nanotechnology", AIP press/Springer, 1999.

2.Akhlesh Lakhtakia,"The Hand Book of Nano Technology, Nanometer Structure, Theory, Modeling and Simulations". Prentice-Hall of India (P) Ltd, New Delhi, 2007.

Open elective 1

AS7591 **BASIC CONCEPTS IN PETROLEUM ENGINEERING** **L T P C**
3 0 0 3

UNIT I RESERVOIR ENGINEERING **10**

Origin, migration, accumulation of petroleum, Properties of oil & natural gas, Reservoir deliverability, petrophysical properties of reservoir rocks, reservoir geometry, reservoir drive mechanisms, Reserve estimation

UNIT II OIL AND WELL DRILLING TECHNOLOGY **10**

Well planning, drilling rigs, Rig operating systems, drilling fluids- functions & properties, drill bit types & their applications, drill string, drilling problems- their control & remedies

UNIT III PETROLEUM PRODUCTION OPERATIONS **9**

Petroleum production system, formation damage, well stimulation techniques, artificial lift techniques, Nodal system analysis

UNIT IV EOR TECHNIQUES **9**

Basic principle & mechanism of EOR, Screening of EOR process, recovery efficiency, permeability heterogeneity, EOR methods: chemical flooding, thermal recoveries (steam stimulation, steam flooding, ISC), microbial EOR

UNIT V LATEST TRENDS IN PETROLEUM ENGINEERING **7**

Coal Bed Methane, Shale gas, Oil shale, gas hydrate, heavy oil

TOTAL: 45 PERIODS

REFERENCES

1. Guo, B, Lyons, W.C. and Ghalambor, A., Petroleum production engineering: a computer assisted approach, Gulf Professional Publishing, Burlington
2. Devereux, S., "Drilling Technology", PennWell Publishing Company, 1999
3. Donaldson, E.C. and G. V. Chilingarian, T. F. Yen, "Enhanced oil Recovery – I & II"
4. Ahmed, T, "Reservoir Engineering Handbook", 3rd Edition, Elsevier, 2006.

Open Elective 2

AS7592	INTRODUCTION TO INDUSTRIAL SAFETY MANAGEMENT	L	T	P	C
		3	0	0	3

UNIT I NEED FOR SAFETY IN INDUSTRIES AND REGULATION **10**

Importance & objectives of safety- Safety Programmes – components and realization; evolution of modern safety concept- safety policy – safety organization, Implementation of safety procedures – periodic inspection and replacement; Accidents -identification and prevention; Criteria for setting & layout of plant, Factories Act and Safety Regulations.

UNIT II HAZARDS & RISK ANALYSIS **9**

Fire hazards- Chemical hazards, Toxic hazards, Explosion hazards, Electrical hazards, Mechanical hazards, Radiation hazards, Noise hazards-Over all risk analysis—emergency planning-on site & off site emergency planning, risk management ISO 14000, EMS models case studies. Quantitative risk assessment

UNIT III SAFETY AUDIT AND TECHNIQUES **10**

Objective of safety audit- Hazard identification safety audits, checklist, what if analysis, vulnerability models event tree analysis fault tree analysis, Hazard & Operability (HAZOP) studies-Hazard Analysis (HAZAN)-Fault Tree Analysis, Consequence Analysis, Preliminary Hazard Analysis (PHA), Job Safety Analysis (JSA), safety – survey, inspection, sampling

UNIT IV SAFETY EDUCATION AND TRAINING **9**

Importance of training-identification of training needs-training methods – programme, seminars, conferences, competitions – method of promoting safe practice - motivation – communication - role of government agencies and private consulting agencies in safety training – creating awareness, awards, celebrations, safety posters, safety displays, safety pledge, safety incentive scheme, safety campaign – Domestic Safety and Training.

UNIT V HUMAN FACTORS IN PROCESS SAFETY **7**

Man-machine system Concept – Human factors Engineering and its Applications, Human Behaviour – Individual difference –Motivation –Frustration and Conflicts – Attitudes, Ergonomic Principles – ergonomics Application, Impending safety factors, PPE

TOTAL : 45 PERIODS

REFERENCES

1. Handley, W., "Industrial Safety Hand Book ", 2nd Edn., McGraw-Hill Book Company, 1969.
2. Heinrich, H.W. Dan Peterson, P.E. and Rood, N., " Industrial Accident Prevention", McGraw-Hill Book Co., 1980.
3. Krishnan N.V. "Safety Management in Industry" Jaico Publishing House, Bombay, 1997.
4. John Ridley, "Safety at Work", Butterworth & Co., London, 1983.
5. Blake R.B., "Industrial Safety" Prentice Hall, Inc., New Jersey, 1973.
6. McCormick, E.J., Human Factors in Engineering and Design, Tata McGraw-Hill, 1982.

ANNA UNIVERSITY, CHENNAI

AFFILIATED INSTITUTIONS

B.E. MECHANICAL ENGINEERING

REGULATIONS – 2017

CHOICE BASED CREDIT SYSTEM

PROGRAMME EDUCATIONAL OBJECTIVES:

Bachelor of Mechanical Engineering curriculum is designed to impart Knowledge, Skill and Attitude on the graduates to

1. Have a successful career in Mechanical Engineering and allied industries.
2. Have expertise in the areas of Design, Thermal, Materials and Manufacturing.
3. Contribute towards technological development through academic research and industrial practices.
4. Practice their profession with good communication, leadership, ethics and social responsibility.
5. Graduates will adapt to evolving technologies through life-long learning.

PROGRAMME OUTCOMES

1. An ability to apply knowledge of mathematics and engineering sciences to develop mathematical models for industrial problems.
2. An ability to identify, formulates, and solve complex engineering problems. with high degree of competence.
3. An ability to design and conduct experiments, as well as to analyze and interpret data obtained through those experiments.
4. An ability to design mechanical systems, component, or a process to meet desired needs within the realistic constraints such as environmental, social, political and economic sustainability.
5. An ability to use modern tools, software and equipment to analyze multidisciplinary problems.
6. An ability to demonstrate on professional and ethical responsibilities.
7. An ability to communicate, write reports and express research findings in a scientific community.
8. An ability to adapt quickly to the global changes and contemporary practices.
9. An ability to engage in life-long learning.

PEO / PO Mapping

Programme Educational Objectives	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
I	✓	✓	✓	✓	✓	✓	✓	✓	✓
II	✓	✓	✓		✓			✓	
III		✓		✓	✓	✓		✓	
IV					✓	✓	✓		✓
V		✓	✓	✓	✓				✓

PRINCIPAL
JCT College of Engineering & Technology
PICHANUR, COIMBATORE - 641 105.

		COURSE TITLE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
YEAR 1	SEM 1	Communicative English							✓		
		Engineering Mathematics I	✓	✓	✓						✓
		Engineering Physics	✓	✓	✓						✓
		Engineering Chemistry				✓					
		Problem Solving and Python Programming					✓				
		Engineering Graphics		✓	✓				✓		
		Problem Solving and Python Programming Laboratory			✓		✓				
		Physics and Chemistry Laboratory			✓						
		COURSE TITLE	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
	SEM 2	Technical English							✓		
		Engineering Mathematics II	✓	✓	✓				✓		✓
		Materials Science				✓				✓	
		Basic Electrical, Electronics and Instrumentation Engineering				✓				✓	
		Environmental Science and Engineering				✓					
		Engineering Mechanics	✓	✓					✓	✓	✓
		Engineering Practices Laboratory			✓						
		Basic Electrical, Electronics and Instrumentation Engineering			✓						
		COURSE TITLE	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
YEAR 2	SEM 3	Transforms and Partial Differential Equations	✓	✓	✓					✓	✓
		Engineering Thermodynamics	✓	✓	✓				✓	✓	
		Fluid Mechanics and Machinery	✓	✓	✓						
		Manufacturing Technology - I			✓	✓	✓	✓		✓	✓
		Electrical Drives and Controls									
		Manufacturing Technology Laboratory - I			✓	✓	✓	✓		✓	✓
		Computer Aided Machine Drawing			✓	✓	✓	✓		✓	✓
		Electrical Engineering Laboratory			✓						
		Interpersonal Skills / Listening & Speaking			✓						
		COURSE TITLE	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
	SEM 4	Statistics and Numerical Methods	✓	✓							
		Kinematics of Machinery	✓	✓	✓		✓				
		Manufacturing Technology– II	✓		✓	✓	✓			✓	✓
		Engineering Metallurgy							✓		

		Strength of Materials for Mechanical Engineers	✓	✓	✓	✓					
		Thermal Engineering- I	✓	✓			✓				
		Manufacturing Technology Laboratory–II			✓						
		Strength of Materials and Fluid Mechanics Machinery Laboratory			✓						
		Advanced Reading and Writing						✓			✓
		COURSE TITLE	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
YEAR 3	SEM 5	Thermal Engineering- II	✓	✓			✓			✓	
		Design of Machine Elements		✓		✓			✓	✓	✓
		Metrology and Measurements	✓		✓	✓			✓	✓	
		Dynamics of Machines	✓	✓	✓		✓		✓		✓
		Kinematics and Dynamics Laboratory	✓	✓	✓	✓					
		Thermal Engineering Laboratory	✓	✓	✓						
		Metrology and Measurements Laboratory	✓	✓	✓	✓			✓		
		COURSE TITLE	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
	SEM 6	Design of Transmission Systems		✓		✓			✓		✓
		Computer Aided Design and Manufacturing		✓	✓		✓				
		Heat and Mass Transfer	✓	✓	✓	✓				✓	✓
		Finite Element Analysis	✓	✓		✓					✓
		Hydraulics and Pneumatics	✓	✓		✓				✓	
		C.A.D. / C.A.M. Laboratory		✓	✓			✓			
		Design and Fabrication Project						✓	✓		✓
		Professional Communication				✓	✓	✓	✓		✓
		COURSE TITLE	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
YEAR 4	SEM 7	Power Plant Engineering	✓	✓	✓	✓				✓	
		Mechatronics	✓	✓	✓		✓			✓	✓
		Process Planning and Cost Estimation		✓		✓					
		Simulation and Analysis Laboratory	✓				✓		✓		
		Mechatronics Laboratory	✓	✓	✓		✓			✓	✓
		Technical Seminar						✓			
	SEM 8	Project Work	✓	✓	✓			✓	✓		
		Principles of Management						✓			✓

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ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS
B.E. MECHANICAL ENGINEERING
REGULATIONS - 2017
CHOICE BASED CREDIT SYSTEM
I TO VIII SEMESTERS CURRICULA AND SYLLABI

SEMESTER I

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	HS8151	Communicative English	HS	4	4	0	0	4
2.	MA8151	Engineering Mathematics - I	BS	4	4	0	0	4
3.	PH8151	Engineering Physics	BS	3	3	0	0	3
4.	CY8151	Engineering Chemistry	BS	3	3	0	0	3
5.	GE8151	Problem Solving and Python Programming	ES	3	3	0	0	3
6.	GE8152	Engineering Graphics	ES	6	2	0	4	4
PRACTICALS								
7.	GE8161	Problem Solving and Python Programming Laboratory	ES	4	0	0	4	2
8.	BS8161	Physics and Chemistry Laboratory	BS	4	0	0	4	2
			TOTAL	**31**	**19**	**0**	**12**	**25**

SEMESTER II

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	HS8251	Technical English	HS	4	4	0	0	4
2.	MA8251	Engineering Mathematics - II	BS	4	4	0	0	4
3.	PH8251	Materials Science	BS	3	3	0	0	3
4.	BE8253	Basic Electrical, Electronics and Instrumentation Engineering	ES	3	3	0	0	3
5.	GE8291	Environmental Science and Engineering	HS	3	3	0	0	3
6.	GE8292	Engineering Mechanics	ES	5	3	2	0	4
PRACTICALS								
7.	GE8261	Engineering Practices Laboratory	ES	4	0	0	4	2
8.	BE8261	Basic Electrical, Electronics and Instrumentation Engineering Laboratory	ES	4	0	0	4	2
			TOTAL	**30**	**20**	**2**	**8**	**25**

SEMESTER III

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	MA8353	Transforms and Partial Differential Equations	BS	4	4	0	0	4
2.	ME8391	Engineering Thermodynamics	PC	5	3	2	0	4
3.	CE8394	Fluid Mechanics and Machinery	ES	4	4	0	0	4
4.	ME8351	Manufacturing Technology - I	PC	3	3	0	0	3
5.	EE8353	Electrical Drives and Controls	ES	3	3	0	0	3
PRACTICAL								
6.	ME8361	Manufacturing Technology Laboratory - I	PC	4	0	0	4	2
7.	ME8381	Computer Aided Machine Drawing	PC	4	0	0	4	2
8.	EE8361	Electrical Engineering Laboratory	ES	4	0	0	4	2
9.	HS8381	Interpersonal Skills / Listening & Speaking	EEC	2	0	0	2	1
			TOTAL	**33**	**17**	**2**	**14**	**25**

SEMESTER IV

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	MA8452	Statistics and Numerical Methods	BS	4	4	0	0	4
2.	ME8492	Kinematics of Machinery	PC	3	3	0	0	3
3.	ME8451	Manufacturing Technology – II	PC	3	3	0	0	3
4.	ME8491	Engineering Metallurgy	PC	3	3	0	0	3
5.	CE8395	Strength of Materials for Mechanical Engineers	ES	3	3	0	0	3
6.	ME8493	Thermal Engineering- I	PC	3	3	0	0	3
PRACTICAL								
7.	ME8462	Manufacturing Technology Laboratory – II	PC	4	0	0	4	2
8.	CE8381	Strength of Materials and Fluid Mechanics and Machinery Laboratory	ES	4	0	0	4	2
9.	HS8461	Advanced Reading and Writing	EEC	2	0	0	2	1
			TOTAL	**29**	**19**	**0**	**10**	**24**

SEMESTER V

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	ME8595	Thermal Engineering- II	PC	3	3	0	0	3
2.	ME8593	Design of Machine Elements	PC	3	3	0	0	3
3.	ME8501	Metrology and Measurements	PC	3	3	0	0	3
4.	ME8594	Dynamics of Machines	PC	4	4	0	0	4
5.		Open Elective I	OE	3	3	0	0	3
PRACTICAL								
6.	ME8511	Kinematics and Dynamics Laboratory	PC	4	0	0	4	2
7.	ME8512	Thermal Engineering Laboratory	PC	4	0	0	4	2
8.	ME8513	Metrology and Measurements Laboratory	PC	4	0	0	4	2
			TOTAL	**28**	**16**	**0**	**12**	**22**

SEMESTER VI

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	ME8651	Design of Transmission Systems	PC	3	3	0	0	3
2.	ME8691	Computer Aided Design and Manufacturing	PC	3	3	0	0	3
3.	ME8693	Heat and Mass Transfer	PC	5	3	2	0	4
4.	ME8692	Finite Element Analysis	PC	3	3	0	0	3
5.	ME8694	Hydraulics and Pneumatics	PC	3	3	0	0	3
6.		Professional Elective - I	PE	3	3	0	0	3
PRACTICAL								
7.	ME8681	CAD / CAM Laboratory	PC	4	0	0	4	2
8.	ME8682	Design and Fabrication Project	EEC	4	0	0	4	2
9.	HS8581	Professional Communication	EEC	2	0	0	2	1
			TOTAL	**30**	**18**	**2**	**10**	**24**

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SEMESTER VII

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	ME8792	Power Plant Engineering	PC	3	3	0	0	3
2.	ME8793	Process Planning and Cost Estimation	PC	3	3	0	0	3
3.	ME8791	Mechatronics	PC	3	3	0	0	3
4.		Open Elective - II	OE	3	3	0	0	3
5.		Professional Elective – II	PE	3	3	0	0	3
6.		Professional Elective – III	PE	3	3	0	0	3
PRACTICAL								
7.	ME8711	Simulation and Analysis Laboratory	PC	4	0	0	4	2
8.	ME8781	Mechatronics Laboratory	PC	4	0	0	4	2
9.	ME8712	Technical Seminar	EEC	2	0	0	2	1
			TOTAL	**28**	**18**	**0**	**10**	**23**

SEMESTER VIII

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	MG8591	Principles of Management	HS	3	3	0	0	3
2.		Professional Elective– IV	PE	3	3	0	0	3
PRACTICAL								
3.	ME8811	Project Work	EEC	20	0	0	20	10
			TOTAL	**29**	**9**	**0**	**20**	**16**

TOTAL NUMBER OF CREDITS TO BE EARNED FOR AWARD OF THE DEGREE = 184

HUMANITIES AND SOCIAL SCIENCES (HS)

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1	HS8151	Communicative English	HS	4	4	0	0	4
2	HS8251	Technical English	HS	4	4	0	0	4
3.	GE8291	Environmental Science and Engineering	HS	3	3	0	0	3
4	MG8591	Principles of Management	HS	3	3	0	0	3

BASIC SCIENCE (BS)

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	MA8151	Engineering Mathematics - I	BS	5	3	2	0	4
2.	PH8151	Engineering Physics	BS	3	3	0	0	3
3.	CY8151	Engineering Chemistry	BS	3	3	0	0	3
4.	BS8161	Physics and Chemistry Laboratory	BS	4	0	0	4	2
5.	MA8251	Engineering Mathematics II	BS	4	4	0	0	4
6.	PH8251	Materials Science	BS	3	3	0	0	3
7.	MA8353	Transforms and Partial Differential Equations	BS	4	4	0	0	4
8.	MA8452	Statistics and Numerical Methods	BS	4	4	0	0	4

ENGINEERING SCIENCES (ES)

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	GE8151	Problem Solving and Python Programming	ES	3	3	0	0	3
2.	GE8152	Engineering Graphics	ES	6	2	0	4	4
3.	GE8161	Problem Solving and Python Programming Laboratory	ES	4	0	0	4	2
4.	BE8253	Basic Electrical, Electronics and Instrumentation Engineering	ES	3	3	0	0	3
5.	GE8292	Engineering Mechanics	ES	5	3	2	0	4
6.	GE8261	Engineering Practices Laboratory	ES	4	0	0	4	2
7.	BE8261	Basic Electrical, Electronics and Instrumentation Engineering Laboratory	ES	4	0	0	4	2
8.	CE8394	Fluid Mechanics and Machinery	ES	5	3	2	0	4
9.	EE8353	Electrical Drives and Controls	ES	3	3	0	0	3
10.	EE8361	Electrical Engineering Laboratory	ES	4	0	0	4	2
11.	CE8395	Strength of Materials for Mechanical Engineers	ES	3	3	0	0	3
12.	CE8381	Strength of Materials and Fluid Mechanics and Machinery Laboratory	ES	4	0	0	4	2

PROFESSIONAL CORE (PC)

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	ME8391	Engineering Thermodynamics	PC	5	3	2	0	4
2.	ME8351	Manufacturing Technology - I	PC	3	3	0	0	3
3.	ME8361	Manufacturing Technology Laboratory - I	PC	4	0	0	4	2
4.	ME8381	Computer Aided Machine Drawing	PC	4	0	0	4	2
5.	ME8492	Kinematics of Machinery	PC	3	3	0	0	3
6.	ME8451	Manufacturing Technology– II	PC	3	3	0	0	3
7.	ME8491	Engineering Metallurgy	PC	3	3	0	0	3
8.	ME8493	Thermal Engineering- I	PC	3	3	0	0	3
9.	ME8462	Manufacturing Technology Laboratory–II	PC	4	0	0	4	2
10.	ME8595	Thermal Engineering- II	PC	3	3	0	0	3
11.	ME8593	Design of Machine Elements	PC	3	3	0	0	3
12.	ME8501	Metrology and Measurements	PC	3	3	0	0	3
13.	ME8594	Dynamics of Machines	PC	4	4	0	0	4
14.	ME8511	Kinematics and Dynamics Laboratory	PC	4	0	0	4	2
15.	ME8512	Thermal Engineering Laboratory	PC	4	0	0	4	2
16.	ME8513	Metrology and Measurements Laboratory	PC	4	0	0	4	2
17.	ME8651	Design of Transmission Systems	PC	3	3	0	0	3
18.	ME8691	Computer Aided Design and Manufacturing	PC	3	3	0	0	3
19.	ME8693	Heat and Mass Transfer	PC	5	3	2	0	4
20.	ME8692	Finite Element Analysis	PC	3	3	0	0	3
21.	ME8694	Hydraulics and Pneumatics	PC	3	3	0	0	3
22.	ME8681	C.A.D. / C.A.M. Laboratory	PC	4	0	0	4	2
23.	ME8682	Design and Fabrication Project	PC	4	0	0	4	2
24.	ME8792	Power Plant Engineering	PC	3	3	0	0	3
25.	ME8791	Mechatronics	PC	3	3	0	0	3
26.	ME8793	Process Planning and Cost Estimation	PC	3	3	0	0	3
27.	ME8711	Simulation and Analysis Laboratory	PC	4	0	0	4	2
28.	ME8781	Mechatronics Laboratory	PC	4	0	0	4	2

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PROFESSIONAL ELECTIVES FOR B.E. MECHANICAL ENGINEERING

SEMESTER VI, ELECTIVE I

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	ME8091	Automobile Engineering	PE	3	3	0	0	3
2.	PR8592	Welding Technology	PE	3	3	0	0	3
3.	ME8096	Gas Dynamics and Jet Propulsion	PE	3	3	0	0	3
4.	GE8075	Intellectual Property Rights	PE	3	3	0	0	3
5.	GE8073	Fundamentals of Nanoscience	PE	3	3	0	0	3

SEMESTER VII, ELECTIVE II

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	ME8071	Refrigeration and Air conditioning	PE	3	3	0	0	3
2.	ME8072	Renewable Sources of Energy	PE	3	3	0	0	3
3.	ME8098	Quality Control and Reliability Engineering	PE	3	3	0	0	3
4.	ME8073	Unconventional Machining Processes	PE	3	3	0	0	3
5.	MG8491	Operations Research	PE	3	3	0	0	3
6.	MF8071	Additive Manufacturing	PE	3	3	0	0	3
7.	GE8077	Total Quality Management	PE	3	3	0	0	3

SEMESTER VII, ELECTIVE III

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	ME8099	Robotics	PE	3	3	0	0	3
2.	ME8095	Design of Jigs, Fixtures and Press Tools	PE	3	3	0	0	3
3.	ME8093	Computational Fluid Dynamics	PE	3	3	0	0	3
4.	ME8097	Non Destructive Testing and Evaluation	PE	3	3	0	0	3
5.	ME8092	Composite Materials and Mechanics	PE	3	3	0	0	3
6.	GE8072	Foundation Skills in Integrated Product Development	PE	3	3	0	0	3
7.	GE8074	Human Rights	PE	3	3	0	0	3
8.	GE8071	Disaster Management	PE	3	3	0	0	3

SEMESTER VIII, ELECTIVE IV

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	IE8693	Production Planning and Control	PE	3	3	0	0	3
2.	MG8091	Entrepreneurship Development	PE	3	3	0	0	3
3.	ME8094	Computer Integrated Manufacturing Systems	PE	3	3	0	0	3
4.	ME8074	Vibration and Noise Control	PE	3	3	0	0	3
5.	EE8091	Micro Electro Mechanical Systems	PE	3	3	0	0	3
6.	GE8076	Professional Ethics in Engineering	PE	3	3	0	0	3

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	HS8381	Interpersonal Skills/Listening &	EEC	4	0	0	4	2
2.	ME8712	Technical Seminar	EEC	2	0	0	2	1
3.	ME8811	Project Work	EEC	20	0	0	20	12
4.	HS8461	Advanced Reading and Writing	EEC	2	0	0	2	1
5.	ME8682	Design and Fabrication Project	EEC	4	0	0	4	2
6.	HS8581	Professional Communication	EEC	2	0	0	2	1

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SUMMARY

SL. NO.	SUBJECT AREA	CREDITS PER SEMESTER								CREDITS TOTAL	Percentage %
		I	II	III	IV	V	VI	VII	VIII		
1.	HS	4	7	-	-	-		-	3	14	7.61%
2.	BS	12	7	4	4	-	-	-	-	27	14.67%
3.	ES	9	11	9	5	-	-	-	-	33	17.80%
4.	PC	-	-	11	14	19	18	13	-	74	40.22%
5.	PE	-	-	-	-	-	3	6	3	15	8.15%
6.	OE	-	-	-	-	3	-	3		6	3.26%
7.	EEC	-	-	1	1	-	3	1	10	16	7.6%
	Total	25	25	25	24	22	24	23	16	184	
8.	Non Credit / Mandatory										

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ANNA UNIVERSITY, CHENNAI
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CHOICE BASED CREDIT SYSTEM
OPEN ELECTIVES (Offered by Other Branches)

V SEMESTER
OPEN ELECTIVE - I

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	OCE551	Air Pollution and Control Engineering	OE	3	3	0	0	3
2.	OAT551	Automotive Systems	OE	3	3	0	0	3
3.	OIC551	Biomedical Instrumentation	OE	3	3	0	0	3
4.	OIT552	Cloud Computing	OE	3	3	0	0	3
5.	OIT551	Database Management Systems	OE	3	3	0	0	3
6.	OAI551	Environment and Agriculture	OE	3	3	0	0	3
7.	OPT551	Fibre Reinforced Plastics	OE	3	3	0	0	3
8.	OCE552	Geographic Information System	OE	3	3	0	0	3
9.	OAT552	Internal Combustion Engines	OE	3	3	0	0	3
10.	OML551	Introduction To Nanotechnology	OE	3	3	0	0	3
11.	OIM552	Lean Manufacturing	OE	3	3	0	0	3
12.	OBM552	Medical Physics	OE	3	3	0	0	3
13.	OML552	Microscopy	OE	3	3	0	0	3
14.	OAI552	Participatory Water Resources Management	OE	3	3	0	0	3
15.	OCH552	Principles of Chemical Engineering	OE	3	3	0	0	3
16.	OBT554	Principles of Food Preservation	OE	3	3	0	0	3
17.	OMF551	Product Design and Development	OE	3	3	0	0	3
18.	OAI553	Production Technology of Agricultural machinery	OE	3	3	0	0	3
19.	ORO551	Renewable Energy Sources	OE	3	3	0	0	3
20.	OAN551	Sensors and Transducers	OE	3	3	0	0	3
21.	OIC552	State Variable Analysis and Design	OE	3	3	0	0	3
22.	OTL553	Telecommunication Network Management	OE	3	3	0	0	3
23.	OIM551	World Class Manufacturing	OE	3	3	0	0	3

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VII SEMESTER

OPEN ELECTIVE - II

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	OAI751	Agricultural Finance, Banking and Co-operation	OE	3	3	0	0	3
2.	OEE751	Basic Circuit Theory	OE	3	3	0	0	3
3.	OGI751	Climate Change and its Impact	OE	3	3	0	0	3
4.	OCS751	Data Structures and Algorithms	OE	3	3	0	0	3
5.	OML752	Electronic Materials	OE	3	3	0	0	3
6.	OCE751	Environmental and Social Impact Assessment	OE	3	3	0	0	3
7.	OAE751	Fundamentals of Combustion	OE	3	3	0	0	3
8.	OGI752	Fundamentals of Planetary Remote Sensing	OE	3	3	0	0	3
9.	OEN751	Green Building Design	OE	3	3	0	0	3
10.	OAI752	Integrated Water Resources Management	OE	3	3	0	0	3
11.	OEI 751	Introduction to Embedded Systems	OE	3	3	0	0	3
12.	OMF751	Lean Six Sigma	OE	3	3	0	0	3
13.	OAN751	Low Cost Automation	OE	3	3	0	0	3
14.	OMT751	MEMS and NEMS	OE	3	3	0	0	3
15.	ORO751	Nano Computing	OE	3	3	0	0	3
16.	OAE752	Principles of Flight Mechanics	OE	3	3	0	0	3
17.	OCH751	Process Modeling and Simulation	OE	3	3	0	0	3
18.	OAT751	Production of Automotive Components	OE	3	3	0	0	3
19.	OIE751	Robotics	OE	3	3	0	0	3
20.	OML753	Selection of Materials	OE	3	3	0	0	3
21.	OML751	Testing of Materials	OE	3	3	0	0	3
22.	OAT752	Vehicle Styling and Design	OE	3	3	0	0	3
23.	OTT751	Weaving Mechanisms	OE	3	3	0	0	3
24.	OMV751	Marine Vehicles	OE	3	3	0	0	3

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