

**SCHEME**  
**OF**  
**STUDIES AND EXAMINATIONS**  
**B.TECH. ELECTRICAL & ELECTRONICS**  
**ENGINEERING**  
**(w.e.f. 2012-13)**

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The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

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**SCHEME OF STUDIES & EXAMINATIONS**  
**B.Tech. 1<sup>ST</sup> YEAR (SEMESTER – I) (Common for all branches)**  
**Credit Based Scheme w.e.f. 2012-13**

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam	
			L	T	P		Theor y	Practi cal				
1	HUM 101B	COMMUNICATIVE ENGLISH	3	1		25	75	-	100	4	3	
2	MATH 101B	MATHEMATICS-I	3	1		25	75	-	100	4	3	
3	PHY 101B	ENGINEERING PHYSICS-I	3	1		25	75	-	100	4	3	
4	ME101B	MANUFACTURING PROCESSES (Gr-A)	3	1		25	75	-	100	4	3	
	CH101 B	OR ENGINEERING CHEMISTRY (Gr-B)	3	1		25	75	-				
5	EE101B	PRINCIPLES OF ELECTRICAL ENGINEERING (Gr-A)	3	1		25	75	-	100	4	3	
	CSE101B	OR INTRODUCTION TO COMPUTERS & PROGRAMMING (Gr-B)	3	1		25	75	-				
6	ME103B	ENGINEERING GRAPHICS & DRAWING (Gr-A)	1	-	4	40	-	60	100	3	3	
	ME105B	OR ELEMENTS OF MECHANICAL ENGINEERING (Gr-B)	3	1	-	25	75	-				
7	PHY103B	PHYSICS LAB-I	-	-	2	20		30	50	1	3	
8	ME 107B	WORKSHOP PRACTICE (Gr-A)	-	-	4	40		60	100	2	3	
	CH103B	OR CHEMISTRY LAB (Gr-B)	-	-	2	20		30				
9	EE103B	PRINCIPLES OF ELECTRICAL ENGINEERING LAB (Gr-A)	-	-	2	20		30	50	1	3	
	CSE103B	OR COMPUTER PROGRAMMING LAB (Gr-B)	-	-	2	20		30				
10	ME109B	ELEMENTS OF MECHANICAL ENGINEERING LAB (Gr-B)	-	-	2	20		30	50	1	3	
<b>Total</b>			<b>Gr-A</b>	<b>16</b>	<b>5</b>	<b>12</b>	<b>245</b>	<b>375</b>	<b>180</b>	<b>800</b>	<b>27</b>	
			<b>Gr-B</b>	<b>18</b>	<b>6</b>	<b>8</b>	<b>230</b>	<b>450</b>	<b>120</b>	<b>800</b>	<b>28</b>	

**Note:**

- Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of Moral Values & Ethics and sports are given in General Proficiency Syllabus.
- The students will be allowed to use non-programmable scientific calculator. However, sharing/ exchange of calculator is prohibited in the examination.
- Electronics gadgets including Cellular phones are not allowed in the examination.
- All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/ college, so that there is an equitable distribution of teaching load in odd and even semesters.

**Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonapat)**

**B.Tech. 1<sup>ST</sup> YEAR (SEMESTER – II) (Common for all branches)**

**Credit Based Scheme w.e.f. 2012-13**

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam	
			L	T	P		Theory	Practical				
1.	MATH102B	MATHEMATICS-II	3	1		25	75	-	100	4	3	
2	PHY102B	ENGINEERING PHYSICS-II	3	1		25	75	-	100	4	3	
3	ME101 B	MANUFACTURING PROCESSES (Gr-B)	3	1		25	75	-	100	4	3	
	CH101 B	ENGINEERING CHEMISTRY (Gr-A)	3	1		25	75	-				
4	EE101B	PRINCIPLES OF ELECTRICAL ENGINEERING (Gr-B)	3	1		25	75	-	100	4	3	
	CSE101B	INTRODUCTION TO COMPUTERS & PROGRAMMING (Gr-A)	3	1		25	75	-				
5	ECE102B	BASICS OF ELECTRONICS ENGINEERING OR	3	1		25	75	-	100	4	3	
	BT102B	BASICS OF BIO TECHNOLOGY OR										
	HUM102 B	ORAL COMMUNICATION SKILLS OR										
	CE102 B	BASICS OF CIVIL ENGINEERING										
6	ME103B	ENGINEERING GRAPHICS & DRAWING (Gr-B)	1	-	4	40	-	60	100	3	3	
	ME105B	ELEMENTS OF MECHANICAL ENGINEERING (Gr-A)	3	1	-	25	75	-	100	4		
7	PHY104B	PHYSICS LAB-II	-	-	2	20		30	50	1	3	
8	ME 107B	WORKSHOP PRACTICE (Gr-B)	-	-	4	40		60	100	2	3	
	CH103B	CHEMISTRY LAB (Gr-A)	-	-	2	20		30	50	1		
9	EE103B	PRINCIPLES OF ELECTRICAL ENGINEERING LAB (Gr-B)	-	-	2	20		30	50	1	3	
	CSE103B	COMPUTER PROGRAMMING LAB (Gr-A)	-	-	2	20		30	50			
10	ME109B	ELEMENTS OF MECHANICAL ENGINEERING LAB (Gr-A)	-	-	2	20		30	50	1	3	
11	GEN 101B	MORAL VALUES & ETHICS	1	-	-	-	-	-	-	-	-	
12	GP 102B	GENERAL PROFICIENCY & ETHICS	1	-	-	-	-	50	50	2		
<b>Total</b>			<b>Gr-B</b>	<b>17</b>	<b>5</b>	<b>12</b>	<b>245</b>	<b>375</b>	<b>230</b>	<b>850</b>	<b>29</b>	
			<b>Gr-A</b>	<b>19</b>	<b>6</b>	<b>8</b>	<b>230</b>	<b>450</b>	<b>170</b>	<b>850</b>	<b>30</b>	

**Note:**

- Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of Moral Values & Ethics and Sports are given in General Proficiency Syllabus.
- Each student has to undergo a workshop atleast 4 weeks (80-100 hours) at the end of II semester during summer vacations. **Out of the four weeks, two weeks would be dedicated to general skills and two weeks training for specialized discipline/ department** The evaluation of this training shall be carried out in the III semester.
- The students will be allowed to use non-programmable scientific calculator. However, sharing/ exchange of calculator is prohibited in the examination.
- Electronics gadgets including Cellular phones are not allowed in the examination.
- All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/ college, so that there is an equitable distribution of teaching load in odd and even semesters.
- The elective course HUM102 B ORAL COMMUNICATION SKILLS is deleted with effect from the session 2013 -14.

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The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

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**B.TECH. 2<sup>nd</sup> YEAR (SEMESTER – III) ELECTRICAL & ELECTRONICS ENGINEERING**  
**Credit Based Scheme w.e.f. 2013–2014**

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total Marks	Total Credits	Duration of Exam
			L	T	P		Theory	Prac.			
1.	EE209B	ESTIMATION COSTING & ELECTRIC CODES and STANDARDS	3	1	-	25	75	-	100	4	3
2.	MGT201B	ENGINEERING ECONOMICS (Gr – A) (common for all branches except BT & BME)	4	0	-	25	75	-	100	4	3
	GES201B	ENVIRONMENTAL STUDIES (Gr – B) (common for all branches )	3	-	-	-	75*	-	75*	-	3
3.	EE201B	ELECTRICAL ENGINEERING MATERIALS (EE, EEE, IC, AEI)	3	-	-	25	75	-	100	3	3
4.	EE203B	NETWORK ANALYSIS-I (EE, EEE, IC)	3	1	-	25	75	-	100	4	3
5.	ECE201B	DIGITAL ELECTRONICS (CSE,ECE, EEE, IC, EE)	3	1	-	25	75	-	100	4	3
6.	EE205B	NUMERICAL METHODS & OPTIMIZATION TECHNIQUES (EE, EEE, IC)	3	1	-	25	75	-	100	4	3
7.	EE207B	POWER ELECTRONICS DEVICES (EE, EEE, IC)	3	1	-	25	75	-	100	4	3
8.	ECE221B	DIGITAL ELECTRONICS LAB. (CSE,ECE, EEE, IC, EE)	-	-	2	20	-	30	50	1	3
9.	EE225B	NUMERICAL METHODS & OPTIMIZATION TECHNIQUES LAB. (EE, EEE, IC)	-	-	2	20	-	30	50	1	3
10.	EE231B	ELECTRICAL WIRING & INSTALLATIONS LAB (EE, EEE, IC, CHE)	-	-	2	20	-	30	50	1	3
11.	GES203B	ENVIRONMENTAL STUDIES FIELD WORK (Gr – B) (Common to all branches)	-	-	-	-	-	25*	25*	-	3
12.	ME217B	WORKSHOP	-	-	2	50	-	-	50	2	3
		<b>Total</b>	<b>21</b>	<b>05</b>	<b>08</b>	<b>260</b>	<b>525</b>	<b>115</b>	<b>900</b>	<b>28</b>	
		<b>Gr-A</b>	<b>22</b>	<b>05</b>	<b>08</b>	<b>285</b>	<b>525</b>	<b>90</b>	<b>900</b>	<b>32</b>	

**Note:**

- Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of moral values & ethics is given in General Proficiency Syllabus.
- \*The Environmental studies (GES201B) and Environmental Studies Field Work (GES203B) are compulsory & qualifying courses.
- The students will be allowed to use non-programmable scientific calculator in the examination. However, sharing/exchange of calculator is prohibited in the examination.
- Electronics gadgets including Cellular phones are not allowed in the examination.
- Assessment of workshop Training is undergone in summer vacations at the end of second semester will be based on seminar viva-voce, report & certificate of workshop training obtained by the students from in house workshop
- All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/ college, so that there is an equitable distribution of teaching load in odd and even semesters.

**DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL, SONEPAT**  
**SCHEME OF STUDIES & EXAMINATIONS**  
**B.TECH. 2<sup>nd</sup> YEAR (SEMESTER – IV) ELECTRICAL & ELECTRONICS ENGINEERING**  
**Credit Based Scheme w.e.f. 2013–2014**

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total Marks	Total Credit	Duration of Exam
			L	T	P		Theory	Prac.			
1.	MGT201B	ENGINEERING ECONOMICS (Gr – B) (common for all branches except BT & BME)	4	0	-	25	75	-	100	4	3
	GES201B	ENVIRONMENTAL STUDIES (Gr – A) (common for all branches)	3	-	-	-	75*	-	75*	-	3
2.	EE202B	NETWORK ANALYSIS-II (EE, EEE, IC)	3	1	-	25	75	-	100	4	3
3.	EE204B	ELECTRICAL MEASUREMENTS & MEASURING INSTRUMENTS (EE, EEE, IC)	3	1	-	25	75	-	100	4	3
4.	EE212B	ELECTRO-MECHANICAL ENERGY CONVERSION (EEE, IC)	3	1	-	25	75	-	100	4	3
5.	EE208B	ELECTRO MAGNETIC THEORY (EE, EEE, IC)	3	1	-	25	75	-	100	4	3
6.	EE210B	CONTROL SYSTEMS ENGG. (EE, EEE, IC)	3	1	-	25	75	-	100	4	3
7.	EE222B	NETWORK ANALYSIS LAB (EE, EEE, IC)	-	-	2	20	-	30	50	1	3
8.	EE224B	ELECTRICAL MEASUREMENTS & MEASURING INSTRUMENTS LAB. (EE, EEE, IC)	-	-	2	20	-	30	50	1	3
9.	EE232B	ELECTRO-MECHANICAL ENERGY CONVERSION LAB. (EEE, IC)	-	-	3	40	-	60	100	2	3
10.	EE230B	CONTROL SYSTEMS ENGG. LAB. (EE, EEE, IC)	-	-	2	20	-	30	50	1	3
11.	GES203B	ENVIRONMENTAL STUDIES FIELD WORK (Gr – A)	-	-	-	-	-	25*	25*	-	-
12.	GPEEE202B	GENERAL PROFICIENCY & ETHICS	1	-	-	-	-	75	75	2	3
		<b>Total</b>									
		<b>Gr-B</b>	19	05	9	250	450	200	900	31	
		<b>Gr-A</b>	18	05	9	225	450	225	900	27	

**Note:**

- Each student has to undergo Professional Training-I of at least 4 weeks from the industry / institute / research lab / training centre, etc. during summer vacation at the end of 4<sup>th</sup> Semester & its evaluation shall be carried out in 5<sup>th</sup> Semester.
- Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of moral values & ethics is given in General Proficiency Syllabus.
- \*The Environmental studies (GES-201B) and Environmental Studies Field Work (GES-203B) are compulsory & qualifying courses.
- The students will be allowed to use non-programmable scientific calculator in the examination. However, sharing/exchange of calculator is prohibited in the examination.
- Electronics gadgets including Cellular phones are not allowed in the examination.
- All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/ college, so that there is an equitable distribution of teaching load in odd and even semesters.

**DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL, SONEPAT**  
**SCHEME OF STUDIES & EXAMINATIONS**  
**B.TECH. 3<sup>rd</sup> YEAR (SEMESTER – V) ELECTRICAL & ELECTRONICS ENGINEERING**  
**Credit Based Scheme w.e.f. 2014–2015**

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total Marks	Total Credits	Duration of Exam
			L	T	P		Theory	Prac.			
1.	CSE204B	OBJECT ORIENTED PROGRAMMING(ECE,EEE, IC,common with 4 <sup>th</sup> Sem. CSE)	3	1	-	25	75	-	100	4	3
2.	EE303B	DIGITAL CONTROL SYSTEMS (EE, EEE, IC)	3	1	-	25	75	-	100	4	3
3.	ECE311B	INTEGRATED ELECTRONICS (EE, EEE, IC)	3	1	-	25	75	-	100	4	3
4.	EE305B	POWER SYSTEMS-I (EE, EEE)	3	1	-	25	75	-	100	4	3
5.	EE307B	POWER ELECTRONICS CIRCUITS (EE, EEE, IC)	3	1	-	25	75	-	100	4	3
6.	EE309B	MICROPROCESSOR (8085), INTERFACING & APPLICATIONS (EE, EEE, IC)	3	1	-	25	75	-	100	4	3
7.	ECE331B	INTEGRATED ELECTRONICS LAB. (EE, EEE, IC)	-	-	2	20	-	30	50	1	3
8.	CSE224B	OBJECT ORIENTED PROGRAMMING(ECE,EEE, IC,common with 4 <sup>th</sup> Sem. CSE)	-	-	2	20	-	30	50	1	3
9.	EE327B	POWER ELECTRONICS LAB. (EE, EEE, IC)	-	-	2	20	-	30	50	1	3
10.	EE329B	MICROPROCESSOR (8085), INTERFACING & APPLICATIONS LAB. (EE, EEE, IC)	-	-	2	20	-	30	50	1	3
11.	EEE333B	PROFESSIONAL TRAINING-I	-	-	2	50	-	-	50	2	-
		TOTAL	18	06	10	280	450	120	850	30	

**Note:**

1. Assessment of Professional Training-I, undergone in summer vacations at the end of 4<sup>th</sup> semester, will be based on seminar, viva-voce, report & certificate of professional training obtained by the students from the industry / institute / research lab / training center, etc.
2. Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of moral values & ethics is given in General Proficiency Syllabus.
3. The students will be allowed to use non-programmable scientific calculator in the examination. However, sharing/exchange of calculator is prohibited in the examination.
4. Electronics gadgets including Cellular phones are not allowed in the examination.

**DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL, SONEPAT**  
**SCHEME OF STUDIES & EXAMINATIONS**  
**B.TECH. 3<sup>rd</sup> YEAR (SEMESTER – VI) ELECTRICAL & ELECTRONICS ENGINEERING**  
**Credit Based Scheme w.e.f. 2014–2015**

S. no.	Course No.	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total Marks	Total Credits	Duration of Exam
			L	T	P		Theory	Prac.			
1.	EE302B	POWER SYSTEMS –II (EE, EEE)	3	1	-	25	75	-	100	4	3
2.	ECE302B	MICROWAVE & RADAR ENGG.	3	1	-	25	75	-	100	4	3
3.	EE306B	ADVANCED MICROPROCESSOR AND MICRO-CONTROLLER (EE, EEE, IC)	3	1	-	25	75	-	100	4	3
4.	ECE312B	COMMUNICATION SYSTEMS & TECHNOLOGY (EE, EEE, IC)	3	1	-	25	75	-	100	4	3
5.	EE308B	ELECTRIC POWER GENERATION (EE, EEE, IC)	3	1	-	25	75	-	100	4	3
6.	EE310B	EMBEDDED SYSTEMS & APPLICATIONS (EE, EEE, IC)	3	1	-	25	75	-	100	4	3
7.	EE322B	POWER SYSTEMS LAB (EE, EEE, IC)	-	-	2	20	-	30	50	1	3
8.	ECE332B	COMMUNICATION SYSTEMS & TECHNOLOGY LAB (EE, EEE, IC)	-	-	2	20	-	30	50	1	3
9.	ECE322B	MICROWAVE & RADAR ENGG. LAB	-	-	2	20	-	30	50	1	3
10.	EE326B	ADVANCED MICROPROCESSOR AND MICRO-CONTROLLER LAB (EE, EEE, IC)	-	-	2	20	-	30	50	1	3
11.	HUM302B	REPORT WRITING SKILLS (common for all branches)	1	-	-	25	50	-	75	1	2
12.	HUM304B	ORAL PRESENTATION SKILL (common for all branches)	-	-	2	20	-	30	50	1	2
13.	GPEEE302B	GENERAL PROFICIENCY & ETHICS	1	-	-	-	-	75	75	2	3
		TOTAL	20	06	10	275	500	200	975	32	

**Note:**

- Each student has to undergo Professional Training-I of at least 4 weeks from the industry / institute / research lab / training centre, etc. during summer vacation at the end of 6<sup>th</sup> Semester & its evaluation shall be carried out in 7<sup>th</sup> Semester.
- \*Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of moral values & ethics is given in General Proficiency Syllabus.
- The students will be allowed to use non-programmable scientific calculator in the examination. However, sharing/exchange of calculator is prohibited in the examination.
- Electronics gadgets including Cellular phones are not allowed in the examination.

**DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL, SONEPAT**  
**SCHEME OF STUDIES & EXAMINATIONS**  
**B.TECH. 4<sup>th</sup> YEAR (SEMESTER – VII) ELECTRICAL & ELECTRONICS ENGINEERING**  
**Credit Based Scheme w.e.f. 2015-2016**

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total Marks	Total Credits	Duration of Exam
			L	T	P		Theory	Prac.			
1.	EE401B	SENSORS & TRANSDUCERS (EE, EEE, IC, common with 5 <sup>th</sup> sem. AEI))	3	1	-	25	75	-	100	4	3
2.	EE403B	ELECTRIC DRIVES (EE, EEE, IC)	3	1	-	25	75	-	100	4	3
3.	EE405B	DIGITAL SIGNAL & IMAGE PROCESSING (EE, EEE, IC)	3	1	-	25	75	-	100	4	3
4.	ECE407B	VLSI DESIGN (ECE, AEI, EEE)	3	1	-	25	75	-	100	4	3
5.		OPEN ELECTIVE	4	-	-	25	75	-	100	4	3
6.	EE423B	ELECTRIC DRIVES LAB. (EE, EEE, IC)			2	20	-	30	50	1	3
7.	EE425B	DIGITAL SIGNAL & IMAGE PROCESSING LAB. (EE, EEE, IC)	-	-	2	20	-	30	50	1	3
8.	EEE415B	PROJECT	-	-	4	100	-	-	100	4	-
9.	EEE433B	PROFESSIONAL TRAINING – II	-	-	2	50	-	-	50	2	-
		TOTAL	16	04	10	295	375	60	750	28	

**LIST OF OPEN ELECTIVES:**

1	MEI 623B	ENTREPRENEURSHIP	6	BT401B	BIOINFORMATICS
2	BME451B	MEDICAL INSTRUMENTATION	7	AE417B	MODERN VEHICLE TECHNOLOGY
3	ECE305B	CONSUMER ELECTRONICS	8	CE451B	POLLUTION & CONTROL
4	EE451B	ENERGY AUDIT	9	CSE411B	MANAGEMENT INFORMATION SYSTEM
5	EEE457B	ENERGY RESOURCES & TECHNOLOGY	10	IT413B	CYBER SECURITY

**Note:**

1. Assessment of Professional Training-II, undergone in summer vacations at the end of 6<sup>th</sup> semester, will be based on seminar, viva-voce, report & certificate of professional training obtained by the students from the industry / institute / research lab / training centre, etc.
2. Student will be permitted to opt for any one elective run by other departments. However, departments will offer only those electives for which they have expertise. The choice of students for any elective shall not be a binding for department to offer, if department does not have expertise. Minimum strength of students shall be twenty.
3. Project load will be treated as 2 hrs. per week for project coordinator including his own guiding load of 1 hour, and 1 hour for each participating teacher irrespective of number of students/groups under him/her. Project will commence in VII Semester where student will identify project problem, complete design, procure the material, start the fabrication, complete the survey, etc. depending upon nature of the problem. Project will continue in VIII semester.
4. Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of moral values & ethics is given in General Proficiency Syllabus.
5. The students will be allowed to use non-programmable scientific calculator in the examination. However, sharing/exchange of calculator is prohibited in the examination.
6. Electronics gadgets including Cellular phones are not allowed in the examination.



**SCHEME OF STUDIES & EXAMINATIONS**  
**B.TECH. 4<sup>th</sup> YEAR (SEMESTER – VIII) ELECTRICAL & ELECTRONICS ENGINEERING**  
**Credit Based Scheme w.e.f. 2015-2016**

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total Marks	Total Credits	Duration of Exam
			L	T	P		Theory	Prac.			
1.	ECE404B	DATA COMMUNICATIONS & NETWORK (ECE,EEE)	3	1	-	25	75	-	100	4	3
2.	EE404B	COMPUTER APPLICATIONS TO POWER SYSTEM ANALYSIS (EE, EEE)	3	1	-	25	75	-	100	4	3
3.		DEPT. ELECTIVE – I	4	-	-	25	75	-	100	4	3
4.		DEPT. ELECTIVE – II	4	-	-	25	75	-	100	4	3
5.	EE414B	COMPUTER APPLICATIONS TO POWER SYSTEM ANALYSIS LAB. (EE, EEE)	-	-	2	20	-	30	50	1	3
6.	EEE412B	SEMINAR	-	-	2	50	-	-	50	2	
7.	EEE415B	PROJECT	-	-	8	75	-	125	200	8	3
8.	GPTEE402B	GENERAL FITNESS FOR THE PROFESSION	-	-	-	-	-	100	100	4	3
		TOTAL	14	02	12	250	300	250	800	31	

**DEPT. ELECTIVE – I**

1. EE432B EHV AC / DC
2. ECE420B TELECOMMUNICATION SWITCHING SYSTEM
3. EE424B FUZZY CONTROL SYSTEM
4. EE438B RECENT TRENDS IN DE-REGULATED POWER SYSTEMS
5. EE466B UTILIZATION OF ELECTRIC POWER & TRACTION

**DEPT. ELECTIVE – II**

1. ECE402B WIRELESS COMMUNICATION
2. EE444B ELECTRICAL POWER QUALITY
3. EE446B ARTIFICIAL INTELLIGENCE
4. ECE416BDIGITAL IMAGE PROCESSING
5. EE450B POWER MANAGEMENT

**Note:**

1. Project load will be treated as 2 hrs. per week for the project coordinator including his own guiding load of 1 hour, and 1 hour for each participating teacher irrespective of number of students / groups under him / her. Project involving design, fabrication, testing, computer simulation, case studies etc., which has been commenced by students in VII semester will be completed in VIII semester.
2. For the subject EEE412B-Seminar, a student will select a topic from emerging areas of Engineering and Technology and study it independently. Student will give a seminar talk on the topic.
3. A team consisting of Dean of faculty, Chairperson of the department & an external examiner appointed by University shall carry out the evaluation of the student for his / her General Fitness for the Profession.
4. Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of moral values & ethics is given in General Proficiency Syllabus.
5. The students will be allowed to use non-programmable scientific calculator in the examination. However, sharing/exchange of calculator is prohibited in the examination.
6. Electronics gadgets including Cellular phones are not allowed in the examination.
7. Students will be permitted to opt for any one elective. However, departments will offer only those electives for which they have expertise. The choice of students for any elective shall not be a binding for department to offer, if department does not have expertise. Minimum strength of students shall be twenty.

## HUM 101B COMMUNICATIVE ENGLISH

### B. Tech. Semester - I (Common for all Branches)

L	T	P	Credits	Class Work	: 25 Marks
3	1	--	4	Examination	: 75 Marks
				Total	: 100 Marks
				Duration of Examination	: 3 Hours

#### Objective

The course aims at developing the desired language (English) skills of students of engineering and technology so that they become proficient in communication to excel in their professional lives. The course has been designed so as to enhance their linguistic and communicative competence.

#### Course Content

##### UNIT I

###### Communicative Grammar:

- A) Spotting the errors pertaining to tenses, conditional sentences, Concord – grammatical concord, notional concord and the principle of proximity b/w subject and verb
- B) Voice, Reported Speech.

##### UNIT II

###### Language through Literature:

###### Linguistic Reading of the following texts

- A) 'Kabuliwallah' by Rabindranath Tagore\*
- B) 'Am I Blue?' by Alice Walker\*
- C) 'If You are Wrong, Admit It' by Dale Carnegie\*
- D) 'Engine Trouble' by R.K. Narayan\*

The prescribed texts will be used as case studies for various components of the syllabus. \* the Source is given in the list of Texts Books given below.

##### UNIT III

###### Group Communication:

- A) Communication: concept, Process and Barriers
- B) Communicating using Standard Pronunciation with the help of IPA
- C) Formal Speaking with peers ( e.g. discussion, talks on current issues in a class)
- B) Writing official letters on issues concerning students and social life
- C) Writing small reports on scientific issues, IT issues, University fests/programmes
- C) E-mail writing and writing for web

##### UNIT IV

###### Communicative Creativity:

- A) Comprehension: Extracting, interpreting, summarizing, reviewing and analyzing the prescribed texts.
- B) Composition: Developing themes and situations through role play activities or dialogue writing.

Contd.

#### TEXT BOOKS

1. Quirk, Randolph, Sidney Greenbaum, Geoffrey Leech & Jan Svartvik. *A Comprehensive Grammar of the English Language*. London: Longman, 1989
2. Communicative English for Engineers and Professionals by Nitin Bhatnagar & Mamta Bhatnagar New Delhi: Pearson / Longman
3. Crystal, David. *Rediscover Grammar*. London: Longman/Pearson, 1988.
4. \*Tagore, Rabinder. "Kabuliwallah", *Famous Indian Stories*. Ed. M.G.Narsimha Murthy .Mumbai: Orient Blackswan, 2009. (Web source: [www.angelfire.com](http://www.angelfire.com))
5. \* Walker, Alice. "Am I Blue", *An Anthology of Short Stories* . Ed. Usha Bande .New Delhi: OUP , 2004. (Web source- [www.old.li.scru.edu](http://www.old.li.scru.edu))
6. \*Narayanan .K.R. "Engine Trouble", *Contemporary English Prose* .Ed. K.P.K.Menon. New York: OUP,1976. (

The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

Web Source- [www.scribd.com](http://www.scribd.com))

7. \*Carnegie, Dale. "If you are wrong admit it", *An Anthology of Modern Prose*. Ed Manmohan K.Bhatnagar. Delhi :Macmillan India Ltd,2006.

#### SUGGESTED READING

1. Pink, M.A. and S.E. Thomas. *English Grammar, Composition and Correspondence*. Delhi: S. Chand and Sons
2. McRae, John and Roy Boardman. *Reading Between the Lines*. Delh: Foundation Books (Cambridge University Press)
3. Sharma, Sangeeta and Binod Mishra. *Communication Skills for Engineers and scientists*. Delhi: PHI, 2009
4. Fitikides, T.J. *Common Mistakes in English*. Essex: Pearson Education, 1936, 6<sup>th</sup> edition 2000.

#### SCHEME OF END SEMESTER EXAMINATION (MAJOR TEST)

##### Theory

1. The duration of the exam will be 3 hours.
2. The Question Paper for this theory course shall have seven questions in all covering all the units of the syllabus..
3. The student is required to attempt all the seven questions.
4. Questions No. 1 based on Unit I is of 15 marks. It may be in the form of 'Do as directed: trace the error, choose the correct alternative, supply the correct alternative/s, change the voice, convert the speech from direct to indirect or vice-versa'.
5. Question no 2 and 3 based on prescribed texts in Unit II. Question no 2 of 10 marks is to evaluate the comprehension of the text through short answer questions or a long answer question to assess the students' reading comprehension, interpretative and analytical abilities. Question no 3 of 15 marks will judge the linguistic aspect of the text such as using a particular word in its various syntactic forms like noun, adjective, verb etc.; matching the lists of words and their explanation; providing opposite/similar meanings and other grammar components prescribed in Unit I of the syllabus.
6. Question no 4 based on Unit III is of 10 marks. It may be in the form of transcription of words given, describe an event, classmate, discuss an issue etc.
7. Question no 5 based on Unit III is of 10 marks. It requires the student to frame either a small report on a topic given or write the given official letter, or e-mail a message.
8. Question no 6 based on unit IV is of 10 marks. It evaluates the Comprehension and Interpretation of the texts prescribed in Unit II. The vocabulary, general understanding and interpretation of the content may be evaluated in the form of question answer exercise, culling out important points, suggesting a suitable topic/title, summarizing and interpreting.
9. Question No. 7 based on unit IV is of 5 marks. It requires the student to develop a hypothetical situation in a dialogue form, or to develop an outline, key expression, for role play activity.

**B. Tech. Semester - I (Common for all Branches)**

**MATH 101B MATHEMATICS – I**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Class Work</b>	<b>: 25 Marks</b>
<b>3</b>	<b>1</b>	<b>--</b>	<b>4</b>	<b>Examination</b>	<b>: 75 Marks</b>
				<b>Total</b>	<b>: 100 Marks</b>
				<b>Duration of Examination</b>	<b>: 3 Hours</b>

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**UNIT-I**

**Infinite series : Convergence and divergence, Comparison, D' Alembert's ratio, Integral, Raabe's, Logarithmic and Cauchy root tests, Alternating series, Absolute and conditional convergence.**

**Applications of Differentiation : Taylor's and Maclaurin's series, Asymptotes, Curvature Asymptotes.**

**UNIT-II**

**Partial Differentiation & its Applications : Functions of two or more variables; partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, Jacobians, Higher order partial derivatives.**

**Homogeneous functions, Euler's theorem, Taylor's series for functions of two variables (without proof), maxima-minima of function of two variables, Lagrange's method of undetermined multipliers, Differentiation under integral sign.**

**UNIT-III**

**Applications of Single & Multiple Integration : Applications of single integration to find volume of solids and surface area of solids of revolution. Double integral, change of order of integration, Double integral in polar coordinates, Applications of double integral to find area enclosed by plane curves and volume of solids of revolution.**

**Triple integral, volume of solids, change of variables, Beta and gamma functions and relationship between them.**

**UNIT-IV**

**Vector Calculus : Differentiation of vectors, scalar and vector point functions Gradient of a scalar field and directional derivative, divergence and curl of a vector field and their physical interpretations.**

**Integration of vectors, line integral, surface integral, volume integral, Green, Stoke's and Gauss theorems (without proof) and their simple applications.**

**TEXT BOOKS :**

- 1. Advanced Engineering Mathematics : F. Kreyszig.**
- 2. Higher Engineering Mathematics : B.S. Grewal.**

**REFERENCE BOOKS :**

- 1. Engineering Mathematics Part-I : S.S. Sastry.**
- 2. Differential and Integral Calculus : Piskunov.**
- 3. Advanced Engineering Mathematics : R.K. Jain and S.R.K. Iyengar**
- 4. Advanced Engg. Mathematics : Michael D. Greenberg**

**Note:**

- 1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.**
- 2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed**

**PHY 101B      ENGINEERING PHYSICS – I**  
**B. Tech. Semester - I (Common for all Branches)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>
<b>3</b>	<b>1</b>	<b>--</b>	<b>4</b>

<b>Class Work</b>	<b>: 25 Marks</b>
<b>Examination</b>	<b>: 75 Marks</b>
<b>Total</b>	<b>: 100 Marks</b>
<b>Duration of Examination</b>	<b>: 3 Hours</b>

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**UNIT-I**

**PHYSICAL OPTICS:**

**Interference:** Division of wave front-Fresnel's Biprism, Division of amplitude – Newton's rings, Michelson interferometer, applications.

**Diffraction :** Difference between Fraunhofer and Fresnel diffraction, Fraunhofer diffraction through a slit, Plane transmission diffraction grating and its spectra, dispersive and resolving powers.

**Polarization :** Polarised and unpolarized light, double refraction, Nicol prism, quarter and half wave plates, Plane, Elliptically & circularly polarised light, Polarimetry: Biquartz and Laurent's half-shade polarimeters.

**UNIT-II**

**LASER & FIBRE OPTICS:** Introduction, Spontaneous and stimulated emissions, Laser action, characteristics of laser beam, Ruby laser, He-Ne, Nd-Yag and semiconductor lasers, applications of laser.

Introduction, Propagation of light in fibres, Types of fiber (pulse & continuous), numerical aperture, Modes of propagation in optical fibre, application of optical fibre.

**ACOUSTIC OF BUILDINGS:** Introduction, Reverberation, Sabine's formula for reverberation time, Absorption coefficient and its measurements, factors affecting the architectural acoustics and their remedy, Sound absorbing materials.

**UNIT-III**

**TRANSMISSION OF HEAT AND THERMAL RADIATION**

Modes of transmission of heat, Thermal conductivity, Rectilinear flow of heat through a rod, Radial flow of heat through a spherical shell, determination of Thermal conductivity of good and bad conductors.

Black body, Emissive and Absorptive Powers, Wein's Displacement Law, Kirchhoff's Law, Stefan's Law, Determination of Stefan's Constant.

**UNIT-IV**

**NUCLEAR & ELEMENTARY IDEA OF PARTICLE PHYSICS**

Outline of interaction of charged particles and of Gamma-rays with matter. Counters: Gas filled counters (Ionization Chamber, Proportional Counter and G M Counter). Detector: Scintillation detector, Semiconductor detectors (p-n junction detector), Biological effects of nuclear radiation.

Introduction to elementary particles, Interaction in particle physics: strong, electromagnetic, weak and gravitational. .

**TEXT BOOKS :**

1. A text book of Optics – Brij Lal and Subramanyam
2. Perspectives of Modern Physics - Arthur Beiser (TMH)
3. Modern Engineering Physics – A.S. Vasudeva (S. Chand)
4. Engineering Physics by R.K. Gaur and S.L. Gupta
5. Engineering Physics by H.K Malik and A.K. Singh (Tata McGraw Hill).
7. Engineering Physics by S.P. Taneja (Chand Pub.)

**REFERENCE BOOKS:**

- 1.. Physics Vol-I & II – Resnick & Halliday (Wiley Eastern)**
- 2. Heat and Thermodynamics – M.N. Saha & B.N. Srivastava**
- 3. Nuclear Physics Principles and Applications by John Lilley(Wiley-India).**

**Note:**

- 1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.**
- 2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed**

ME 101B MANUFACTURING PROCESSES

B. Tech. Semester – I/II (Common for all Branches)

L	T	P	Credits	Class Work	: 25 Marks
3	1	--	4	Examination	: 75Marks
				Total	: 100 Marks
				Duration of Examination	: 3 Hours

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UNIT-I

**Introduction:** Introduction to Manufacturing Processes and their Classification , automation in manufacturing, Industrial Safety; Introduction, Types of Accidents, Causes and Common Sources of Accidents, Methods of Safety, Electric Safety Measures, First Aid.  
**Plant Layout, Principles of Plant Layout, Objectives of Layout, Types of Plant and shop layouts and their Advantages.**

UNIT-II

**Engineering Materials:** General Properties and Applications of Engineering Materials, Mild Steel, Medium Carbon Steel, High Carbon Steel, High Speed Steel and Cast Iron, Non-Ferrous Materials, Shop's Tools Materials, **Super Alloys or High Temperature Materials**  
**Foundry:** Introduction to Casting Processes, Basic Steps in Casting Process, Pattern, Types of Patterns, Pattern allowances, Risers, Runners, Gates, Molding Sand and its composition, Sand Preparation, Molding Methods, Core Sands and Core Making, Core Assembly, Mold Assembly, Melting ( Cupola) and Pouring, Fettling, Casting Defects and Remedies. **Testing of Castings**

UNIT-III

**Cold Working (Sheet Metal Work):** Sheet Metal Operations, Measuring, Layout Marking, Shearing, Punching, Blanking, Piercing, Forming, Bending and Joining - Advantages and Limitations. **Hot Working Processes:** Introduction to Hot Working, Principles of Hot Working Processes, Forging, Rolling, Extrusion, Wire Drawing.

**Introduction to Machine Tools:** Specifications and Uses of commonly used Machine Tools in a Workshop such as Lathe, Shaper, Planer, Milling, Drilling, Slotter, Introduction to Metal Cutting. Nomenclature of a Single Points Cutting Tool and Tool Wear, Mechanics of Chips Formation, Type of Chips, Use of Coolants in machining.

UNIT-IV

**Welding:** Introduction to Welding, Classification of Welding Processes, Gas Welding: Oxy-Acetylene Welding, Resistance Welding; Spot and Seam Welding, Arc Welding: Metal Arc, TIG & MIG Welding, Welding Defects and Remedies, Soldering & Brazing, Comparisons among Welding, Brazing and Soldering **Surface Finishing Processes, Introduction to Heat Treatment Processes, Estimating of Manufacturing Cost**

**Text Books:**

1. Workshop Technology Vol. I & II - Hazra & Chaudhary, Asian Book Comp., New Delhi.
2. Process and Materials of Manufacture -- Lindberg, R.A. Prentice Hall of India, New Delhi.
3. Principles of Manufacturing Materials and Processes - Campbell, J.S.- McGraw- Hill.

**Reference Books:**

1. Manufacturing Science - Amitabha Ghosh & Ashok Kumar Malik, - East-West Press.
2. Manufacturing Process and Systems - Ostwald, Munoz , John Wiley.
3. Workshop Technology, Vol. 1, 2 & 3 – Chapman, WAJ, Edward Arnold.

**Note:**

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed

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The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

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**CH 101B ENGINEERING CHEMISTRY**  
**B. Tech. Semester – I/II (Common for all Branches)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Class Work</b>	<b>: 25 Marks</b>
<b>3</b>	<b>1</b>	<b>--</b>	<b>4</b>	<b>Examination</b>	<b>: 75 Marks</b>
				<b>Total</b>	<b>: 100 Marks</b>
				<b>Duration of Examination</b>	<b>: 3 Hours</b>

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**UNIT-I**

**Thermodynamics –Second law, concept of entropy ,entropy change for ideal gas, free energy and work functions, free energy change ,chemical potential, Gibb’s Helmholtz equation, Clausius –Clapeyron equation. Related numerical problems with above topics.**

**Phase-rule- Terminology, Derivation of Gibb’s Phase Rule equation ,One component system(water system), Two components systems, system with Eutectic point (Pb-Ag), system with congruent melting point (Zn-Mg), system with incongruent melting point (Na-K), Applications of above systems. Elementary idea of Zone refining and Zone levelling**

**UNIT-II**

**Water and its treatment- Hardness of water and its determination, units of hardness, alkalinity of water and its determination, related numerical problems ,water softening, Ion-exchange process, mixed bed demineralisation, desalination of water by using different methods.**

**Corrosion and its prevention: Galvanic & concentration cell, dry and wet corrosion, Electrochemical theory of corrosion, Galvanic corrosion, Pitting corrosion , differential aeration corrosion, water line corrosion, stress corrosion, factor effecting corrosion, Preventing measures, electroless Plating of Ni and Cu.**

**UNIT-III**

**Polymers and Polymerization: Organic polymers, polymerisation, various types of polymerisation, effect of structure on properties of polymers, preparation properties and technical applications of thermoplastics (PE, PVC, PVA, Teflon), thermosets (PF, UF & MF) and elastomers (Synthetic Rubber including SBR, Buna-S, Buna-N, Thiokol & Polyurethanes) , Inorganic polymers (general properties) , Glass transition temperature, silicones Composite Materials & their application: optical fibres, Fullerenes ,organic electronic material ,composite materials & their classification, constituents of composites, role of interface in composite performance and durability, fiber –Reinforced composite, advantage and applications of composites.**

**UNIT-IV**

**Lubricants and fuels: Friction, mechanism of lubrication, classification and properties of lubricants and selection of Lubricants, Definition and classification of fuel, Calorific value and methods of its determination.**

**Analytical methods: Thermal methods; Principle, method and application of TGA,DTA & DSC, interaction of E.M radiation with a molecule and origin of spectrum, Vibrational & electronic spectra (Experimental details are excluded), spectrophotometry, , conductometric titrations, elementary discussion on Flame-photometry.**

**TEXT/ REFERENCE BOOKS:**

- 1. Physical Chemistry, P.W. Atkins (ELBS, Oxford Press).**
- 2. Physical Chemistry, W.J. Moore (Orient-Longman).**
- 3. Instrumental methods of Chemical Analysis, MERITT & WILLARD (East-West Press).**
- 4. Chemistry in Engineering & Tech., Vol.I& II, Rajaram, Kuriacose (TMH)**
- 5.Engineering Chemistry ,ShashiChawla (DhanpatRai and co.)**
- 6. Engineering Chemistry, P.C. Jain, Monica Jain (DhanpatRai& Co.).**
- 7.Engenring chemistry ,S.S Dara (S.chand&co.)**

**Note:**

**In the semester examination, the Examiners will set 08 questions in all selecting two from each unit.**

**The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.**



EE 101B PRINCIPLES OF ELECTRICAL ENGINEERING

B. Tech. Semester – I/II (Common for all Branches)

L	T	P	Credits	Class Work	: 25 Marks
3	1	--	4	Examination	: 75 Marks
				Total	: 100 Marks
				Duration of Examination	: 3 Hours

UNIT-1

D.C. Circuit Analysis: Basic concepts of electric circuits, Ohm's Law, Independent energy sources, Dependent energy sources, passive elements, circuit properties, Kirchoff's laws, applications of Kirchoff's laws, Nodal and Loop methods of Analysis, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Reciprocity Theorem, Maximum Power Transfer Theorem, Millman's Theorem, Star-Delta or delta-star transformation, Applications of network theorems P-spice for DC circuit analysis.

UNIT-2

A.C. Circuits: Sinusoidal signal, Phasors, polar & rectangular, exponential & trigonometric representations, Resistance, Inductance & Capacitance components, behavior of these components in A.C. circuits, Phasor relationship for circuit elements, Impedance & Admittance, instantaneous & peak values, average and RMS values, active power, reactive power, apparent power, power factor, complex power, behavior of AC series, parallel circuits, RL, RC & RLC A.C. circuits (series and parallel), Resonance-series and parallel R-L-C Circuits, Q-factor, cut-off frequencies & bandwidth.

UNIT-3

Three Phase Circuits: Phase and line voltages and currents, balanced star and delta circuits, power equation, measurement of power by two wattmeter method.

Measuring Instruments: Principle, Construction & working of moving coil type voltmeter & ammeter, moving iron type voltmeter & ammeter, Electrodynamometric type wattmeter, single-phase induction type energy meter.

UNIT-4

Transformers: Ampere's law, Mutual Inductance, Construction, Working principle and phasor diagrams of Single-phase Transformer, Emf equation, Equivalent circuit, testing, efficiency and regulation of single-phase transformer, Auto transformer.

Rotating Machines: Construction and working principle of dc motor and generator and its characteristics. Construction and working principle of 3-phase Induction machines & 3-phase synchronous machines, torque-speed characteristics.

TEXT BOOKS:

1. Basic Electrical Engg (2nd Edition) : Kothari & Nagarath, TMH
2. Electrical Technology (Vol-I): B.L Theraja & A K Theraja, S.Chand
3. Fundamental of electrical Engineering, Rajendra Prasad, PHI, Edition 2005.
4. Basic Electrical Engineering, V.N Mittle & Arvind Mittal, TMH, Second Edition
5. Basic Electrical Engineering, S.N. Singh, PHI
6. *Fundamental of Electrical Engg. & Electronics*, S.K.Sahdev, Dhanpat Rai

REFERENCE BOOKS:

1. Electrical Engineering Fundamentals: Deltoro, PHI
2. Basic Electrical Engineering (TMH WBUT Series), Abhijit Chakrabarti & Sudipta Nath, TMH
3. Basic Electrical Engineering, T.K. Nagsarkar & M.S. Sukhija, Oxford
4. Introduction to Electrical Engineering, M.S. Naidu & S, Kamakshaiah, TMH
5. Basic Electrical Engineering, J.J. Cathey & S.A Nasar, TMH, Second Edition.
6. *Basic Electrical Engineering*, D C Kulshreshtha, Mc Graw Hill
7. *Basic Electrical Engineering*, VN Mittle, Arvind Mittal, Mc Graw Hill

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The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

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Note: In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**CSE 101B INTRODUCTION TO COMPUTERS AND PROGRAMMING**

**B. Tech. Semester – I/II (Common for all Branches)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Class Work</b>	<b>: 25 Marks</b>
<b>3</b>	<b>1</b>	<b>--</b>	<b>4</b>	<b>Examination</b>	<b>: 75 Marks</b>
				<b>Total</b>	<b>: 100 Marks</b>
				<b>Duration of Examination</b>	<b>: 3 Hours</b>

**UNIT-I**

An introduction of Computer System: Anatomy of a digital Computer, Different Units of Computer System, Classification of Computer Systems, Radix Number systems. Binary codes: BCD, Gray, EBCDIC, ASCII  
 Operating System: Operating System Concepts, Operating System services, Types of Operating Systems.  
 Introduction to PC Operating Systems: Unix/Linux, DOS, Windows.

**UNIT-II**

Programming Languages and algorithms: Machine, Assembly and High Level Language; Assembler, Linker, Loader, Compiler, Interpreter, debuggers, Programming fundamentals: problem definition, algorithms, flowcharts and their symbols  
 Computer Networks: Basic concepts of Computer Networks, Working of Internet and its Major features. Network Topologies: Bus, Star, Ring, Hybrid, Tree, Complete, Irregular; Types of Networks: LAN, MAN and WAN.  
 Electronic Mail: advantages and disadvantages, e-mail addresses, message components, message composition, mailer features, E-mail inner workings, E-mail management, Newsgroups, mailing lists, chat rooms.

**UNIT-III**

Basics of 'C' Language

C Fundamentals, Basic data types, local and external variables and scope, formatted input/ output, expressions, selection statements, loops and their applications; arrays, functions, recursive functions, pointers and arrays. Strings literals, arrays of strings; applications, Structures, Unions and Enumerations.

**UNIT-IV**

Advanced Features of 'C' Language

preprocessor directives, macro definition, conditional compilation, storage classes, type's qualifiers, Low level programming (Bitwise operators, Bit fields in structures, other low level techniques), error handling, file operations(low level/high level).

**BOOKS**

1. The C Programming Language by Dennis M Ritchie, Brian W. Kernigham, 1988, PHI.
2. Fundamentals of Computing and C Programming, R. B. Patel, Khanna Publications, 2010, New Delhi.
3. Information technology, Dennis P. Curtin, Kim Foley, Kunal Sen, Cathleen Morin, 1998, TMH
4. Theory and problem of programming with C, Byron C Gottfried, TMH
5. Using Computers and Information by Jack B. Rochester, 1996, Que Education & Training.
6. C Programming – A modern approach by K.N. King, 1996, WW Norton & Co.

**Note:**

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed

The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

**ME 103 B      ENGINEERING GRAPHICS AND DRAWING**  
**B. Tech. Semester – I/II (Common for all Branches)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Class Work</b>	<b>: 40 Marks</b>
<b>1</b>	<b>--</b>	<b>4</b>	<b>3</b>	<b>Examination</b>	<b>: 60Marks</b>
				<b>Total</b>	<b>: 100 Marks</b>
				<b>Duration of Examination</b>	<b>: 3 Hours</b>

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**UNIT I**

**Basics of Engineering Graphics and Drawing – Drawing Papers, Minidrafter, Pencils. Drawing Paper Layout, Title Block, Types of Lines, Lettering, Dimensioning, types of Projections; First and Third Angle systems of Orthographic Projections. Projection of Points in different Quadrants.**

**Projections of Straight Lines – Contained by both Reference Planes, Contained by one and inclined to other Reference Plane, Contained by one and Parallel to other Reference Plane, Parallel to both Reference Plane, Perpendicular to one of the Reference Planes, Inclined to one Plane but Parallel to the other Reference Planes, Inclined to both the Reference Planes, True Length of a Line and its Inclination with Reference Planes, Traces of a Line.**

**UNIT II**

**Projections of Planes – Parallel to one Reference Plane, Inclined to one Plane but Perpendicular to the other, Inclined to both Reference Planes.**

**Projections of Polyhedral Solids and Solids of Revolution- in simple positions with axis perpendicular to a Reference Plane, with axis parallel to both Reference Planes, with axis parallel to one Reference Plane and inclined to the other Reference Plane, Projections of sections of Prisms, Pyramids, Cylinders and Cones. True Shape of Sections of Solids.**

**UNIT III**

**Development - Development of Surfaces of various Solids objects.**

**Free Hand Sketching - Orthographic Views from Isometric, Views of Simple Machine Components such as Brackets, Bearing Blocks, Guiding Blocks and Simple Couplings and Pipe Joints.**

**UNIT IV**

**Isometric Projections - Introduction, Isometric Scale, Isometric Views and Drawing of various Plane and Solids objects. Perspective drawing and oblique view.**

**Orthographic Drawings - Screw Threads, Bolts, Nuts and Washers, Bolted, Riveted and Welded Joints**

**Text Books:**

- 1. Engineering Drawing: MB Shah and BC Rana, Pearsons**
- 2. Engineering Graphics and Drafting: P.S. Gill, S.K. Kataria and Sons.**

**Reference Books:**

- 1. A Text Book of Engineering Drawing: RK Dhawan, S Chand & Company**
- 2. Engineering Drawing Plane and Solid Geometry : N.D. Bhatt, Charotar Publishing House.**

**Note:**

- 1. For class work, the students shall be assigned to prepare at least ten drawing sheets covering all units and each topic of the syllabus.**
- 2. For practical examination, the examiner will set a question paper containing total eight questions, two questions from each unit covering each topic of the syllabus; students are required to attempt five**

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The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

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questions at least one from each unit.

**ME 105 B ELEMENTS OF MECHANICAL ENGINEERING**

**B. Tech. Semester – I/II (Common for all Branches)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Class Work</b>	<b>: 25 Marks</b>
<b>3</b>	<b>1</b>	<b>--</b>	<b>4</b>	<b>Examination</b>	<b>: 75Marks</b>
				<b>Total</b>	<b>: 100 Marks</b>
				<b>Duration of Examination</b>	<b>: 3 Hours</b>

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**UNIT-I**

**Thermodynamics- Elementary definitions in thermodynamics, fundamentals of first and 2nd law of thermodynamic- concept of internal energy, enthalpy and entropy, heat pump and refrigerator, elementary numerical problems.**

**Properties of Steam & Boilers: properties of steam, use of steam tables and mollier diagram, measurement of dryness fraction of steam, Carnot and Rankin cycle, elementary numerical problems. Classification of boilers, Comparison of water and fire tube boilers mounting and accessories with their functions, Constructional and operational details of Cochran and Babcock and Wilcox boilers, elementary numerical problems.**

**Steam Turbines and Condensers: Classification of turbines and their working principles, Types of condensers and their uses.**

**UNIT-II**

**I.C. Engines and Gas Turbines: Introduction, Classification, Constructional details and working of two-stroke and four-stroke diesel and petrol engines, Efficiency of Otto & Diesel cycles , Working principle of gas turbine, elementary numerical problems.**

**Refrigeration and air conditioning- rating of refrigeration machine, coefficient of performance, simple vapor compression cycle, fundamentals of air conditioning, use of Psychrometric charts.**

**UNIT-III**

**Water Turbines and Pumps : Introduction, Classification, Construction details and working principle of Pelton, Francis and Kaplan turbines, Classification of water pumps and construction detail & working principle of centrifugal pump.**

**Simple Lifting Machines: Definition of machine, Velocity ratio, Mechanical advantage, Efficiency, Laws of machines, Reversibility of machine, Wheel and axle, Differential pulley block, Single, double and triple start worm and worm wheel, Single and double purchase winch crabs, Simple and compound screw jacks, elementary numerical problems.**

**UNIT-IV**

**Introduction to Power transmission and Devices: Belt drive, Rope drive, Chain drive, Types of gear and Gear train, Types and function of clutches, Types and function of brakes.**

**Stresses and Strains: Introduction, Concept & types of Stresses and strains, Poison's ratio, stresses and strains in simple and compound bars under axial loading, Stress-strain diagrams, Hooks law, Elastic constants & their relationships. Concept of shear force and bending moments in beams, elementary numerical problems.**

**TEXT BOOKS:**

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The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

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1. **Hydraulic and Fluid Mechanics – Modi and Seth, Pub. – Standard Book House, New Delhi**
2. **Engineering Thermodynamics – C.P. Arora, Pub. - TMH, New Delhi**
3. **Thermal Engineering – A.S. Sarad, Pub. - Satya Prakashan, New Delhi.**
4. **Engineering Mechanics – K.L. Kumar, Pub. - TMH, New Delhi.**
5. **Theory of Machines – S.S. Rattan, Pub. – TMH, New Delhi.**

**REFERENCE BOOKS:**

1. **Strength of Materials – Popov, Pub. - PHI, New Delhi.**
2. **Hydraulic Machines – Jagdish Lal, Pub.- Metropolitan, Allahbad.**
3. **Thermal Science and Engineering – D.S. Kumar, Pub. – Kateria & Sons, New Delhi.**

**Note:**

1. **In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.**
2. **The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed**

**PHY 103B      PHYSICS LAB – I**  
**B. Tech. Semester - I (Common for all Branches)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Class Work</b>	<b>: 20Marks</b>
--	--	2	1	<b>Examination</b>	<b>: 30Marks</b>
				<b>Total</b>	<b>: 50 Marks</b>
				<b>Duration of Examination</b>	<b>: 3 Hours</b>

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**Note: Students will be required to perform 10 experiments in a semester.**

**LIST OF EXPERIMENTS**

1. To find the wavelength of sodium light by using Newton's rings experimental setup.
2. To find the wavelength of sodium light by Fresnel's biprism experimental setup
3. To find the wavelength of various colours of white light with the help of a plane transmission diffraction grating.
4. To find the refractive index and Cauchy's constants of a prism by using spectrometer.
5. To find the wavelength of sodium light by using Michelson interferometer.
6. To find the resolving power of a telescope.
7. To find the pitch of a screw using He-Ne laser.
8. To find the specific rotation of sugar solution by using a polarimeter.
9. To compare the capacitances of two capacitors by De'sauty bridge.
10. To find the flashing and quenching potentials of Argon and also to find the capacitance of unknown capacitor.
11. To study the photo conducting cell and hence to verify the inverse square law.
12. To find the temperature co-efficient of resistance by using platinum resistance thermometer and Callender and Griffith bridge.
13. To find the frequency of A.C. mains by using sonometer.
14. To find the velocity of ultrasonic waves in non-conducting medium by piezo-electric method.
15. To determine the value of Stefan's constant.
16. To find the coefficient of thermal conductivity of a good conductor by Searle's method.
17. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton method.

**RECOMMENDED BOOKS :**

1. Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH)
2. Practical Physics – S.L.Gupta & V.Kumar (Pragati Prakashan).
3. Advanced Practical Physics Vol.I & II – Chauhan & Singh (Pragati Prakashan).

**ME 107B          WORKSHOP PRACTICE**  
**B. Tech. Semester – I/II (Common for all Branches)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>
--	--	4	2

<b>Class Work</b>	<b>:</b>	<b>40 Marks</b>
<b>Examination</b>	<b>:</b>	<b>60Marks</b>
<b>Total</b>	<b>:</b>	<b>100 Marks</b>
<b>Duration of Examination</b>	<b>:</b>	<b>3 Hours</b>

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**LIST OF EXPERIMENTS / JOBS**

1. To study different types of measuring tools/instruments used in metrology and determine least counts of vernier calipers, micrometers and vernier height gauges.
2. To study different types of machine tools ( lathe, shaper, planer, slotter, milling, drilling machines).
3. To prepare a job on a lathe involving facing, outside turning, taper turning, step turning, radius making and parting-off.
4. To study different types of fitting tools and marking tools used in fitting practice.
5. To prepare lay out on a metal sheet by making and prepare rectangular tray, pipe shaped components e.g. funnel.
6. To prepare joints for welding suitable for butt welding and lap welding.
7. To study various types of carpentry tools and prepare simple types of at least two wooden joints.
8. To prepare simple engineering components/ shapes by forging.
9. To prepare mold and core assembly, to put metal in the mold and fettle the casting.
10. To prepare horizontal surface/ vertical surface/ curved surface/ slots or V-grooves on a shaper/ planner.
11. To prepare a job involving side and face milling on a milling machine.
12. To study of CNC lathe, CNC Milling and EDM Machines.

**Note:** 1. At least ten experiments/ jobs are to be performed/ prepared by students in the semester.

3. At least 8 experiments/ jobs should be performed / prepared from the above list, remaining two may either be performed/ prepared from the above list or designed and set as per the scope of the syllabus of Manufacturing Processes.

**CH 103B      CHEMISTRY LAB.**  
**B. Tech. Semester – I/II (Common for all Branches)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>	<b>Class Work</b>	<b>: 20 Marks</b>
--	--	2	1	<b>Examination</b>	<b>: 30Marks</b>
				<b>Total</b>	<b>: 50 Marks</b>
				<b>Duration of Examination</b>	<b>: 3 Hours</b>

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**LIST OF EXPERIMENTS**

1. Determination of Ca<sup>++</sup> and Mg<sup>++</sup> hardness of water sample using EDTA solution.
2. Determination of alkalinity of water sample.
3. Determination of dissolved oxygen (DO) in the given water sample.
  
4. To find the melting and eutectic point for a two component system by using method of cooling curve.
5. Determination of viscosity of lubricant by red wood viscometer(No. 1 & No. 2).
6. To determine Flash point & Fire point of an oil by Pensky-Marten's flash point apparatus and by Abel's closed cup apparatus..
7. To prepare Phenol-formaldehyde and urea- formaldehyde resin.
8. To find out saponification No. of an oil..
9. Determination of concentration of KMnO<sub>4</sub> solution spectrophotometrically.
10. Determination of strength of HCl solution by titrating it against NaOH solution conductometrically.
11. To determine amount of sodium and potassium in a given water sample by flame photometer
12. Estimation of total iron in an iron alloy.

**Suggested Books:**

1. A Text book on Experiments and Calculation –Engineering Chemistry by S.S.Dara, S.Chand & Company Ltd.
2. Essential of Experimental Engineering chemistry, Shashi Chawla, Dhanpat Rai Publishing Co.
3. Theory & Practice Applied Chemistry – O.P.Virman, A.K. Narula( New Age).

**Note:**

1. The student will be required to perform 10 experiments/exercises from the above list and any other two experiments designed by the department based on the theory course (course code101B Course Name Chemistry )
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator are prohibited in the examination.
3. Electronic gadgets including Cellular phones are not allowed in the examination.



**EE 103B PRINCIPLES OF ELECTRICAL ENGINEERING LAB**

**B. Tech. Semester – I/II (Common for all Branches)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Class Work</b>	<b>: 20 Marks</b>
--	--	2	1	<b>Examination</b>	<b>: 30Marks</b>
				<b>Total</b>	<b>: 50 Marks</b>
				<b>Duration of Examination</b>	<b>: 3 Hours</b>

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**LIST OF EXPERIMENTS**

1. To verify KCL and KVL.
2. To verify Thevenin's & Norton's Theorems.
3. To verify maximum power transfer theorem in D.C. Circuit.
4. To verify reciprocity theorem.
5. To verify Superposition theorem.
6. To study frequency response of a series R-L-C circuit and determine resonant frequency & Q- factor for various Values of R, L, C.
7. To study frequency response of a parallel R-L-C circuit and determine resonant frequency & Q -Factor for various values of R, L, C.
8. To perform direct load test of a transformer and plot efficiency Vs load characteristic.
9. To perform direct load test of a D.C. shunt generator and plot load voltage Vs load current curve.
10. To study various type of meters.
11. .Measurement of power by three voltmeters / three ammeters method.
12. Measurement of power in a three phase system by two watt meter method.

**Note:**

1. At least 10 experiments are to be performed by students in the semester.
2. At least 8 experiments should be performed from the above list; remaining two experiments may either be performed from the above list or designed and set by the Dept. as per the scope of the syllabus of EE101B.

**CSE 103B      COMPUTER PROGRAMMING LAB**  
**B. Tech. Semester – I/II (Common for all Branches)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Class Work</b>	<b>: 20 Marks</b>
--	--	2	1	<b>Examination</b>	<b>: 30Marks</b>
				<b>Total</b>	<b>: 50 Marks</b>
				<b>Duration of Examination</b>	<b>: 3 Hours</b>

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**LIST OF PRACTICAL PROBLEMS**

1. Write a program to find the largest of three numbers. (if-then-else)
2. Write a program to find the largest number out of ten numbers (for-statement)
3. Write a program to find the average male height & average female heights in the class (input is in form of sex code, height).
4. Write a program to find roots of quadratic equation using functions and switch statements.
5. Write a program using arrays to find the largest and second largest no. out of given 50 nos.
6. Write a program to multiply two matrices.
7. Write a program to sort numbers using the Quicksort Algorithm.
8. Represent a deck of playing cards using arrays.
9. Write a program to check that the input string is a palindrome or not.
10. Write a program to read a string and write it in reverse order.
11. Write a program to concatenate two strings.
12. Write a program which manipulates structures (write, read, and update records).
13. Write a program which creates a file and writes into it supplied input.
14. Write a program which manipulates structures into files (write, read, and update records).

**Note: At least 5 to 10 more exercises to be given by the teacher concerned**

**ME 109 B    ELEMENTS OF MECHANICAL ENGINEERING LAB.**  
**B. Tech. Semester – I/II (Common for all Branches)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Class Work</b>	<b>: 20 Marks</b>
--	--	2	1	<b>Examination</b>	<b>: 30Marks</b>
				<b>Total</b>	<b>: 50 Marks</b>
				<b>Duration of Examination</b>	<b>: 3 Hours</b>

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**LIST OF EXPERIMENTS**

1. To study Cochran & Babcock & Wilcox boilers.
2. To study the working & function of mountings & accessories in boilers.
3. To study 2-Stroke & 4-Stroke diesel engines.
4. To study 2-Stroke & 4-Stroke petrol engines.
5. To calculate the V.R., M.A. & efficiency of single, double & triple start worm & worm wheel.
6. To calculate the V.R., M.A. & efficiency of single & double purchase winch crabs.
7. To draw the SF & BM diagrams of a simply supported beam with concentrated loads.
8. To study the simple & compound screw jacks and find their MA, VR & efficiency.
9. To study the constructional features & working of Pelton Turbine.
10. To prepare stress-strain diagram for mild steel & cast iron specimens under tension and compression respectively on a Universal testing machine.

- Note:**
1. Total ten experiments are to be performed in the Semester.
  2. At least eight experiments should be performed from the above list. Remaining three experiments should be performed as designed & set as per the scope of the syllabus of ME – 101: Elements of Mechanical Engineering.



**MATH 102B MATHEMATICS - II**  
**B. Tech. Semester - II (Common for all Branches)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Class Work</b>	<b>: 75 Marks</b>
<b>3</b>	<b>1</b>	<b>--</b>	<b>4</b>	<b>Examination</b>	<b>: 75 Marks</b>
				<b>Total</b>	<b>: 100 Marks</b>
				<b>Duration of Examination</b>	<b>: 3 Hours</b>

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**UNIT-I**

**Ordinary Differential Equations & its Applications :** Exact differential equations. Equations reducible to exact differential equations. Applications of Differential equations of first order & first degree to simple electric circuits, Newton's law of cooling, heat flow and orthogonal trajectories.

Linear differential equations of second and higher order. Complete solution, complementary function and particular integral, method of variation of parameters to find particular Integral, Cauchy's and Legendre's linear equations, simultaneous linear equations with constant co-efficients.

**UNIT-II**

**Laplace Transforms and its Applications :** Laplace transforms of elementary functions, properties of Laplace transforms, existence conditions, transforms of derivatives, transforms of integrals, multiplication by  $t^n$ , division by  $t$ . Evaluation of integrals by Laplace transforms. Laplace transform of Unit step function, unit impulse function and periodic function. Inverse transforms, convolution theorem, application to linear differential equations and simultaneous linear differential equations with constant coefficients.

**UNIT-III**

**Functions of Complex Variable :** Definition, Exponential function, Trigonometric and Hyperbolic functions, Logarithmic functions. Limit and Continuity of a function, Differentiability and Analyticity.

Cauchy-Riemann equations, necessary and sufficient conditions for a function to be analytic, polar form of the Cauchy-Riemann equations. Harmonic functions, application to flow problems. Integration of complex functions. Cauchy-Integral theorem and formula.

Power series, radius and circle of convergence, Taylor's Maclaurin's and Laurent's series. Zeroes and singularities of complex functions, Residues

**UNIT-IV**

**Fourier Series and Fourier Transforms :** Euler's formulae, conditions for a Fourier expansion, change of interval, Fourier expansion of odd and even functions, Fourier expansion of square wave, rectangular wave, saw-toothed wave, half and full rectified wave, half range sine and cosine series.

Fourier integrals, Fourier transforms, Shifting theorem (both on time and frequency axes), Fourier transforms of derivatives, Fourier transforms of integrals, Convolution theorem, Fourier transform of Dirac-delta function.

**TEXT BOOKS :**

1. Advanced Engg. Mathematics F Kreyszig
2. Higher Engg. Mathematics B.S. Grewal

**REFERENCE BOOKS:**

1. Differential Equations – H.T.H. Piaggio.
2. Elements of Partial Differential Equations – I.N. Sneddon.
3. Advanced Engineering Mathematics – R.K. Jain, S.R.K. Iyengar.
4. Advanced Engg. Mathematics – Michael D. Greenberg.

**Note:**

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed

**PHY 102B      ENGINEERING PHYSICS – II**  
**B. Tech. Semester - II (Common for all Branches)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Class Work</b>	<b>: 25 Marks</b>
<b>3</b>	<b>1</b>	<b>--</b>	<b>4</b>	<b>Examination</b>	<b>: 75 Marks</b>
				<b>Total</b>	<b>: 100 Marks</b>
				<b>Duration of Examination</b>	<b>: 3 Hours</b>

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**UNIT-I**

**ELECTRODYNAMICS & QUANTUM PHYSICS**

Introduction, Displacement current, Equation of continuity, Gauss's Law in dielectric, applications of Gauss's law, Maxwell's equations (both differential and integral form), plane e.m. wave equations in free space, dielectric and conducting medium; Poynting vector.

Difficulties with Classical physics, Introduction to quantum mechanics-simple concepts, Black Body radiations, Planck's Law of radiation and its limitations, Group velocity and phase velocity, Schrodinger wave equations, Application of Schrodinger Equations (Particle in a box).

**UNIT-II**

**CRYSTAL STRUCTURE**

Space Lattice, unit cell and translation vectors, Miller indices, Bravais lattice structure in 3D, simple crystal structure (NaCl, ZnS and CsCl<sub>2</sub>), Elementary idea of reciprocal lattice, Ewald Construction, Experimental x-ray diffraction method, Laue method, powder Method.

**FREE ELECTRON THEORY**

Elements of classical free electron theory, Drude's Theory of Conduction and its limitations, quantum theory of free electrons, Fermi level, Density of states, Fermi-Dirac distribution function, Thermionic emission, Richardson's equation.

**UNIT-III**

**BAND THEORY OF SOLIDS**

Origin of energy bands, Kronig, Penney Model (qualitative), E-K diagrams, Brillouin Zones, Concept of effective mass and holes, Classification of solids into metals, Semiconductors and insulators, Fermi energy and its variation with temperature, Conduction in Intrinsic and Extrinsic Semiconductors. Hall Effect and its Applications.

**UNIT-IV**

**SUPERCONDUCTIVITY & NANOSCIENCE**

Introduction to superconductivity, Critical temperature, Meissner Effect, Types of Superconductor, London Equations, penetration depth and coherence length, BCS Theory(qualitative ideas), High temperature superconductors.

Concept of Nano-materials, Size dependence of band gap, Top-down and bottom-up approach for preparing nano-materials, MEMS & NEMS, Properties and applications of Fullerene, Graphene, CNT, Nanowires, Nano-composites, Quantum dots..

**TEXT BOOKS :**

1. Solid State Physics – S.O.Pillai (6th Edition, New Age).
2. Quantum Mechanics – Ghatak & Loknathan.
3. Fundamentals of Solid State Physics – B.S.Saxena, R.C.Gupta & P.N.Saxena (Pragati)

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The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

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Prakashan).

4. **Solid State Physics** by H. Ibach & H. Luth, Springer, Berlin.
5. **Engineering Physics** by H.K Malik and A.K. Singh (Tata McGraw Hill).
6. **Engineering Physics** by S.P. Taneja (Chand Pub.)

**REFERENCE BOOKS :**

1. **Introduction to Solid State Physics (VII Ed.)** - Charles Kittel (John Wiley).
2. **Quantum Mechanics – Powell and Crasemann** (Oxford & IBH)
3. **Classical Electrodynamics** by S.P. Puri (Narosa)
4. **Nano-technology- Molecularly Designed Materials: G. M. Chow & K. E. Gonsalves** (American Chemical society).

**Note:**

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed

**ECE 102B      BASICS OF ELECTRONICS ENGINEERING**  
**B. Tech. Semester – II (OPTIONAL- Common for all Branches )**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Class Work</b>	<b>: 25 Marks</b>
<b>3</b>	<b>1</b>	<b>--</b>	<b>4</b>	<b>Examination</b>	<b>: 75Marks</b>
				<b>Total</b>	<b>: 100 Marks</b>
				<b>Duration of Examination</b>	<b>: 3 Hours</b>

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**UNIT I**

**Semiconductor Physics, Diodes and Applications:** Basic concepts, intrinsic and extrinsic semiconductors, diffusion and drift currents ,Hall effect and its applications-pn junction under open circuit, reverse bias and forward bias conditions, p-n junction in the breakdown region, ideal diode, types of diodes –zener diode, varactor diode, LED and photodiode. Rectifier (half wave and full wave).

**Amplifiers:** Introduction of different types of BJT amplifiers & their characteristics.

**UNIT II**

**Operational Amplifiers:** OP-amps, its characteristics, inverting, non-inverting, summing, averaging, scaling ,difference, integrator and differentiator amplifiers.

**Power Supplies:** Introduction and working of switched mode power supply (SMPS), voltage regulator.

**UNIT III**

**Digital Electronics:** Binary, Octal and Hexadecimal number system and conversion, Boolean algebra, truth tables of logic gates AND, OR,NOT,EX-OR,EX-NOR, NAND, NOR AND their implementation using diodes transistors, switches and lamps, Universal gates.

**Electronic Instruments:** Transducers, Role, importance and applications of general purpose test instruments viz. multi meter (digital and analog), cathode ray oscilloscope (CRO), function/ signal generator.

**UNIT IV**

**Communication System:** Modulation, need of modulation, Block diagram of basic communication system, overview of AM, FM and PM.

**Microprocessor:** Basics of 8085 & its architecture. Instruction set, Interrupts, Addressing modes.

**Reference Books:**

1. Sedra A S and Smith K C. “Microelectronic Circuits” New York.Oxford University Press, New York
2. Tocci R J and widner N S “Digital Systems” – Principles and Applications”, Pearson Education India , new Delhi .
3. Cooper and Helfric, “Modern Electronic Instrumentation and Measuring Techniques”. Prentice Hall of India, New Delhi.
4. Boylestad and Nashelsky, “Electronic Devices and Circuit Theory”, Pearson Education India, New Delhi
5. Millman and Grabel, “Microelectronics”, Tata McGraw Hill
6. Millman and Halkias, “Electronics Devices and Circuits”. Tata McGraw Hill
7. Kennedy and Davis, “Electronic Communication Systems”, Tata McGraw Hill
8. Ramesh S. Gaonkar, “Microprocessor Architecture,Programming,and Applications with the 8085”,Penram International Publishing.

**Note:**

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.

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The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

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2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed

<b>BT 102B      BASICS OF BIOTECHNOLOGY</b>			
<b>B. Tech. Semester – II (OPTIONAL- Common for all Branches )</b>			
<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>
3	1	--	4

  

<b>Class Work</b>	<b>: 25 Marks</b>
<b>Examination</b>	<b>: 75Marks</b>
<b>Total</b>	<b>: 100 Marks</b>
<b>Duration of Examination</b>	<b>: 3 Hours</b>

#### UNIT – I

**Introduction: Nature and scope of Biotechnology.**

**Cell Structure and Function: Prokaryotes and Eukaryotes- cell wall, cell membrane, nucleus, mitochondria, chloroplast, ribosome, vacuoles, bacteria and viruses: brief descriptions.**

**Biomolecules: A brief account of structure and functions of carbohydrates, lipids, proteins.**

#### UNIT– II

**Cell Division: Mitosis and meiosis**

**Genes and chromosomes: Classical- Mendel's laws and chromosomes, nature of genetic material, DNA and RNA as genetic material, concept of organization of genetic material into chromosomes.**

**DNA replication: DNA polymerases, replication mechanism.**

#### UNIT-III

**Gene Expression: Central dogma, genetic code, gene expression-a brief account of transcription and translation, housekeeping genes, mutations and their molecular basis.**

**Genetic Engineering: An introduction to genetic engineering: cloning (vectors, enzymes), DNA and genomic libraries, transgenics, DNA fingerprinting, genomics.**

#### UNIT – IV

**Applications of Biotechnology : Bioprocess and fermentation technology, cell culture, enzyme technology, biological fuel generation, single cell protein, sewage treatment, environmental biotechnology, biotechnology and medicine, biotechnology in agriculture & forestry industry, food and beverage technology, production of biological inventions, safety in biotechnology.**

#### TEXT/ REFERENCE BOOKS:

- **Biotechnology, Smith, Cambridge Press.**
- **Modern Concepts of Biotechnology, H. D. Kumar, Vikas Publishing House (P) Ltd.**
- **Elements of Biotechnology, P. K. Gupta, Rastogi Publications.**

#### Note:

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed

**HUM 102B ORAL COMMUNICATION SKILLS**  
**B. Tech. Semester – II (OPTIONAL- Common for all Branches )**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Class Work</b>	<b>:</b>	<b>25 Marks</b>
<b>3</b>	<b>1</b>	<b>--</b>	<b>4</b>	<b>Examination</b>	<b>:</b>	<b>75Marks</b>
				<b>Total</b>	<b>:</b>	<b>100 Marks</b>
				<b>Duration of Examination</b>	<b>:</b>	<b>3 Hours</b>

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**OBJECTIVE**

To train students to have proficiency in oral communication through interpersonal communicative situations.

**COURSE CONTENT**

**UNIT I**

**Essentials of Speaking Skills:**

Familiarity with phonetic sound symbols; Transcription of simple words using International Phonetic Alphabet; Use of dictionary to cultivate standard pronunciation and develop phonetic discrimination

**UNIT II**

**Speaking Skills:**

Need and Significance of Effective Oral Communication; Practice of Conversation – Interpersonal and Telephonic Conversation; Formal Group Discussion

**UNIT III**

**Non-Verbal Elements in Oral Communication Skills:**

Reading Face, eyes, gesture and body posture, time, space and culture in communicative situations; practicing verbal and non-verbal communication (Body Language) to acquire effective Oral communication;

**UNIT IV**

**Listening Skills:**

Essentials of Good Listening, Types of Listening, Barriers in Effective listening, Exercises in Listening to Talk Shows, Speech Reviews; Practice in English Sounds and Speech using RP/MRP

**RECOMMENDED READING**

1. Buck, Gary. *Assessing Listening*. Delhi: Foundation Books (Cambridge University Press), 200.
2. Balasubramanian, T. *A Textbook of English Phonetics for Indian Students*. Chennai: MacMillan, 1981 (rpt 2007).
3. Gangal, J.K. *A Practical Course in Spoken English*. New Delhi: PHI, 2011
4. Raman, Meenakshi and Sangeeta Sharma. *Communication Skills*. Delhi: OUP, 2011
5. Ribbens, Geoff and Richard Thompson. *Body Language*. New York: Hodder & Stoughton, 2007.

**CE 102B                      BASICS OF CIVIL ENGINEERING**  
**B. Tech. Semester – II (OPTIONAL- Common for all Branches )**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Class Work</b>	<b>: 25 Marks</b>
<b>3</b>	<b>1</b>	<b>--</b>	<b>4</b>	<b>Examination</b>	<b>: 75Marks</b>
				<b>Total</b>	<b>: 100 Marks</b>
				<b>Duration of Examination</b>	<b>: 3 Hours</b>

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**UNIT - I**

**Materials for Construction: Stones, Sands, Lime, Bricks, Timber, Steel their Classification and Properties. Different Types of Cement and their Properties, manufacturing of Cement, Concrete, and properties of Concrete, Ingredient of Concrete and Their Functions**

**Component parts of a Building, Foundation, Masonry Works, Doors and Windows, Floors, Roofs, DPC, Building Services**

**UNIT - II**

**Surveying , Introduction to Surveying: Definition, importance, classification of surveys, Principle, Leveling: definitions of terms used in leveling, different types of levels, Contours, Definition, representation of reliefs, horizontal equivalent, contour interval, characteristics of contours, methods of contouring, contour gradient, uses of contour maps, Introduction to GIS, GPS and Remote sensing.**

**UNIT - III**

**Transportation: Various modes and means of transportation, Different types of transport systems, Importance of road transport, History of Road Development, Indian Road Congress. Main features of 20 years road development plans in India, PMGSY**

**Sources of power, estimation of water power, water budget equation, necessity and importance of harnessing small hydro power plants, Dams, Types of Dams, Location and Impact assessment of a Dam project.**

**UNIT - IV**

**Geotechnical Engineering: History and its applications, Soil Properties, Classification of Soil, Geotechnical and Geophysical investigation of Soil.**

**Irrigation Engineering: Necessity, advantages, disadvantages, impact of irrigation on human environment, need and development of irrigation in India.**

**Text Books:**

- 1. Basic Civil Engineering, Satheesh Gopi, Pearson.**
- 2. Basic Civil Engineering, Dr. B.C. Punmia, Ashok Kumar Jain, Arun Kr. Jain, Firewall Medi**

**Reference Books:**

- 1. Surveying by Prof. N. Singh, Tata McGraw Hill, New Delhi**
- 2. Basic Civil Engineering, Rakesh Beohar, Firewall Media**
- 3. Highway Engg. by S. K. Khanna & C.e.G.Justo, Nem Chand & Bros,Roorkee**
- 4. Water Resources Engineering by Linseley and Franzini**
- 5. Basic Civil Engineering, L.G. Kulkarni A. D. Pawar S. P. Nitsure, Technical Publications.**

**Note:**

- 1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.**
- 2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.**

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The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

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**PHY 104B      PHYSICS LAB. - II**  
**B. Tech. Semester - II (Common for all Branches)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Class Work</b>	<b>: 20 Marks</b>
--	--	2	1	<b>Examination</b>	<b>: 30Marks</b>
				<b>Total</b>	<b>: 50 Marks</b>
				<b>Duration of Examination</b>	<b>: 3 Hours</b>

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**Note: Students will be required to perform 10 experiments in a semester.**

**LIST OF EXPERIMENTS**

1. To find the low resistance by Carey - Foster's bridge.
2. To find the resistance of a galvanometer by Thomson's constant deflection method using a post office box.
3. To find the value of high resistances by Substitution method.
4. To find the value of high resistances by Leakage method.
5. To study the characteristics of a solar cell and to find the fill factor.
6. To find the value of e/m for electrons by Helical method.
7. To find the ionisation potential of Argon/Mercury using a thyratron tube.
8. To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee's apparatus.
9. To study the characteristics of (Cu-Fe, Cu-Constantan) thermo couple.
10. To find the value of Planck's constant by using a photoelectric cell.
11. To find the value of co-efficient of self-inductance by using a Rayleigh bridge.
12. To find the value of Hall Co-efficient of semi-conductor.
13. To study the V-I characteristics of a p-n diode.
14. To find the band gap of intrinsic semi-conductor using four probe method.
15. To calculate the hysteresis loss by tracing a B-H curve.
16. To verify the Truth Table of various Logic Gates.

**RECOMMENDED BOOKS :**

1. Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH)
2. Practical Physics – S.L.Gupta & V.Kumar (Pragati Prakashan).
3. Advanced Practical Physics Vol.I & II – Chauhan & Singh (Pragati Prakashan).

GP 102B GENERAL PROFICIENCY & ETHICS						
B. Tech. Semester – II (Common for all Branches)						
L	T	P	Credits		Examination	: 50Marks
1	--	--	2		Total	: 50 Marks

The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/ her performance / achievements in different walks of life.

A Faculty Counselor will be attached to a group of students which will remain associated with him / her during the entire period of the degree program in the University. Each faculty member will serve as a faculty counselor. They will act like a local guardian for the students associated with him / her and will help them in terms of career guidance, personal difficulties.

**A. The student will present a written report before the committee with following in view:**

The student will present before the committee his/ her achievements during the current academic session in the form of a written report highlighting followings:

- I. Academic Performance -----
- II. Extra Curricular Activities / Community Service, Hostel Activities **(8 Marks)**
- III. Technical Activities / Industrial, Educational tour **(8 Marks)**
- IV. Sports/games **(4 Marks)**
- V. Moral values & Ethics **(10 Marks)**

**NOTE:** Report submitted by the students should be typed on both sides of the paper.

**B. A student will support his/ her achievement and verbal & communicative skill through presentation before the committee. **(20 Marks)****

**C. Moral values & Ethics**

Syllabus - Introduction to Value Education. Understanding ethics, value system, happiness, prosperity

A minor test / Quiz will be conducted and It will be the duty of the concerned teacher assigned to teach Moral values & Ethics to submit the awards to respective chairman of the department / Director/Principal.

The evaluation of this course will be made by the following Committee.

**University Departments:**

- 1 Chairperson of the Department Chairman
- 2 Senior Most Faculty Counselor Member
- 3 Vice- Chancellor's Nominee Member

**Affiliated Colleges:**

- 1 Director/Principal Chairman
- 2 Head of the Department/Sr. Faculty Member
- 3 External Examiner to be appointed by the University Member

**Note:** Remuneration will be paid to the external examiner only (at par with the other practical examinations).

**EE-209B ESTIMATION COSTING, ELECTRICAL CODES & STANDARDS**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**  
**SEMESTER-III**

L T P Credits  
3 1 - 4

Class-work Marks : 25  
Exam Marks : 75  
Total Marks : 100  
Duration of Exam : 3 Hrs.

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**UNIT-I**

Purpose of estimating and costing, per forma for making estimates, Preparation of materials schedule, costing, price list, preparation of tender document (with 2-3 exercises), net price list, market survey, overhead charges, labour charges, electric point method and fixed percentage method, contingency, profit, purchase system, enquiries, comparative statements, orders for supply, payment of bills. Tenders-its constituents, finalization, specimen tender.

**UNIT-II**

General and common aspects (National electrical code SP 30:2011), Scope of the national electrical code and definitions, Graphical symbols, guidelines for preparation of diagrams, charts, tables, and marking, Standard values, Fundamental principles of electrical installations, Assessment of General characteristics of Buildings, Wiring installations- terminology, & general aspects for selection of wiring systems, Mains intake and distribution of electrical energy in consumers premises – Distribution board system & distribution, distribution board system, general design of feeder, distribution & final circuit, special cabling requirement safety in electrical work, safety practices.

**UNIT-III**

Wiring systems-Size of wires, protection of wiring from damage, Cleated wiring system, Casing wiring, metal-sheathed wiring, C.T.S. wiring, PVC wiring, All insulated wiring, Enclosed wiring systems, Equipment, fitting and accessories, Ceiling roses, Luminaries, lamp holders, lamps, socket outlets and plugs, switches, fans, **Earthing**-General remarks, design considerations, earth electrodes and its types, measurement of earth electrode resistance, earthing of installations in buildings, types of system earthing.

**UNIT-IV**

Electrical aspects of building services-general guidelines, aspects of lightning services, aspects of ventilation, aspects of air conditioning and heating services, electrical aspects of lifts, escalator services, fire alarm and fighting system, clock systems, telephone systems, electrical aspects of computer control of environmental systems-Building management system(BMS) and its Architecture, Electrical installations in domestic & commercial buildings- classification, General characteristics of installations, supply characteristics and parameters, switchgear for control and protection, service lines, metering. earthing, building services, fire protection & testing in domestic & commercial buildings.

**TEXT BOOKS:**

1. Electrical Installation, estimating and costing: JB Gupta; SK Kataria and sons, New Delhi.
2. Estimating and costing :SK Bhattacharya ; TMH, New Delhi.
3. National Electrical code 2011: Bureau of Indian Standards

**REFERENCE BOOKS:**

1. Estimating and costing: Surjeet singh; Dhanpat Rai.and co., New Delhi.
2. Estimating and costing: SL Uppal, khanna publishers, New delhi.

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all containing two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**MGT 201B ENGINEERING ECONOMICS**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**

**Semester – III/IV (Common for all Branches Except BT& BME)**

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The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

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<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>
4	-	--	4

<b>Class Work</b>	<b>:</b>	<b>25 Marks</b>
<b>Examination</b>	<b>:</b>	<b>75Marks</b>
<b>Total</b>	<b>:</b>	<b>100 Marks</b>
<b>Duration of Examination</b>	<b>:</b>	<b>3 Hours</b>

**COURSE OBJECTIVE:** The aims of this course are to:

1. Acquaint the student with the basic economic concepts and their operational significance
2. Stimulate him to think systematically and objectively about cotemporary economic problems.

#### **UNIT-I**

**Definition of economics-** various definitions, nature of Economic problem, Micro and macro economics- their feature and scope, production possibility curve, Economic laws and their nature. Relation between Science, Engineering Technology and Economics. Concept and measurement of utility, Law of Diminishing Marginal Utility, Law of equi-marginal utility – its practical application and importance.

#### **UNIT-II**

Meaning of Demand, Individual and Market demand schedule, Law of demand, shape of demand curve. Elasticity of demand, measurement of elasticity of demand, factors effecting elasticity of demand, practical importance & application of the concept of elasticity of demand. Various concepts of cost-Fixed cost, variable cost, average cost, marginal cost, money cost, real cost, opportunity cost. Shape of average cost, marginal cost, total cost etc. in short run and long run.

#### **UNIT III**

Meaning of production and factors of production; Law of variable proportions, Law of Return to Scale, Internal and External economics and diseconomies of scale. Meaning of Market, Type of Market– perfect Competition, Monopoly, Oligopoly, Monopolistic competition (Main features of these markers).

#### **UNIT-IV**

Supply and Law of Supply, Role of Demand & Supply in Price Determination and effect of changes in demand and supply on prices . Nature and characteristics of Indian economy, privatization – meaning, merits and demerits. Globalisation of India economy – merits and demerits. Elementary Concept of WTO & TRIPS agreement, Monetary Policy & Fiscal Policy

#### **TEXT BOOKS:**

1. Ahuja H.L”Micro Economic Theory” S. Chand Publication, New Delhi
2. Dewett K.K “Modern Economic Theory” S. Chand Publication, New Delhi
3. Jain T.R, Grover M.L, Ohri V.K Khanna O.P,”Economics for engineers” V.K .Publication ,New Delhi

#### **SUGGESTED BOOKS:**

1. Jhingan M.L”Micro Economic Theory” S.Chand Publication ,New Delhi
2. Chopra P.N “Principle of Economics” Kalyani Publishers, Delhi
3. Mishra S.K “Modern Micro Economics” Pragati Publication Mumbai.
4. Dwivedi D.N ”Micro Economics ” Pearson Education, New Delhi.

#### **Note:**

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed

### **GES 201B ENVIRONMENTAL STUDIES**

The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**

**B. Tech. Semester – III/IV (Common for all Branches)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Examination</b>	<b>:</b>	<b>75Marks</b>
<b>3</b>	<b>--</b>	<b>--</b>	<b>0</b>	<b>Total</b>	<b>:</b>	<b>75 Marks</b>
				<b>Duration of Examination</b>	<b>:</b>	<b>3 Hours</b>

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**UNIT – I** The Multidisciplinary nature of environmental studies, Definition, scope and importance.

Need for Public awareness

**UNIT – II** Natural Resources:

Renewable and non-renewable resources:

Natural resources and associated problems.

- Forest resources: Use and over-exploitation: deforestation, case studies, Timber exploitation, mining, dams and their effects and forests tribal people.
- Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- Food resources: World food problems, changes, caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources; case studies.
- Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
  - Role of an individual in conservation of natural resources.
  - Equitable use of resources for sustainable lifestyles.

**UNIT- III** Ecosystems:

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following eco-system:
  - Forest ecosystem.
  - Grassland ecosystem.
  - Desert ecosystem.
  - Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

**UNIT- IV** Biodiversity and its conservations:

- Introduction – Definition: Genetic, species and ecosystem diversity.
- Biogeographically classification of India.
- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.

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The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

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**UNIT – V** Environmental Pollution:

Definition, causes, effects and control, measures of:

- a) Air pollution
- b) Water pollution
- c) Soil pollution
- d) Marine pollution
- e) Noise pollution
- f) Thermal Pollution
- g) Nuclear hazards
  - Solid waste management: Causes effects and control measures of urban and industrial wastes.
  - Role of an individual in prevention of pollution.
  - Pollution case studies.
  - Disaster management: Floods, earthquake, cyclone and landslides.

**UNIT – VI** Social issues and the Environment:

- a) From unsustainable to sustainable development
- b) Urban problems related to energy
- c) Water conservation, rain water harvesting, watershed management
- d) Resettlement and rehabilitation of people; its problems and concerns, case studies
- e) Environmental ethics: Issues and possible solutions
- f) Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies
- g) Wasteland reclamation
- h) Consumerism and waste products
- i) Environment Protection Act
- j) Air (Prevention and Control of Pollution) Act
- k) Water (Prevention and Control of Pollution) Act
- l) Wildlife Protection Act
- m) Forest Conservation Act
- n) Issues involved in enforcement of environmental legislation
- o) Public awareness

**UNIT – VII**

Human population and the Environment.  
Population growth, variation among nations.  
Population explosion – Family Welfare Programme.  
Environment and human health.  
Human Rights.  
Value Education.  
HIV/ AIDS.  
Woman and Child Welfare.  
Role of Information Technology in Environment and human health.  
Case Studies.

**REFERENCES:**

1. Agarwal, K.C. 2001, Environmental Biology, Nidi Pub. Ltd. Bikaner.
2. Bharucha, Franch, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380013, India .
3. Brunner R.C. 1989, Hazardous Waste Incineration, Mc. Graw Hill Inc. 480p.
4. Clark R.S., Marine Pollution, Slanderson Press Oxford (TB).
5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Pub. House, Mumbai. 1195p.
6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment ®.

8. Gleick, H.P., 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security, Stockholm Env. Institute, Oxford Univ., Press 473p.
9. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R).
10. Heywood, V.H. & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
11. Jadhav, H & Bhosale, V.M. 1995, Environmental Protection and Laws, Himalaya Pub. House, Helhi 284p.
12. Mckinney, M.L. & Schoch, RM 1996, Environmental Sciences Systems & Solutions, Web enhanced Edition 639p.
13. Mhaskar A.K., Mater Hazardous, Tekchno-Sciences Publications (TB).
14. Miller T.G. Jr. Environmental Science, Wadsoworth Publishing Co. (TB).
15. Odum, E.P. 1971, Fundamentals of Ecology, W.B. Saunders Co. USA, 574p.
16. Rao M.N. & Dutta, A.K. 1987, Waste Water Treatment. Oxford & IBH Publ. Co. Pvt. Ltd., 345p
17. Sharma, B.K., 2001, Environmental Chemistry, Goel Publ. House, Meerut.
18. Survey of the Environment, The Hindu (M).
19. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Sciences (TB).
20. Trivedi, R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II Enviro Mdiea (R).
21. Trividi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol I and II Enviro Media (R).
22. Trividi R.K. and P.K. Goel, Introduction to air pollution, Techno Sciences Pub. (TB).
23. Wagner K.D., 1998, Environmental Management, W.B. Saunders Co. Philadelophia, USA 499p.
24. A text bok environmental education G.V.S. Publishers by Dr. J.P. Yadav.

(M) Magazine (R) Reference (TB) Textbook

- Note:**
1. Examiner will set eight questions. Students will be required to attempt five Questions.
  3. The awards of this paper shall not be counted in the award of the Degree/DMC.

**GES 203B ENVIRONMENTAL STUDIES FIELD WORK  
B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**

**B. Tech. Semester – III/IV (Common for all Branches)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Field Work</b>	<b>: 25Marks</b>
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**FIELD WORK:**

- Visit to a local area to document environmental assets – river/ forest/ grassland/ hill/ mountain.
- Visit to a local polluted site-Urban/ Rural/ Industrial/ Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems – pond, river, hill slopes, etc. (Field work equal to 5 lectures hours).

**Note: The awards of this paper shall not be counted in the award of the Degree/DMC.**

**ME 217 B Workshop**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**

**B. Tech. Semester – III (Common for all branches)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Class Work</b>	<b>: 50 Marks</b>
-	-	2	2		

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**Each student has to undergo a workshop atleast 4 weeks (80-100 hours ) at the end of II semester during summer vacations. Out of the four weeks, two weeks would be dedicated to general skills and two weeks training for specialized discipline / department. The evaluation of this training shall be carried out in the III semester**

**LIST OF JOBS TO BE CARRIED OUT DURING THIS PERIOD**

1. To study and prepare different types of jobs on machine tools ( lathe, shaper, planer, slotter, milling, drilling machines).
2. To prepare lay out on a metal sheet by making and prepare rectangular tray, pipe shaped components e.g. funnel.
3. To prepare joints for welding suitable for butt welding and lap welding.
4. To study various types of carpentry tools and prepare simple types of wooden joints.
5. To prepare simple engineering components/ shapes by forging.
6. To prepare mold and core assembly, to put metal in the mold and fettle the casting.
7. To study of CNC lathe, CNC Milling and EDM Machines.
8. Any work assigned in Electrical Workshop, Computer Hardware/ Language lab, Electronics Workshop, Biomedical Hardware, Automobile Workshop etc.

**This student will prepare job(s)/project as an individual or in a group using workshop in house infrastructure.**

The student shall submit a typed report.

Training will be evaluated on the spot out of 20 marks.

The report will be evaluated in the III Semester by a Committee consisting of two teachers.

The student will interact with the committee through presentation to demonstrate his/ her learning. The basis of evaluation will primarily be the knowledge and exposure of students on different kinds of Machines. The committee will evaluate out of 30 marks.

The committee shall submit the awards out of 50 marks.



**EE201B      ELECTRICAL ENGINEERING MATERIALS**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC, AEI**  
**SEMESTER-III**

L   T   P   Credits  
3   -   -   3

Class-work Marks    : 25  
Exam Marks            : 75  
Total Marks            : 100  
Duration of Exam     : 3 Hrs.

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**UNIT-I**

Atomic bonding, crystallinity, Miller Indices, X-ray crystallography, structural imperfections, crystal growth. Free electron theory of metals, factors affecting electric conductivity of metals, thermal conductivity of metals, heat developed in current Carrying conductors, thermoelectric effect, super conductivity.

**UNIT-II**

Polarization mechanism and dielectric constant, behavior of polarization under impulse and frequency switching, dielectric loss, spontaneous polarization, piezoelectric effect. Origin of permanent magnetic dipoles in materials, classifications, diamagnetism, paramagnetism, ferromagnetism, Magnetic Anisotropy magnetostriction.

**UNIT-III**

Energy band theory, classification of materials using energy band theory, Hall effect, drift and diffusion currents, continuity equation, P-N diode, volt-amp equation and its temperature dependence. Properties and applications of electrical conducting, semiconducting, insulating and magnetic materials.

**UNIT-IV**

Special purpose materials, Nickel iron alloys, high frequency materials, permanent magnet materials, Feebly magnetic materials, Ageing of a permanent magnet, Effect of impurities, Losses in Magnetic materials.

**TEXT BOOKS:**

4. Electrical Engineering Materials: A.J. Dekker; PHI.
5. Solid State Electronic Devices: StreetMan & Banerjee; Pearson.

**REFERENCE BOOKS:**

3. Electrical Engineering Materials: S.P Seth & P.V Gupta; Dhanpat Rai.
4. *Electrical Properties of Materials*, L.Solymar, D.Walsh, Oxford
5. *Materials Science for Electrical and Electronic Engineers*, Lan P.Jones, Oxford

**NOTE:**

2. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**EE203B NETWORK ANALYSIS-I**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-III**

L T P Credits  
3 1 - 4

Class-work Marks : 25  
Exam Marks : 75  
Total Marks : 100  
Duration of Exam : 3 Hrs.

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**UNIT-I**

**Sinusoidal Steady-State Circuit Analysis:** Fundamentals of Circuits, R, L & C Components, Sinusoids, phasors, phasor relationship for circuit elements, impedance & admittance, Network Theorems in AC circuits: Mesh analysis, nodal Analysis, thevenin's & Norton's theorem, Superposition Theorem, Maximum Power transfer theorem, AC analysis using P-spice, Applications

**UNIT-II**

**AC Power Analysis & Polyphase Circuits:** Instantaneous & average power, RMS or effective value, apparent power & power factor, complex power, power relations in AC circuits, two-phase system, three-phase system, wye & delta systems, Balanced three-phase voltages, Balanced wye-wye connections, Balanced wye-delta connections, Balanced delta-delta connections, Balanced delta-wye connections, unbalanced three phase systems, three-phase power, P-spice for polyphase circuits.

**UNIT-III**

**Signals & LTI Systems:** Introduction to continuous and discrete signals, their classification and types, periodic waveforms and signal synthesis, LTI systems and their properties; system modeling in terms of differential equations, Transient response of R, L, C circuits for impulse, step, ramp, sinusoidal and exponential signals.

**Laplace Transform:** Review of properties and applications of Laplace transform of complex waveform. Transient Response of RC, RL, RLC series, parallel, series-parallel circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using Laplace transform.

**UNIT-IV**

**Fourier Series & Fourier Transform:** Introduction to Frequency domain Representation, Fourier Series Representation of Periodic Signals, Convergence of the Fourier Series, Properties of Fourier Series, Exponential Fourier Series, I/P O/P Relationship for LTI Systems using Fourier Series, Circuit applications, Fourier Transform representation of aperiodic & periodic signals, Properties of Fourier Transform, Basic Fourier Transform Pairs, Circuit applications.

**TEXT BOOKS:**

1. Network Analysis & Synthesis: Umesh Sinha; Satya Prakash Pub.
2. Network Analysis & Synthesis: F.F.Kuo; John Wiley & Sons Inc.
3. *Network Analysis and Synthesis*, SP Ghos, AK Chakarborty, Mc Graw Hill
4. *Electric Circuits and Networks*, K.S. Suresh Kumar, Pearson

**REFERENCE BOOKS:**

1. Introduction to modern Network Synthesis: Van Valkenburg; John Wiley
2. Network Analysis: Van Valkenburg; PHI
3. Basic circuit theory: Dasoer Kuh; McGraw Hill.
4. A Course in Electrical Circuit Analysis by Soni & Gupta; Dhanpat Rai Publication.
5. Circuit Analysis: G.K. Mithal; Khanna Publication.
6. Networks and Systems: D.Roy Choudhury; New Age International
7. Engineering Circuit Analysis; Hayat & Kemmerley TMH.
8. *Linear Circuits Analysis and Synthesis*, A.Ramakalyan, Oxford
9. *Circuits and Networks*, T.K.Nagsarkar, M.S.Sukjija, Oxford 2-1
10. *Circuit Analysis A Systems Approach*, Russell M.Mersereau, Joel R. Jackson, Pearson

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

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The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

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2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ ex-change of calculator are prohibited in the examinations.



**ECE201B      DIGITAL ELECTRONICS**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), CSE, ECE, EE, IC**  
**SEMESTER-III**

L   T   P      Credits  
3   1   -      4

Class-work Marks      : 25  
Exam Marks              : 75  
Total Marks              : 100  
Duration of Exam        : 3 Hrs.

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**SECTION- I**

**UNIT 1- FUNDAMENTALS OF DIGITAL TECHNIQUES**

Digital signal, logic gates: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR, Boolean algebra. Review of Number systems. Binary codes: BCD, Excess-3, Gray, EBCDIC, ASCII, Error detection and correction codes.

**UNIT 2-COMBINATIONAL DESIGN USING GATES:**

Design using gates, Simplifications of SOP and POS Boolean Expressions, Karnaugh map up to four variables.

**SECTION- II**

**UNIT 3-COMBINATIONAL DESIGN USING MSI DEVICES**

Multiplexers and Demultiplexers and their use as logic elements, Decoders, Adders / Subtractors, BCD arithmetic circuits, Encoders, Code Converters, Decoders / Drivers for display devices.

**Unit 4-SEQUENTIAL CIRCUITS:**

Flip Flops : S-R, J-K, T, D, master-slave, edge triggered, shift registers, sequence generators, Counters, Asynchronous and Synchronous Ring counters and Johnson Counter, Design of Synchronous and Asynchronous sequential circuits.

**SECTION- III**

**UNIT 5-DIGITAL LOGIC FAMILIES**

Switching mode operation of p-n junction, bipolar and MOS. devices. Bipolar logic families:RTL, DTL, DCTL, HTL, TTL, ECL, MOS, and CMOS logic families. Tristate logic, Interfacing of CMOS and TTL families.

**UNIT 6-SEMICONDUCTERS MEMORY DEVICES**

Memory organizations, Characteristics of memory devices, Classifications of semiconductors memories.

**SECTION- IV**

**UNIT 7-A/D AND D/A CONVERTERS:**

Sample and hold circuit, weighted resistor and R -2 R ladder D/A Converters, specifications for D/ A converters. A/ D converters : Quantization, parallel -comparator, successive approximation, counting type, dual-slope ADC, specifications of ADCs.

**UNIT 8 PROGRAMMABLE LOGIC DEVICES:**

PLA, PAL, FPGA and CPLDs.

**TEXT BOOKS :**

1. Modern Digital Electronics(Edition III) : R. P. Jain; TMH

**REFERENCE BOOKS:**

1. Digital Integrated Electronics : Taub & Schilling; MGH
2. Digital Principles and Applications : Malvino & Leach; McGraw Hill.
3. Digital Design : Morris Mano; PHI.

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each section. The candidates will be required to attempt five questions in all selecting at least one from each section. All questions will carry equal marks.

**EE205B          NUMERICAL METHODS & OPTIMIZATION TECHNIQUES**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-III**

L T P          Credits  
3 1 -          4

Class-work Marks          : 25  
Exam Marks                 : 75  
Total Marks                 : 100  
Duration of Exam          : 3 Hrs.

**Unit I**

Introduction and Classical Optimization Techniques: Statement of an Optimization problem – design vector – design constraints – constraint surface – objective function – objective function surfaces – classification of Optimization problems. Classical Optimization Techniques: Single variable Optimization – multivariable Optimization without constraints – necessary and sufficient conditions for minimum / maximum – multivariable Optimization with equality constraints. Solution by method of Lagrange multipliers – multivariable Optimization with inequality constraint – Kuhn – Tucker conditions.

**Unit II**

Linear Programming: Standard form of a linear programming problem – geometry of linear programming problems – definitions and theorems, linear simultaneous equations: Elimination method, Gauss and Gauss-Jordan method, Jacobi's method, Gauss-Seidal method. Relaxation method solution of a system of – pivotal reduction of a general system of equations, simplex method. Transportation problem finding initial basic feasible solution by north - west corner rule, least cost method and vogel's approximation method.

**Unit III**

Unconstrained Nonlinear Programming: One – dimensional minimization methods: Classification, Fibonacci method and Quadratic interpolation method  
Unconstrained Optimization Techniques: Univariate method, Powell's method and steepest descent method.

**Unit IV**

Constrained Nonlinear Programming: Characteristics of a constrained problem, Classification, Basic approach of Penalty Function method, Introduction to convex Programming Problem.  
Numerical Solution of Ordinary & Partial Differential Equations: Taylor series method, Euler and modified Euler method, Runge-Kutta methods, Milne's method, Adams-Moulton method, Power method for Eigen values by iteration, Finite difference approximations of partial derivatives, solution of Laplace equation.

**Text Books:**

1. "Engineering optimization: Theory and practice" – by S. S. Rao, New Age International (P) Limited, 3<sup>rd</sup> edition, 1998

**Reference Books:**

1. "Optimization Methods in Operations Research and system Analysis" – K. V. Mital and C. Mohan, New Age International (P) Limited, 3<sup>rd</sup> edition, 1996
2. Operations Research – by Dr. S. D. Sharma
3. "Operations Research: An Introduction" – by H. A. Taha, PHI Pvt. Ltd., 6<sup>th</sup> edition
4. Linear Programming – by G. Hadley.

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ ex-change of calculator are prohibited in the examinations.

The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

**EE207B      POWER ELECTRONICS DEVICES**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-III**

L T P Credits  
3 1 - 4

Class-work Marks : 25  
Exam Marks : 75  
Total Marks : 100  
Duration of Exam : 3 Hrs.

**UNIT-I**

**Diodes:** P-N junction and its V-I Characteristics, Switching characteristics of Diode, half-wave and full wave rectifiers, clipping & clamping, breakdown mechanism, avalanche & zener diodes, LED, Construction & characteristics of power diodes.

**Transistors:** Introduction, Bipolar junction transistor, construction, transistor operations, BJT characteristics, load line, operating point, leakage currents, saturation and cut off mode of operations, Eber-Moll's model.

**UNIT-II**

**Transistor Biasing:** Operating point, bias stability, collector to base bias, self-bias, emitter bias, bias compensation, stabilization factors, Construction & characteristics of power transistors

**Field Effect Transistors:** Junction field effect transistor, pinch off voltage, volt-ampere characteristics, small signal model, MOSFET Enhancement & Depletion mode, V-MOSFET. Common source amplifier, source follower, biasing of FET, applications of FET as a voltage variable resistor (VVR).

**UNIT-III**

**Power Semiconductor Devices:** Role & applications of power electronics, review of construction and characteristics of power diode, Schottky diode, power Bipolar Junction transistor, power MOSFETs, Construction & characteristics of thyristors: Thyristor, Silicon controlled switch, Gate Turn-off Thyristor, Insulated Gate Bipolar Transistor, Metal oxide controlled Thyristor, Multilayer devices: Construction & characteristics of DIAC, TRIAC, Reverse Conducting Thyristor, BENISTOR..

**UNIT-IV**

**SCR Firing & Commutating Circuits:** Ratings and protections, series and parallel connections, Devices used for firing circuits: UJT firing PUT, SUS, SBS, Firing Circuits: R, RC, UJT, PUT and other firing circuits based on ICs and microprocessors; pulse transformer and opto-coupler, Thyristor Turn-off methods: Line commutation, Load commutation, forced commutation, Commutating circuits, Volatge commutation, current Commutation & Pulse commutation.

**TEXT BOOKS:**

1. M. H. Rashid, "Power Electronics - Circuits, Devices and Applications", P.H.I Private Ltd. New Delhi, Second Edition, 1994
2. Power Electronics : PC Sen; TMH
3. Power Electronics: P.S Bhimra, Khanna Publication

**REFERENCE BOOKS:**

1. N. Mohan et.al. "Power Electronics- Converters, Applications and Design", John Wiley & Sons (Asia) Private Ltd., Singapore, 1996.
2. Bimal K Bose, "Modern Power Electronics and AC Drives" PHI
3. R W Erickson and D Makgimovic, "Fundamental of Power Electronics" Springer, 2nd Edition.
4. Thyristorised Power Controllers : GK Dubey, PHI
5. *Electronics Principles*, Sahdev, Dhanpat Rai
6. *Electric Circuits and Electronic Devices*, David A. Bell, Oxford
7. *Microelectronic Circuits Theory and Applications*, Adal S.Sedra, Kenneth C. Smith, Oxford
8. *Electronics Devices & Circuits*, S.K.Sahdev, Dhanpat Rai

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

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The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

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**EE225B          NUMERICAL METHODS & OPTIMIZATION TECHNIQUES LAB**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-III**

L   T   P   Credits  
-   -   2   1

Class-work Marks        : 20  
Exam Marks                : 30  
Total Marks                : 50  
Duration of Exam         : 2 Hrs.

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**WRITE DOWN AND EXECUTE THE FOLLOWING PROGRAMS USING C/C++/MATLAB**

1. To solve multivariable optimization without constraints.
2. To solve multivariable optimization with equality constraints.
3. Curve fitting by least - square approximations.
4. To solve the system of linear equations using Gauss-Elimination method.
5. To solve the system of linear equations using Gauss-Seidal iteration method.
6. To solve the system of linear equations using Gauss-Jorden method.
7. To solve the system of unconstrained non-linear equations using Fibonacci method
8. To solve unconstrained optimization technique using Univariate method.
9. To solve unconstrained optimization technique using Powell's method
10. To solve unconstrained optimization technique using Steepest Descent method
11. To find the largest eigen value of a matrix by power-method.
12. To find numerical solution of ordinary differential equations by Euler's method.
13. To find numerical solution of ordinary differential equations by Runge-Kutta method.
14. To find numerical solution of ordinary differential equations by Milne's method.

**NOTE:**

1. The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.
3. Electronic gadgets including cellular phones are not allowed in the examination.

**EE231B          ELECTRICAL WIRING & INSTALLATION LAB**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC, CHE**  
**SEMESTER-III**

L   T   P   Credits  
-   -   2        1

Class-work Marks        : 20  
Exam Marks                : 30  
Total Marks                : 50  
Duration of Exam         : 2 Hrs.

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**LIST OF EXPERIMENTS:**

1. Introduction of tools, electrical materials, safety procedure, symbols and abbreviations.
2. To study and make stair case wiring connections.
3. To study house wiring i.e., batten, cleat, casing-caping and conduit wirings.
4. To study & make fluorescent tube light connections, CFL & LED lights.
5. To study high pressure mercury vapour lamp (H.P.M.V) & Sodium Lamp.
6. To study circuit & working of SMPS, UPS & Inverter.
7. To study repairing of home appliances such as heater, electric iron, fans etc.
8. To study construction of moving iron, moving coil, electrodynamic & induction type meters.
9. To design & fabricate single phase transformer.
10. To study fuses, relays, contactors, MCBs and circuit breakers.
11. Insulation testing of electrical equipments.
12. To design and fabricate a PCB for a circuit, wire-up and test.
13. Drilling & mounting of components on above PCB.

**NOTE:**

1. The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.
3. Electronic gadgets including cellular phones are not allowed in the examination.

**ECE221B      DIGITAL ELECTRONICS LAB**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), CSE, ECE, EE, IC**  
**SEMESTER-III**

L   T   P   Credits  
-   -   2      1

Class-work Marks      : 20  
Exam Marks             : 30  
Total Marks             : 50  
Duration of Exam       : 2 Hrs.

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**LIST OF EXPERIMENTS:**

- 1      Study of TTL gates –AND,OR,NOT,NAND,NOR,EX-OR,EX-NOR
- 2      To realize the universal property of NAND gate
- 3      To realize the universal property of NOR gate
- 4      Design & realize a given function using K-maps and verify its performance.
- 5      To verify the operation of Multiplexer & De-multiplexer.
- 6      To verify the operation of Comparators.
- 7      To perform Half adder and Full adder
- 8      To perform Half Subtractor and Full subtractor.
- 9      To verify the truth table of S-R,J-K,T & D Type flip flop .
- 10     To verify the operation of bi-directional shift register.
- 11     To study analog to digital and digital to analog converter
- 12     To design & verify the operation of 3 bit synchronous counter.
- 13     To design & verify the operation of synchronous UP/DOWN decade counter using JK flip flop & derive a seven segment display using the same.
- 14     To design & verify the operation of asynchronous UP/DOWN decade counter using JK flip flop & derive a seven segment display using the same.
- 15     Design a 4- bit shift register ,verify its operation and verify the operation of a ring counter and a Johnson counter.

**NOTE:**

- 1      The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
- 2      The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.
- 3      Electronic gadgets including cellular phones are not allowed in the examination.

**EE202B NETWORK ANALYSIS-II**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-IV**

L T P Credits  
3 1 - 4

Class-work Marks : 25  
Exam Marks : 75  
Total Marks : 100  
Duration of Exam : 3 Hrs.

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**UNIT-I**

**TWO PORT NETWORKS:** Characteristics and Parameters of two port networks, Network Configurations, short circuit Admittance parameters, open-circuit impedance parameters, Transmission parameters, hybrid parameters, condition for reciprocity & symmetry of two-port networks in different parameters representations. Inter-relationships between parameters of two-port network sets, Expression of input & output impedances in terms of two port parameters, Inter-connection of two port networks, analysis of typical two-port networks, image impedances.

**UNIT-II**

**NETWORK FUNCTIONS & GRAPH THEORY:** Terminal pairs or Ports, Network functions for one-port and two-port networks, concept of poles and zeros in Network functions, Restrictions on pole and zero Locations for driving point functions and transfer functions, Time domain behavior from the pole-zero plot. Principles of network topology, graph matrices, network analysis using graph theory.

**UNIT-III**

**FILTERS:** Types of filters and their characteristics, Filter fundamentals, classification of Filter, Analysis & design of prototype high-pass, prototype low-pass, prototype band-pass, and prototype band-reject Filter, m-derived low-pass & high-pass filters, low-pass filter and high-pass filter with RC & RL circuits, Band pass filter with RLC circuit.

**UNIT-IV**

**NETWORK SYNTHESIS:** Hurwitz polynomials, Properties of Hurwitz polynomials, Positive real functions, procedure of testing of PR functions, concept and procedure of network synthesis, properties of expressions of driving point immittances of LC networks. LC Network synthesis: Foster's I & II Form, Cauer's I & II form, RC & RL Network synthesis, Foster's & Cauer's form of synthesis of lossy networks.

**TEXT BOOKS:**

1. Network Theory Analysis & Synthesis: Smarajit Ghosh; PHI.
2. Network Analysis & Synthesis: F.F.Kuo; John Wiley & Sons Inc.
3. *Circuit Theory*, A.Chakarbarti, Dhanpat Rai

**REFERENCE BOOKS:**

1. Introduction to modern Network Synthesis: Van Valkenburg; John Wiley
2. Network Analysis: Van Valkenburg; PHI
3. Basic circuit theory:Dasoer Kuh; McGraw Hill.
4. A Course in Electrical Circuit Analysis by Soni & Gupta; Dhanpat Rai Publication.
5. Circuit Analysis: G.K. Mithal; Khanna Publication.
6. Networks and Systems: D.Roy Choudhury; New Age International
7. Engineering Circuit Analysis; Hayat & Kemmerley TMH.
8. *Network Theory*, K.Channa Venkatesh D. Ganesh Rao, Pearson

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**EE204B                    ELECTRICAL MEASUREMENTS & MEASURING INSTRUMENTS**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-IV**

L   T   P   Credits  
3   1   -   4

Class-work Marks        : 25  
Exam Marks                : 75  
Total Marks                : 100  
Duration of Exam         : 3 Hrs.

**UNIT- I**

**Fundamentals of Electrical & Electronics measurements:** Standards, True Value, Errors (Gross, Systematic, Random); Static Characteristic of Instruments (Accuracy, Precision, Sensitivity, Resolution & threshold). Classification of Instruments (Absolute & Secondary Instruments; Indicating, Recording & Integrating instruments; Based upon Principle of operation), Generalized Instrument (Block diagram, description of blocks), Three forces in Electromechanical indicating instrument, Comparison between gravity & spring controls; Comparison of damping methods & their suitability, bearing supports, pivot-less supports (Simple & taut-band), Scale information.

**UNIT- II**

**MEASURING INSTRUMENTS:** Instrument cases (Covers). Construction, operating principle, Torque equation, Shape of scale, use as Ammeter or as Voltmeter (Extension of Range), Use on AC/ DC or both, Advantages & disadvantages, Errors (Both on AC/ DC) of PMMC types, Electrodynamical Type, Moving iron type (attraction, repulsion & combined types), Induction type.

**UNIT- III**

**WATTMETERS & ENERGY METERS:** Construction, operating principle, Torque equation, Shape of scale, Errors, Advantages & Disadvantages of Electrodynamical & Induction type Wattmeters; & single phase induction type Energy meter, Compensation & creep in energy meter.

**POWER FACTOR & FREQUENCY METERS:** Construction, operation, principle, Torque equation, Advantages & disadvantages of Single phase power factor meters (Electrodynamical & Moving Iron types) & Frequency meters (Electrical Resonance Type, Ferrodynamical & Electrodynamical types).

**UNIT- IV**

**LOW & HIGH RESISTANCE MEASUREMENTS:** Limitations of Wheatstone bridge; Kelvin's double bridge method, Difficulties in high resistance measurements, Measurement of high resistance by direct deflection, loss of charge method, Megohm bridge.

**A.C. BRIDGES:** General balance equation, Ckt. diagram, Phasor diagram, Advantages, disadvantages, applications of Maxwell's, inductance-capacitance, Hays, Owens, Schering & Wein's bridges, Shielding & earthing, Wagner's device.

**TEXT BOOK:**

1. A Course in Elect. & Electronic Measurement & Instrumentation by A. K. Sawhney; Khanna Pub.

**REFERENCE BOOKS:**

1. Electrical Measurements by E.W. Golding
2. Electronic & Elect. Measurement & Instrumentation by J.B. Gupta; Kataria & Sons.
3. Electronic Instrumentation & Measurement Technique, W.D. Cooper & A.D. Helfrick.
4. Measuring Systems by E.O. Doebelin; TMH.

**NOTE:**

3. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.
4. The students will be allowed to use non-programmable scientific calculator. However, sharing/ ex-change of calculator are prohibited in the examinations.

The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)



EE 212B      ELECTROMECHANICAL ENERGY CONVERSION  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), IC**  
**. SEMESTER-IV**

L T P Credits  
3 1 - 4

Class-work Marks : 25  
Exam Marks : 75  
Total Marks : 100  
Duration of Exam : 3 Hrs.

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**UNIT 1 Magnetic Circuits and Principles of Electromechanical Energy Conversion:**

Magnetic Circuits, static and dynamic emfs and force on current carrying conductor, AC operation of Magnetic Circuits, Hysteresis and Eddy current losses, Force and torque in magnetic field system, energy balance, energy and force in singly excited magnetic field system, concept of co-energy, forces and torques in system with permanent magnets, dynamic equation.

**Unit 2 Transformers:**

Single Phase Transformer: Principle, construction, E.M.F equation, operation of transformer, phasor diagram, Equivalent parameter determination, Equivalent circuit, voltage regulation, losses, efficiency, open-circuit test, short circuit test, Sumpner's test, auto-transformer, Three Phase Transformer: Principle, construction, connection, operation, advantages, various types of connection of three phase transformer.

**Unit 3 DC Machines:**

**D.C Generator:** Principal, Construction, E.M.F equation, types, characteristics, voltage buildup phenomenon in self excited generator, applications

**D.C Motor:** Principle, construction, torque equation, types, characteristics, starting and starters, speed control of DC motor.

**Unit 4 AC Machines:**

**Poly-phase Induction Motor:** Construction, double cage and deep bar motors, production of rotating magnetic field, Principal of operation, torque production, performance characteristics, speed control of induction motor, Introduction to single phase Induction motor, different types of single phase motors and their applications

**Synchronous Machines:**

Construction and basic theory of synchronous generator & motor, emf equation, Phasor diagram, Regulation, V-curve

**TEXT BOOKS:**

1. Electric Machines: I.J.Nagrath and D.P.Kothari, TMH, New Delhi.
2. Performance & Design of D.C. Machines: A.E. Clayton & N.N. Hancock; ELBS

**REFERENCE BOOKS:**

1. Electric Machinery, Fitzgerald & Kingsley, MGH.
2. Theory of alternating current machinery, A.S. Langsdorf, TMH.
3. Electrical Machines, P.S.Bhimbra, Khanna Publishers Delhi
4. *Electric Machinery and Transformers*, Irving Kosow, Pearson
5. *Electric Machinery and Transformers*, Bhag S.Guru, Huseyin R.Hiziroglu, Oxford

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**EE208B                      ELECTROMAGNETIC THEORY**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-IV**

L    T    P    Credits  
3    1    -        4

Class-work Marks        : 25  
Exam Marks                : 75  
Total Marks                : 100  
Duration of Exam         : 3 Hrs.

**UNIT-I**

**STATIC & STEADY FIELDS:** Coulomb's Law, Gauss's Law, potential function, field due to a continuous distribution of charge, equi-potential surfaces, Gauss's Theorem, Poisson's equation, Laplace's equation, method of electrical images, capacitance, electro-static energy, boundary conditions, the electro-static uniqueness theorem, far field of a charge distribution, Dirac-Delta representation for a point charge and an infinitesimal dipole. Faraday's law of Induction, Ampere's Work law in the differential vector form, Ampere's law for a current element, magnetic field due to volume distribution of current and the Dirac-delta function, Ampere's Force Law.

**UNIT-II**

**TIME VARYING FIELDS:** magnetic vector potential, vector potential (Alternative derivation), far field of a current distribution, equation of continuity, Equation of continuity for time varying fields, inconsistency of Ampere's law, Maxwell's field equations and their interpretation, solution for free space conditions, electromagnetic waves in a homogeneous medium, propagation of uniform plane-wave, relation between E & H in a uniform plane-wave, wave equations for conducting medium, Maxwell's equations using phasor notation, wave propagation in a conducting medium, conductors, dielectrics, wave propagation in good conductor and good dielectric, depth of penetration,.

**UNIT-III**

**POLARIZATION, REFLECTION AND REFRACTION OF E M WAVES:** Polarization,( linear, circular and elliptical), Reflection and refraction of plane waves at the surface of a perfect conductor & perfect dielectric (both normal incidence as well as oblique incidence), Brewster's angle and Total Marks internal reflection, reflection at the surfaces of a conductive medium, surface impedance.

**UNIT-IV**

**TRASMISSION LINE THEORY:** Transmission-line analogy, Poynting theorem, interpretation of  $E \times H$ , power loss in a plane conductor. Transmission line as a distributed circuit, transmission line equation, travelling & standing waves, characteristic impedance, input impedance of terminated line, reflection coefficient, VSWR, Smith's chart and its applications.

**TEXT BOOKS:**

1. Electro-magnetic Waves and Radiating System: Jordan & Balmain, PHI.
2. *Electromagnetics for Engineers*, Fawwaz T. Ulaby, Pearson
3. *Electromagnetic Field Theory and Transmission Lines*, G.S.N. Raju, Pearson

**REFERENCE BOOKS:**

1. Engineering Electromagnetics: Hayt; TMH
2. Electro-Magnetics: Krauss J.DF; Mc Graw Hill.
3. Electromagnetic Waves & Transmission Lines by R.S. Rao, PHI India.
4. Electromagnetics by Sudoko, Oxford Press.
5. *Classical Electromagnetism*, Jerrold Franklin, Pearson
6. *Elements of Engineering Electromagnetics*, Nannapaneni Naryana Rao, Pearson
7. *Field and Wave Electromagnetics*, David K.Cheng, Pearson
8. *Elements of Electromagnetic Fields*, P. S. Seth, Dhanpat Rai
9. *Engineering Electromagnetics*, W H Hayt, J A Buck, Mc Graw Hill

**NOTE:**

The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**EE210B CONTROL SYSTEMS ENGINEERING**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-IV**

L T P Credits  
3 1 - 4

Class-work Marks : 25  
Exam Marks : 75  
Total Marks : 100  
Duration of Exam : 3 Hrs.

**UNIT-I**

**A) INTRODUCTORY CONCEPTS:** System / Plant model, types of models, illustrative examples of plants & their inputs and outputs, controller, servomechanism, regulating system, linear time-invariant (LTI) system, time-varying system, causal system, open loop & closed loop control system & their illustrative examples, continuous time and sampled data control systems. Effects of feedback on sensitivity (to parameter variations), stability, external disturbance (noise), overall gain, etc. Introductory remarks about non-linear control systems.

**B) MATHEMATICAL MODELLING:** Concept of transfer function, relationship between transfer function and impulse response, order of a system, block diagram algebra, signal flow graphs: Mason's gain formula & its application, characteristic equation, derivation of transfer functions of electrical and electromechanical systems. Transfer functions of cascaded and non-loading cascaded elements.

**UNIT-II**

**TIME DOMAIN ANALYSIS:** Typical test signals, time response of first order systems to various standard inputs, time response of 2nd order system to step input, relationship between location of roots of characteristics equation,  $\omega$  and  $\omega_n$ , time domain specifications of a general and an under-damped 2nd order system, steady state error and error constants, dominant closed loop poles, concept of stability, pole-zero configuration and stability, necessary and sufficient conditions for stability, Hurwitz stability criterion, Routh stability criterion and relative stability.

**UNIT-III**

**ROOT LOCUS TECHNIQUE:** Root locus concept, development of root loci for various systems, stability considerations.

**FREQUENCY DOMAIN ANALYSIS:** Relationship between frequency response and time-response for 2nd order system, polar, Nyquist, Bode plots, stability, Gain-margin and Phase Margin, relative stability, frequency response specifications.

**UNIT-IV**

**COMPENSATION:** Necessity of compensation, compensation networks, application of lag and lead compensation, basic modes of feedback control, proportional, integral and derivative controllers, illustrative examples.

**CONTROL COMPONENTS:** Synchronos, servomotors, stepper motors, magnetic amplifier.

**TEXT BOOK:**

- a. Control System Engineering: I.J. Nagrath & M. Gopal; New Age Publishers.

**REFERENCE BOOKS:**

1. Automatic Control Systems: B.C. Kuo, PHI. Publishers.
2. Modern Control Engg: K. Ogata; PHI. Publishers.
3. Control Systems - Principles & Design: Madan Gopal; Tata Mc Graw Hill. Publishers.
4. Modern Control Engineering, R.C. Dorf & Bishop; Addison-Wesley Publishers.
5. Control Systems, R.C.Sukhla, Dhanpat Rai
6. Control Systems, Ashfaq Hussain, Haroon Ashfaq, Dhanpat Rai

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**EE222B      NETWORK ANALYSIS-II LAB**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-IV**

L   T   P   Credits  
-   -   2      1

Class-work Marks    : 20  
Exam Marks            : 30  
Total Marks            : 50  
Duration of Exam     : 2 Hrs.

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**LIST OF EXPERIMENTS:**

1. Transient response of RC circuit.
2. Transient response of RL circuit.
3. Transient Response of RLC Circuit
4. To calculate and verify "Z" parameters of a two port network.
5. To calculate and verify "Y" parameters of a two port network.
6. To determine equivalent parameter of parallel connections of two port network.
7. To plot the frequency response of low pass filter and determine half-power frequency.
8. To plot the frequency response of high pass filter and determine the half-power frequency.
9. To plot the frequency response of band-pass filter and determine the band-width.
10. To calculate and verify "ABCD" parameters of a two port network.
11. To calculate and verify "h" parameters of a two port network.
12. To determine equivalent parameter of series connections of two port network.
13. To synthesize a network of a given network function and verify its response.
14. Introduction of P-Spice.

**NOTE:**

1. The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.
3. Electronic gadgets including cellular phones are not allowed in the examination.

L	T	P	Credits
-	-	2	1

Class-work Marks	: 20
Exam Marks	: 30
Total Marks	: 50
Duration of Exam	: 2 Hrs.

**LIST OF EXPERIMENTS:**

1. To identify the meters from the given lot.
2. To convert & calibrate a D'Arsonval type galvanometer into a voltmeter & into an ammeter.
3. To calibrate an energy meter with the help of a standard wattmeter & a stop watch.
4. To measure power & p.f. by 3-ammeter method.
5. To measure power & p.f. by 3-voltmeter method.
6. To measure power & p.f. in 3-phase circuit by 2-wattmeter method.
7. To measure capacitance by De-Sauty's bridge.
8. To measure inductance by Maxwell's bridge.
9. To measure frequency by Wien's bridge.
10. To measure the power with the help of C.T. & P.T.
11. To measure magnitude & phase angle of a voltage by rectangular type potentiometer.
12. To measure magnitude & phase angle of a voltage by polar type potentiometer.
13. To measure low resistance by Kelvin's double bridge.
14. To measure high resistance by loss of charge method.

**NOTE:**

1. The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ ex-change of calculator are prohibited in the examinations.
3. Electronic gadgets including cellular phones are not allowed in the examination.

**EE 232B            ELECTROMECHANICAL ENERGY CONVERSION LAB**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), IC**  
**SEMESTER-IV**

L   T   P   Credits  
-   -   3       2

Class-work Marks        : 40  
Exam Marks                : 60  
Total Marks                : 100  
Duration of Exam         : 3 Hrs.

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**LIST OF EXPERIMENTS:**

1. To find turns ratio and polarity of a single phase transformer.
2. To perform open and short circuit tests on a single phase transformer.
3. To perform Sumpner's back to back test on single phase transformers.
4. Parallel operation of two single phase transformers.
5. Study of construction of a DC machine.
6. To plot O.C.C of a DC shunt generator and find its Critical Resistance.
7. To perform direct load test of a DC motor.
8. Speed control of a DC motor by armature control and field control methods.
9. To perform open circuit and block rotor tests of an induction motor.
10. Star-delta starting of a three phase induction motor.
11. Plot O.C.C of a synchronous generator.
12. To plot V-curve of a synchronous motor.

**NOTE:**

1. The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.
3. Electronic gadgets including cellular phones are not allowed in the examination.

**BOOKS:**

1. Experiments in basic Electrical Engineering – S.K.Bhattacharya & K.M.Rastogi (New Age International, Publishes).
2. Practicals in Electrical Engineering – N.K.Jain (Dhanpat Rai Publishing Company Pvt. Ltd.)

**EE230B CONTROL SYSTEMS ENGG. LAB**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-IV**

L T P Credits  
- - 2 1

Class-work Marks : 20  
Exam Marks : 30  
Total Marks : 50  
Duration of Exam : 2 Hrs.

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**LIST OF EXPERIMENTS:**

1. To study A.C. servo motor and to plot its torque-speed characteristics.
2. To study D.C. servo motor and to plot its torque speed characteristics.
3. To study the magnetic amplifier and to plot its load current v/s control current characteristics for:
  - (a) series connected mode
  - (b) parallel connected mode.
4. To plot the load current v/s control current characteristics for self excited mode of the magnetic amplifier.
5. To study the synchro & to:
  - (a) Use the synchro pair (synchro transmitter & control transformer) as an error detector.
  - (b) Plot stator voltage v/ s rotor angle for synchro transmitter i.e. to use the synchro transmitter as position transducer.
6. To use the synchro pair (synchro transmitter & synchro motor) as a torque transmitter.
7.
  - (a) To demonstrate simple motor-driven closed-loop position control system.
  - (b) To study and demonstrate simple closed-loop speed control system.
8. To study the lead, lag, lead-lag compensators and to draw their magnitude and phase plots.
9. To study a stepper motor & to execute microprocessor or computer-based control of the same by changing number of steps, direction of rotation & speed.
10. To implement a PID controller for level control of a pilot plant.
11. To implement a PID controller for temperature control of a pilot plant.
12. To study the MATLAB package for simulation of control system design.

**NOTE:**

1. The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ ex-change of calculator are prohibited in the examinations.
3. Electronic gadgets including cellular phones are not allowed in the examination.



<b>GPEEE 202B GENERAL PROFICIENCY &amp; ETHICS</b>						
<b>B. Tech. Semester – IV (Electrical &amp; Electronics Engineering)</b>						
<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>		<b>Examination</b>	<b>: 75Marks</b>
<b>1</b>	<b>--</b>	<b>--</b>	<b>2</b>		<b>Total</b>	<b>: 75 Marks</b>

The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/ her performance / achievements in different walks of life.

A Faculty Counselor will be attached to a group of students which will remain associated with him / her during the entire period of the degree program in the University. Each faculty member will serve as a faculty counselor. They will act like a local guardian for the students associated with him / her and will help them in terms of career guidance, personal difficulties.

**A. The student will present a written report before the committee with following in view:**

The student will present before the committee his/ her achievements during the current academic session in the form of a written report highlighting followings:

- |     |  |                   |
|-----|--|-------------------|
| I.  | Academic Performance   | -----             |
| II. | Extra Curricular Activities / Community Service, Hostel Activities | <b>(8 Marks)</b>  |
| III | Technical Activities / Industrial, Educational tour                | <b>(8 Marks)</b>  |
| IV  | Sports/games   | <b>(14 Marks)</b> |
| V   | Moral values & Ethics  | <b>(15 Marks)</b> |

**NOTE:** Report submitted by the students should be typed on both sides of the paper.

- C. A student will support his/ her achievement and verbal & communicative skill through presentation before the committee. **(30 Marks)**

**C. Moral values & Ethics**

Syllabus - Process for Value Education, self-evaluation concept and process.

A minor test will be conducted during the semester and It will be the duty of the concerned teacher assigned to teach Moral values & Ethics to submit the awards to respective chairman of the department / Director/Principal.

The evaluation of this course will be made by the following Committee.

**University Departments:**

- |   |                               |          |
|---|-------------------------------|----------|
| 1 | Chairperson of the Department | Chairman |
| 2 | Senior Most Faculty Counselor | Member   |
| 3 | Vice- Chancellor's Nominee    | Member   |

**Affiliated Colleges:**

- |   |   |          |
|---|---|----------|
| 1 | Director/Principal                                  | Chairman |
| 2 | Head of the Department/Sr. Faculty                  | Member   |
| 3 | External Examiner to be appointed by the University | Member   |

**Note:** Remuneration will be paid to the external examiner only (at par with the other practical examinations).

## B.TECH. SEMESTER-V

### CSE204B OBJECT ORIENTED PROGRAMMING USING C++ (OOPS) B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), ECE, IC, common with 4<sup>th</sup> sem CSE.

L	T	P	C
3	1	-	4

Class Work: 25  
Exam: 75  
Total: 100  
Duration of Exam: 3 Hrs.

#### Unit-I

Introduction to C++, C++ Standard Library, Basics of a Typical C++ Environment, Pre-processors Directives, Illustrative Simple C++ Programs. Header Files and Namespaces, library files.

**Object Oriented Concepts** : Introduction to Objects and Object Oriented Programming, Encapsulation (Information Hiding), Access Modifiers: Controlling access to a class, method, or variable (public, protected, private, package), Other Modifiers Polymorphism: Overloading,, Inheritance, Overriding Methods, Abstract Classes, Reusability, Class's Behaviors.

#### Unit-II

**Classes and Data Abstraction:** Introduction, Structure Definitions, Accessing Members of Structures, Class Scope and Accessing Class Members, Separating Interface from Implementation, Controlling Access Function And Utility Functions, Initializing Class Objects: Constructors, Using Default Arguments With Constructors, Using Destructors, Classes : Const(Constant) Object And Const Member Functions, Object as Member of Classes, Friend Function and Friend Classes, Using ThisPointer, Dynamic Memory Allocation with New and Delete, Static Class Members, Container Classes And Integrators, Proxy Classes, Function overloading.

**Operator Overloading:** Introduction, Fundamentals of Operator Overloading, Restrictions On Operators Overloading, Operator Functions as Class Members vs. as Friend Functions, Overloading, <<, >> Overloading Unary Operators, Overloading Binary Operators.

#### Unit-III

**Inheritance:** Introduction, Inheritance: Base Classes And Derived Classes, Protected Members, Casting Base- Class Pointers to Derived- Class Pointers, Using Member Functions, Overriding Base -Class Members in a Derived Class, Public, Protected and Private Inheritance, Using Constructors and Destructors in derived Classes, Implicit Derived - Class Object To Base- Class Object Conversion, Composition Vs. Inheritance.

**Virtual Functions and Polymorphism:** Introduction to Virtual Functions, Abstract Base Classes And Concrete Classes, Polymorphism, New Classes And Dynamic Binding, Virtual Destructors, Polymorphism, Dynamic Binding.

#### Unit-IV

**Files and I/O Streams:** Files and Streams, Creating a Sequential Access File, Reading Data From A Sequential Access File, Updating Sequential Access Files, Random Access Files, Creating A Random Access File, Writing Data Randomly To a Random Access File, Reading Data Sequentially from a Random Access File. Stream Input/ Output Classes and Objects, Stream Output, Stream Input, Unformatted I/ O (with read and write), Stream Manipulators, Stream Format States, Stream Error States.

**Templates & Exception Handling:** Function Templates, Overloading Template Functions, Class Template, Class Templates and Non-Type Parameters, Templates and Inheritance, Templates and Friends, Templates and Static Members. Introduction, Basics of C++ Exception Handling: Try Throw, Catch, Throwing an Exception, Catching an Exception, Rethrowing an Exception, Exception specifications, Processing Unexpected Exceptions, Stack Unwinding, Constructors, Destructors and Exception Handling, Exceptions and Inheritance.

#### Text Books:

- C++ How to Program by H M Deitel and P J Deitel, 1998, Prentice Hall
- Object Oriented Programming in Turbo C++ by Robert Lafore ,1994
- Programming with C++ By D Ravichandran, 2003, T.M.H

#### Reference Books:

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The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

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- Object oriented Programming with C++ by E Balagurusamy, 2001, Tata McGraw-Hill
- Computing Concepts with C++ Essentials by Horstmann, 2003, John Wiley,
- The Complete Reference in C++ By Herbert Schildt, 2002, TMH.

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**EE303B                      DIGITAL CONTROL SYSTEM**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-V**

L T P Credits  
3 1 - 4

Class-work Marks : 25  
Exam Marks : 75  
Total Marks : 100  
Duration of Exam : 3 Hrs.

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**UNIT- I**

**INTRODUCTION:**

Terminology: continuous time, discrete-time & digital signals; Basic structure of a computer-controlled system & brief description of its blocks; Computer-based Control trends.

**SIGNAL PROCESSING IN DIGITAL CONTROL:**

Advantages & problems of digital control, General principles of signal conversion: operation by A/ D & D/ A converters, A/ D and D/ A converter circuits; Unit sample sequence; Unit step sequence; Unit sinusoidal sequence; Time-domain models for discrete-time system (state variable models, Difference Equation models & Impulse response models).

**UNIT- II**

**TRANSFORM DOMAIN PROCESSING:**

Ideal sampler, Impulse modulation; Definition of Z-transform; The Z-transforms of typical functions such as Unit sample sequence, Unit step sequence, sampled ramp function, sampled exponential function, sampled sinusoids; Operations with Z transform such as shifting (forward & backward); Z-transform Inversion; Final value & Initial value theorems; Transfer function models; Unit delay Transfer function; Dynamic response; Stability in z-plane; Jury Stability test; Z-plane poles v/s stability (& the nature of response functions); The Hold operation, ZOH; Aliasing; Sampling theorem; Mapping s-plane to z-plane, mapping constant Zeta ( $\xi$ ) and  $\omega_n$  plots from s to z-plane; Bilinear transformation.

**UNIT- III**

**MODELS OF DIGITAL CONTROL DEVICES & SYSTEMS:**

Basic digital control scheme; z-domain description of sampled continuous-time plants, model of ADC & DAC, Interconnection of discrete-time & continuous time systems & their equivalent transfer functions; Implementation of digital controllers, Recursive realizations: direct, cascade & parallel realizations, Non-recursive realization; PID Controller: introduction to analog PID & its tuning through Ziegler-Nichols tuning methods (Process reaction curve and Ultimate Gain & Period methods); Digital PID controller: Positional & velocity forms; Tuning rules for digital PID.

**UNIT- IV**

**DESIGN OF DIGITAL CONTROL ALGORITHMS**

Basic structure of digital control system; Routes to the design of digital Controller, z-plane specifications of control system design: steady state accuracy, Steady state errors & error constants for type -0,-1,-2 systems, Transient accuracy, dominant poles, Effect of extra zero & pole on discrete time 2<sup>nd</sup> order system; Digital compensator design using frequency response plot; Digital compensation design using root locus plot.

**TEXT BOOKS:**

1. M. Gopal, "Digital Control Engg.", Pub: New Age International, New Delhi.
2. M. Gopal, "Digital Control & State Variable Methods (Conventional and Intelligent Control System)", Pub: Tata McGraw Hill Education Pvt. Ltd., New Delhi.

**REFERENCE BOOKS:**

1. B.C. Kuo, "Digital Control Systems"; OXFORD UNIVERSITY PRESS..
2. K. Ogata, "Discrete-time Control Systems"; Pub: Pearson Education, New Jersey.
3. Phillips, C.L. & H.T. Nagla, Jr., "Digital Control System Analysis", Pearson Education, New Jersey.
4. Hopis, C.H. and G.B. Lemont, "Digital Control System: Theory, Hardware & Software"; Pub: McGraw-Hill, New York.
5. Pulse and Digital Circuits : Venkata Rao K. Rama Sudha K. Manmadha Rao G. , Pearson

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

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The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

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**ECE311B      INTEGRATED ELECTRONICS**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-V**

L   T   P      Credits  
3   1   -      4

Class-work Marks      : 25  
Exam Marks             : 75  
Total Marks             : 100  
Duration of Exam       : 3 Hrs.

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**SECTION- I**

**UNIT 1 - TRANSISTOR ANALYSIS USING H-PARAMETER**

Introduction to hybrid model, h-parameters (CE, CB, CC configurations), analysis of a transistor amplifier circuits using h-parameters, hybrid P model at high frequencies.

**UNIT 2 - SINGLE AND MULTISTAGE AMPLIFIERS**

Classification of amplifiers, distortion in amplifiers, frequency response of an amplifier, step response of an amplifier, pass-band of cascaded stages, RC-coupled amplifier, low frequency response of RC coupled stage, effect of an emitter bypass capacitor on low Frequency response, multistage CE amplifier.

**SECTION- II**

**UNIT 3 - FEEDBACK AMPLIFIERS**

Feedback concept, transfer gain with feedback, general characteristics of negative feedback amplifiers, input resistance, output resistance, voltage series feedback, current series feedback, current shunt feedback, voltage shunt feedback.

**UNIT 4 - OSCILLATORS**

Sinusoidal oscillators, Barkhausen criteria, R-C phase shift oscillator, general form of oscillator circuit, wien-bridge oscillator, crystal oscillator.

**SECTION- III**

**UNIT 5 - POWER AMPLIFIERS:**

Class A, B, and C operations; Class A large signal amplifiers, higher order harmonic distortion, efficiency, transformer coupled power amplifier, class B amplifier : efficiency & distortion; class A and class B push-pull amplifiers; class C power amplifier.

**UNIT 6 - OPERATIONAL AMPLIFIERS:**

Ideal and practical operational amplifiers, inverting and non-inverting amplifier, differential amplifier, emitter coupled differential amplifier, transfer characteristics of a differential amplifier, offset error : voltage and current, common mode rejection ratio (CMRR) .

**SECTION- IV**

**UNIT 7 - LINEAR APPLICATIONS OF OPERATIONAL AMPLIFIERS:**

Scale changer, phase shifter, adder, voltage to current converter, current to voltage converter, DC voltage follower, Bridge amplifier, AC coupled amplifier, AC voltage follower, Integrator, differentiator.

**UNIT 8 NON-LINEAR APPLICATIONS OF OPERATIONAL AMPLIFIERS:**

Comparators, sample & hold circuits, Logarithmic amplifier, anti-log amplifier, logarithmic multiplier, waveform generators, Miller & Bootstrap sweep generators, regenerative comparator (Schmitt Trigger), multivibrators, ADC.

**TEXT BOOKS :**

1. Integrated Electronics: Milman Halkias, TMH.
2. Electronic circuit analysis and design (Second edition): D.A.Neamen; TMH

**REFERENCE BOOKS:**

1. Operational Amplifiers: Gaikwad
2. Microelectronic Circuits: Sedra & Smith.
3. Electronics Devices & Circuits: Boylestad & Nashelsky ; Pearson.

**NOTE:**

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The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

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- In the semester examination, the examiner will set 08 questions in all selecting two from each section. The candidates will be required to attempt five questions in all selecting at least one from each section. All questions will carry equal marks.

**EE305B      POWER SYSTEMS-I**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE**  
**SEMESTER-V**

L   T   P      Credits  
 3   1   -      4

Class-work Marks      : 25  
 Exam Marks              : 75  
 Total Marks              : 100  
 Duration of Exam        : 3 Hrs.

**UNIT-I**

**INTRODUCTION:** Structure of a power system, indoor and outdoor substations, equipment for substations, layout, auxiliary supply, Radial, ring mains and network distribution system, comparison of various types of ac and dc systems, Calculation of line parameters.

**UNIT-II**

**PERFORMANCE OF TRANSMISSION LINES:** models of short, medium and long transmission lines, circle diagram, Ferranti effect, proximity effect, capacity of synchronous condenser, voltage control, **MECHANICAL DESIGN:** Sag and stress calculations, effect of ice and wind, dampers.

**UNIT-III**

**INSULATORS & CABLES:** Types, insulating materials, voltage distribution over insulator string, equalizer ring. Types of LV and HV cables, grading of cables, capacitance, ratings.

**UNIT-IV**

**CORONA:** Phenomenon, critical voltage, power loss, reduction in losses, radio-interference, and HVDC transmission – types of links, advantages and limitations.

**TEXT BOOKS:**

- Power System Analysis- John J. Grainger, William D. Stevenson: McGraw-Hill
- Power System Engg: I.J.Nagrath and D.P.Kothari (TMH)
- A Course in Electrical Power: Gupta, Soni & Bhatnagar (Dhanpat Rai & Sons).
- Power Systems Analysis : Arthur R.Bergen Vijay Vittal, Pearson
- Basic Electrical Engineering : T.K.Nagsarka M.S.Sukjija, Oxford

**REFERENCE BOOKS:**

- Elements of power system analysis: W.D.Stevenson (MGH)
- Electric Power System: B.M.Weedy, John Wiley & Sons.
- Transmission & Distribution of Electrical Engineering: H.Cotton.
- Transmission & Distribution of Electrical Engineering: Westing House & Oxford Univ. Press, New Delhi.
- Electric Power: S.L.Uppal (Khanna Pub.)
- Electrical power: J.B.Gupta ( S.K.Kataria & Sons).
- Power System Engineering: B. R. Gupta.
- Electric Power Transmission and Distribution*, S.Sivanagaraju S.Satyanarayana, Pearson
- Electric Power Distribution and Transmission*, Luces M.Faulkenberry Walter Coffey, Pearson

**NOTE:**

- In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**EE307B            POWER ELECTRONICS CIRCUITS**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-V**

L    T    P       Credits  
3    1    -         4

Class-work Marks        : 25  
Exam Marks                : 75  
Total Marks                : 100  
Duration of Exam         : 3 Hrs.

**UNIT-I**

**Design Consideration:** Design of Snubber circuit, driver circuit, temperature control and heat sink for Power MOSFET, GTO and IGBT. Design of inductor, capacitor, LC and LCL filters.

**AC REGULATORS:** Types of regulator, equation of load current, calculation of extinction angle, output voltage equation, three phase regulator.

**UNIT-II**

**CHOPPERS:** Basic scheme, output voltage control techniques, one, two, and four quadrant choppers, step up chopper, voltage commutated chopper, current commutated chopper, MOSFET and IGBT based choppers.

**CONVERTERS:** Half and fully controlled converters, load voltage waveforms, output voltage equation, continuous and discontinuous modes of operation, input power factor of converter, reactive power demand, effect of source inductance, introduction to four quadrant / dual converter, power factor improvement techniques, forced commutated converter, MOSFET and IGBT based converters.

**UNIT-III**

**Modulation Techniques:** Pulse width modulation, Sinusoidal Pulse width modulation (SPWM), Spacevector modulation (SVM), Selective Harmonic Elimination PWM, Hysteresis modulation, and comparison among different PWM techniques.

**INVERTERS:** IGBT/ MOSFET based Half bridge and full bridge inverters, Basic circuits of Voltage source inverter, Current Source inverter, resonant inverter, Introduction to multilevel inverters.

**CYCLOCONVERTERS:** Basic principle of frequency conversion, types of cycloconverter, non-circulating and circulating types of cycloconverters.

**UNIT-IV**

**CONTROL DESIGN and SIMULATIONS:** control principles of power electronic circuits, d-q, p-q theories and their control applications, Feedback control and simulation of inverter/ converter and choppers using P and PI control. Phase lock loop control

**TEXT BOOKS:**

1. M. H. Rashid, "Power Electronics - Circuits, Devices and Applications", P.H.I Private Ltd. New Delhi, Second Edition, 1994
2. Power Electronics : PC Sen; TMH
3. Power Electronics: P.S Bhimra, Khanna Publication

**REFERENCE BOOKS:**

1. N. Mohan et.al. "Power Electronics- Converters, Applications and Design", John Wiley & Sons (Asia) Private Ltd., Singapore, 1996.
2. Bimal K Bose, "Modern Power Electronics and AC Drives" PHI
3. R W Erickson and D Makgimovic, "Fundamental of Power Electronics" Springer, 2nd Edition.
4. Thyristorised Power Controllers : GK Dubey, PHI
5. Semiconductor Devices and Circuits: Alope K.Dutta, Oxford
6. Power Electronics : V.R.Moorthi, Oxford 2-1

The Subjects and Syllabus with EE, EEE, IC, ECE, CSE codes recommended by the Board to FET (25/03/2013)

7. Power Electronic Systems Theory & Design : Jai P. Agrawal, Pearson

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.
  
2. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.



**EE309B                    MICROPROCESSOR (8085), INTERFACING & APPLICATIONS**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-V**

L   T   P   Credits  
3   1   -   4

Class-work Marks        : 25  
Exam Marks                : 75  
Total Marks                : 100  
Duration of Exam         : 3 Hrs.

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**UNIT-I**

Evolution of microprocessors, Introduction to 8085 microprocessor, Pin configuration and Internal Architecture of 8085, Instruction format, Concept of opcodes and operands, instruction set, Classification of instructions, addressing modes, programming examples based on data transfer, arithmetic and logical operations. Looping and branching etc.

**UNIT-II**

Introduction to instruction cycle, machine cycle and T-state, Instruction execution and Timing diagrams,. Stacks and subroutines, Interrupts of 8085, types of interrupts. Interrupt related instructions, Interrupt priority structure, Masking of interrupts, Programming examples based on subroutine concepts and interrupts.

**UNIT-III**

Peripheral devices and their interfacing, The interfacing with 8255 PPI chip, its Architecture, control word and operating modes, Introduction to DMA process & its controller chip 8257 and 8237, programmable interrupt controller 8259 and its operating modes, programmable interval timer 8253/8254 and its modes of operation.

**UNIT-IV**

Interfacing & applications of 8085 Microprocessor, Interfacing issues, Interfacing ADC & DAC, Interfacing memory, Microprocessor based voltage, current, frequency and power measurement schemes, Microprocessor based protective relays, stepper motors, LEDs, DC motors and traffic control.

**TEXT BOOKS:**

1. Ramesh S. Gaonkar, "Microprocessor Architecture, Programming & Applications with the 8085," Penram International Publishers.
2. Sunil Mathur, "Microprocessor 8085 and its Interfacing," PHI.
3. A.Nagoor Kani, "8085 microprocessor and its applications", TMH.

**REFERENCE BOOKS:**

1. B.Ram, "Fundamentals of Microprocessors & Microcomputers," Dhanpat Rai Publications, Delhi.
2. P.K.Ghosh and P.R.Sridhar, "0000 to 8085: Introduction to Microprocessors for Engineers and Scientists," PHI.
3. N. Senthil Kumar, M Saravanan and S. Jeevnathan, " Microprocessors and Microcontrollers," Oxford University Press.
4. Renu Singh and B.P.Singh, "Microprocessors: Interfacing and Applications," New Age International Publishers.

**NOTE:**

1. \*Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of ethics and sports is given in general proficiency syllabus.

**ECE331B      INTEGRATED ELECTRONICS LAB**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-V**

L   T   P      Credits  
-   -   2      1

Class-work Marks      : 20  
Exam Marks             : 30  
Total Marks             : 50  
Duration of Exam       : 2 Hrs.

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**LIST OF EXPERIMENTS:**

- 1      Design & measure the frequency response of an RC coupled amplifier using discrete components.
- 2      Design a two stage RC coupled amplifier and determine the effect of cascading on gain & bandwidth.
- 3      Study the effect of voltage series, current series, voltage shunt, and current shunt feed-back on amplifier using discrete components.
- 4      Design & realize inverting amplifier, non-inverting and buffer amplifier using 741 Op Amp.
- 5      Verify the operation of a differentiator circuit using 741 op amp and show that it acts as a high pass filter.
- 6      Verify the operation of an integrator circuit using 741 op amp and show that it acts as a low pass filter.
- 7      Design and verify the operations of op amp adder and subtractor circuits.
- 8      Plot frequency response of AC coupled amplifier using op amp 741 and study the effect of negative feedback on the bandwidth and gain of the amplifier.
- 9      Design & realize using op amp 741, Wein -bridge oscillator.
- 10     To design & realize using op amp 741, square wave generator.
- 11     To design & realize using op amp 741, logarithmic amplifier & VCCS.

**NOTE:**

4.      The students will be required to perform the 8 experiments/ exercises from the above list and any other experiments designed on the basis course
5.      The students will be allowed to use non-programmable scientific calculator. However, sharing/ ex-change of calculator are prohibited in the examinations.
6.      Electronic gadgets including cellular phones are not allowed in the examination.

**CSE224B C ++ PROGRAMMING LAB (OOPS Lab)**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), ECE, IC, common with 4<sup>th</sup> sem. CSE**  
**. SEMESTER-V**

L	T	P	C
-	-	2	2

Class Work: 20  
Exam: 30  
Total: 50  
Duration of Exam: 3 Hrs.

Q1. Raising a number  $n$  to a power  $p$  is the same as multiplying  $n$  by itself  $p$  times. Write a function called `power ( )` that takes a double value for  $n$  and an int value for  $p$ , and returns the result as double value. Use a default argument of 2 for  $p$ , so that if this argument is omitted, the number will be squared. Write a `main ( )` function that gets values from the user to test this function.

Q2. A point on the two dimensional plane can be represented by two numbers: an X coordinate and a Y coordinate. For example, (4,5) represents a point 4 units to the right of the origin along the X axis and 5 units up the Y axis. The sum of two points can be defined as a new point whose X coordinate is the sum of the X coordinates of the points and whose Y coordinate is the sum of their Y coordinates.

Write a program that uses a structure called `point` to model a point. Define three points, and have the user input values to two of them. Then set the third point equal to the sum of the other two, and display the value of the new point. Interaction with the program might look like this:

```
Enter coordinates for P1: 3 4
Enter coordinates for P2: 5 7
Coordinates of P1 + P2 are : 8, 11
```

Q 3. Create the equivalent of a four function calculator. The program should request the user to enter a number, an operator, and another number. It should then carry out the specified arithmetical operation: adding, subtracting, multiplying, or dividing the two numbers. (It should use a switch statement to select the operation). Finally it should display the result.

When it finishes the calculation, the program should ask if the user wants to do another calculation. The response can be 'Y' or 'N'. Some sample interaction with the program might look like this.

```
Enter first number, operator, second number: 10/ 3
Answer = 3.333333
Do another (Y/ N)? Y
Enter first number, operator, second number 12 + 100 , Answer = 112, Do another (Y/ N)? N
```

Q4. A phone number, such as (212) 767-8900, can be thought of as having three parts: the area code (212), the exchange (767) and the number (8900). Write a program that uses a structure to store these three parts of a phone number separately. Call the structure `phone`. Create two structure variables of type `phone`. Initialize one, and have the user input a number for the other one. Then display both numbers. The interchange might look like this:

```
Enter your area code, exchange, and number: 415 555 1212
My number is (212) 767-8900
Your number is (415) 555-1212
```

Q 5. Create two classes `DM` and `DB` which store the value of distances. `DM` stores distances in metres and centimeters and `DB` in feet and inches. Write a program that can read values for the class objects and add one object of `DM` with another object of `DB`. Use a friend function to carry out the addition operation. The object that stores the results may be a `DM` object or `DB` object, depending on the units in which the results are required. The display should be in the format of feet and inches or metres and centimetres depending on the object on display.

Q 6. Create a class `rational` which represents a numerical value by two double values- `NUMERATOR` & `DENOMINATOR`. Include the following public member Functions:

- constructor with no arguments (default).
  - constructor with two arguments.
  - void reduce() that reduces the rational number by eliminating the highest common factor between the numerator and denominator.
  - Overload + operator to add two rational number.
  - Overload >> operator to enable input through cin.
  - Overload << operator to enable output through cout.
- Write a main () to test all the functions in the class.

Q 7. Consider the following class definition

```
class father {
    protected : int age;
    public; father (int x) {age = x;} virtual void iam ()
{ cout << "I AM THE FATHER, my age is : "<< age<< endl;}
};
```

Derive the two classes son and daughter from the above class and for each, define iam () to write our similar but appropriate messages. You should also define suitable constructors for these classes.

Now, write a main () that creates objects of the three classes and then calls iam () for them.

Declare pointer to father. Successively, assign addresses of objects of the two derived classes to this pointer and in each case, call iam () through the pointer to demonstrate polymorphism in action.

Q 8. Write a program that creates a binary file by reading the data for the students from the terminal.

The data of each student consist of roll no., name ( a string of 30 or lesser no. of characters) and marks.

Q9. A hospital wants to create a database regarding its indoor patients. The information to store include

- Name of the patient
- Date of admission
- Disease
- Date of discharge

Create a structure to store the date (year, month and date as its members). Create a base class to store the above information. The member function should include functions to enter information and display a list of all the patients in the database. Create a derived class to store the age of the patients. List the information about all the to store the age of the patients. List the information about all the pediatric patients (less than twelve years in age).

Q 10. Make a class **Employee** with a name and salary. Make a class **Manager** inherit from **Employee**. Add an instance variable, named department, of type string. Supply a method to **toString** that prints the manager's name, department and salary. Make a class **Executive** inherit from **Manager**. Supply a method **to String** that prints the string "**Executive**" followed by the information stored in the **Manager** superclass object. Supply a test program that tests these classes and methods.

Q11. Imagine a tollbooth with a class called toll Booth. The two data items are a type unsigned int to hold the total number of cars, and a type double to hold the total amount of money collected. A constructor initializes both these to 0. A member function called payingCar() increments the car total and adds 0.50 to the cash total. Another function, called nopayCar(), increments the car total but adds nothing to the cash total. Finally, a member function called displays the two totals.

Include a program to test this class. This program should allow the user to push one key to count a paying car, and another to count a nonpaying car. Pushing the ESC key should cause the program to print out the total cars and total cash and then exit.

Q12. Write a function called `reversit()` that reverses a string (an array of char). Use a for loop that swaps the first and last characters, then the second and next to last characters and so on. The string should be passed to `reversit()` as an argument.

Write a program to exercise `reversit()`. The program should get a string from the user, call `reversit()`, and print out the result. Use an input method that allows embedded blanks. Test the program with Napoleon's famous phrase, "Able was I ere I saw Elba".

Q13. Create some objects of the `string` class, and put them in a Deque-some at the head of the Deque and some at the tail. Display the contents of the Deque using the `forEach()` function and a user written display function. Then search the Deque for a particular string, using the `firstThat()` function and display any strings that match. Finally remove all the items from the Deque using the `getLeft()` function and display each item. Notice the order in which the items are displayed: Using `getLeft()`, those inserted on the left (head) of the Deque are removed in "last in first out" order while those put on the right side are removed in "first in first out" order. The opposite would be true if `getRight()` were used.

Q 14. Create a base class called `shape`. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called `triangle` and `rectangle` from the base `shape`. Add to the base class, a member function `get_data()` to initialize base class data members and another member function `display_area()` to compute and display the area of figures. Make `display_area()` as a virtual function and redefine this function in the derived classes to suit their requirements. Using these three classes, design a program that will accept dimensions of a triangle or a rectangle interactively and display the area.

Remember the two values given as input will be treated as lengths of two sides in the case of rectangles and as base and height in the case of triangles and used as follows:

Area of rectangle =  $x * y$

Area of triangle =  $\frac{1}{2} * x * y$

**Note: At least 5 to 10 more exercises to be given by the Department**

**EE327B      POWER ELECTRONICS LAB**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-V**

L	T	P	Credits	Class-work Marks	: 20
-	-	2	1	Exam Marks	: 30
				Total Marks	: 50
				Duration of Exam	: 2 Hrs.

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**LIST OF EXPERIMENTS:**

1. Study & plot of characteristics of diode, thyristor and triac.
2. Study & plot of characteristics of transistor and MOSFET.
3. Study & experimentation of firing angle control of R and R-C firing circuits.
4. Study & firing angle control of UJT firing circuit.
5. Study & execution of complementary voltage commutation using a lamp flasher.
6. Study & execution of complementary voltage commutation using ring counter.
7. Study & experimentation of thyristorised d-c circuit breaker.
8. Study & execution of A.C. phase control.
9. Study & execution of full wave converter.
10. Study & execution of dc chopper.
11. Study & execution of series inverter.
12. Study & execution of bridge inverter.
13. Study & experimentation of single phase cycloconverter.

**NOTE:**

1. The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.
3. Electronic gadgets including cellular phones are not allowed in the examination.

**EE329B      MICROPROCESSOR (8085), INTERFACING & APPLICATIONS LAB**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-V**

L   T   P   Credits  
-   -   2   1

Class-work Marks    : 20  
Exam Marks            : 30  
Total Marks            : 50  
Duration of Exam      : 2 Hrs.

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**LIST OF EXPERIMENTS:**

1. To study the architecture of 8085 microprocessor & familiarization with its hardware, commands & operation of Microprocessor kit.
2. Write an assembly language program for (i) addition of two 8-bit numbers and(ii) addition of two 16-bit numbers.
3. Write a well-documented program for:
  - (i) subtraction of two 8-bit numbers
  - (ii) subtraction of two 16-bit numbers
5. (i) Write a well documented program for multiplication of two 8-bit numbers by repeated addition method. Also test for typical data.  
(ii) Write a well-documented program for multiplication of two 8-bit numbers by bit rotation method. Also test for typical data.
6. (i) Write a well-documented program for division of two 8-bit numbers by repeated subtraction method. Test for typical data.  
(ii) Write a well-documented program for dividing two 8-bit numbers by bit rotation method. Test for typical data.
7. (i) Write an assembly language program for finding largest number from an array.  
(ii) Write an assembly language program for finding smallest number from an array.
8. (i) Write a program for arranging an array of numbers in descending order.  
(ii) Write a program in 8085 for arranging an array of numbers in ascending order.
9. Write a program in 8085 for finding square of a number using Look-up table.
10. Write an Assembly Language program to control the operation of LEDs and switches using ports of 8255.
11. To measure an electrical quantity using microprocessor & 8255.
12. Write a program to interface a 2-digit number using seven-segment LEDs. Use 8085 microprocessor and 8255 PPI chip.
13. Write a program to control the operation of stepper motor using 8085 microprocessor & 8255 PPI chip.
14. To study the interfacing ADC with 8085.
15. To study the interfacing ADC with 8085.
16. To generate a square waveform of 10 kHz using 8253/8254.
17. To control the operation of DC motor using 8085.

**NOTE:**

1. The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.
3. Electronic gadgets including cellular phones are not allowed in the examination.



**EEE333B      PROFESSIONAL TRAINING – I**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**  
**Semester-V**

L T P  
- - 2

Class-work Marks : 50  
Total Marks : 50  
Credits : 2

At the end of 4<sup>th</sup> semester, each student would undergo four weeks Professional Training in an Industry / Institute / Professional Organization / Research Laboratory, Training Centre, etc. with the prior approval of the Training and Placement Officer of the University and submit to the department a typed report along with a certificate from the organization.

The typed report should be in a prescribed format.

The report will be evaluated in the 5<sup>th</sup> Semester by a Committee consisting of two to three teachers from different specializations to be constituted by the Chairperson of the department. The basis of evaluation will primarily be the knowledge and exposure of the student towards different processes and the functioning of the organization.

The student will interact with the committee through presentation to demonstrate his / her learning.

Teachers associated with evaluation work will each be assigned 2 periods per week load.

**EE302B                      POWER SYSTEMS – II**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE**  
**SEMESTER-VI**

L    T    P      Credits  
3    1    -        4

Class-work Marks        : 25  
Exam Marks                : 75  
Total Marks                : 100  
Duration of Exam         : 3 Hrs.

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**UNIT-I**

**FAULT ANALYSIS:** Transients on a transmission line, short circuit of synchronous machine at no load and on full load, Symmetrical component transformation, phase shift in star-delta transformation, sequence impedances, Single line to ground fault, line to line fault, double line to ground fault, open conductor fault.

**UNIT-II**

**CIRCUIT BREAKERS:** Theory of arc initiation and interruption, restriking voltage transients, current chopping, circuit breaker ratings, duties of switch gear, automatic switch, air circuit breaker, bulk oil, minimum oil, air blast, SF<sub>6</sub> CB, vacuum and DC circuit breakers, Testing of Circuit breaker.

**UNIT-III**

**PROTECTIVE RELAYS & APPLICATION:** Essential qualities of relay, relay classification, principal types of electromagnetic relays, i.e. attracted armature, induction disc, induction cup types, Over-current, instantaneous over-current, IDMT, directional and differential relays, distance relays, plain impedance, mho, reactance relays, zone of protection, primary and backup protections, transmission line & feeder protection, pilot wire and carrier current protection, Transformer, generator, motor and bus zone protection.

**UNIT-IV**

**STATIC & DIGITAL RELAYS:** Classification of static relays, amplitude and phase comparators, block-spike and block-average comparators, rectifier type relays. Introduction to digital relay: basic principles. Application of microprocessors and computers - recent Trends. Travelling wave relay, relaying schemes based on microwave and optical fiber link.

**TEXT BOOKS:**

1. Power System Analysis- John J. Grainger, William D. Stevenson: McGraw-Hill
2. Power System protection and switchgear –B.Ram, D.N.Vishvakarma : TMH.
3. Switchgear and protection - S.S.Rao : Khanna Pub.

**REF. BOOKS:**

1. Protective Relays -Their Theory and Practice Vol.I & II: W.Van Warrington.
2. Electric Power Systems- B. M. Weedy, B. J. Cory: John Wiley& Sons.
3. Advanced power system analysis and dynamics: L.P.Singh, Wiley Eastern N.Delhi.
4. Power System Engg: I.J. Nagrath and D.P. Kothari(TMh).
5. Digital Protection: Protective relay from Electro Mechanical to Microprocessor-L.P.Singh,Wiley Eastern.
6. Power System Protection and Switchgear -B.Ravinder Nath and M.Chander, Wiley Eastern,N.Delhi.
7. A course in Electrical Power - Soni, Gupta and Bhatnagar - Dhanpat Rai & Sons.
8. *Modern Power System Analysis*, DP Kothari, I.J.Nagrath, Mc Graw Hill

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**ECE302B**

**MICROWAVE AND RADAR ENGINEERING**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**  
**B. Tech Semester –VI**

L T P Credits  
3 1 - 4

Class Work : 25Marks  
Theory : 75Marks  
Total : 100Marks  
Duration of Exam. : 3 Hrs.

**UNIT I**

**INTRODUCTION TO MICROWAVES:**

Characteristic features- advantages and applications, Waveguides- Basic concepts and properties, Comparison of Waveguide with transmission lines, Propagation in TE & TM mode, Rectangular waveguide, TEM mode in rectangular waveguide, Introduction to circular waveguides and planar transmission lines.

**MICROWAVE COMPONENTS:**

Directional Couplers, Tees, Hybrid Ring, Attenuators, Cavity resonators, Mixers & detectors, Matched load, Phase shifter, Isolators, Circulators.

**UNIT II**

**MICROWAVE TUBES:**

Limitations of conventional tubes, Construction, operation , properties and applications of Klystron amplifier, Reflex Klystron, Magnetron, TWT, BWO, Crossed field amplifiers.

**MICROWAVE SOLID STATE DEVICES:**

Principle of operation and applications of Varactor diode, Tunnel diode, Schottky diode, GUNN diode, IMPATT, TRAPATT and PIN diodes. MASER, Parametric amplifiers.

**UNIT III**

**MICROWAVE MEASUREMENTS:**

Measurement of Frequency, Power, VSWR, Wavelength & Impedance.

**RADAR FUNDAMENTALS:**

Introduction, RADAR principles, development, frequencies, block diagram and operation and applications.

**UNIT IV**

**RADAR EQUATION:**

Simple form of RADAR equation, Prediction of Range Performance, Minimum detectable signal, Pulse repetition frequency & range ambiguities, system losses, propagation effects.

**RADAR SYSTEMS:**

Block Diagram and operation of CW , Frequency Modulated RADAR, MTI & Pulsed Doppler RADAR, The Doppler effect, blind speed, Applications.

**Text Books :**

1. Foundations for Microwave Engineering: R.E.Collin, MGH
2. Introduction to Radar Systems: Merrill I. Skolnik, MGH

**Reference Books:**

1. Radar Principles, Technology, Applications: Byron Edde, Pearson Education
2. Microwave Devices and Circuit: Samuel Liao, PHI.
3. Elements of Microwave Engineering : R.Chatterjee, EWP

**NOTE:**

In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.

**EE306B          ADVANCED MICROPROCESSOR & MICROCONTROLLER**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-VI**

L   T   P   Credits  
3   1   -   4

Class-work Marks        : 25  
Exam Marks                : 75  
Total Marks                : 100  
Duration of Exam         : 3 Hrs.

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**UNIT-I**

Introduction to 8086 microprocessor, RISC and SISC processors, architecture and pin diagram of 8086 and description of various signals. Register organization of 8086; Description of address computations & memory segmentation; Segment override, Instruction pipelining, Timing diagrams, Addressing modes.

**UNIT-II**

Instruction set of 8086, Instruction execution timing, Instruction format, Data transfer instructions, Arithmetic instructions, Branch instructions, Loop instructions, NOP & HLT instructions, Flag manipulation instructions, Logical instructions, Shift & Rotate instructions, Directives & operators, Interrupts of 8086, Assembly language Programs using 8086.

**UNIT-III**

The concept of microcontroller, comparison between Microcontrollers & Microprocessors. Architecture and Pin diagram of 8051 microcontroller, Memory organization. Special function registers. External memory, Reset operation. Instruction Set, Addressing modes, arithmetic, Logical. Data transfer. Boolean variable manipulation, program branching instructions etc. Programs based on various instructions.

**UNIT-IV**

Timer operation, Timer Mode register, Timer Control register. Timer modes & overflow flag, Starting, Stopping & controlling the timers. Programs for generating square waves of various frequencies. Serial port operation, UART, Serial port control register, Modes of serial port operation. Serial port baud rate. . Initialization & programming of serial port. Interrupts of 8051, SFRs related to interrupts, processing interrupts, program design using interrupts. Interfacing with LED, DC motors, stepper motors.

**TEXT BOOKS:**

1. M.A.Mazidi, J.G.Mazidi, and R.D.Mckinlay, "The 8051 Microcontroller and embedded systems," Pearson.
2. Yu-Chang Liu & Glenn A Gibson, "Microcomputer Systems: The 8086/8088 Family: Architecture, Programming & Design," PHI.
3. Badri Ram, "Advanced Microprocessors and Interfacing," Tata McGraw Hill.
4. Subrata Ghoshal, "8051 Microcontroller," Pearson.
5. Microprocessors and Microcontrollers : N.Senthil Kumar M.Saravanan S.Jeevananthan, Oxford university press.
6. MicroProcessor Comprehensive Studies : Naresh Grover, Dhanpat Rai

**REFERENCE BOOKS:**

1. Brey and Sharma, "The Intel Microprocessors: Architecture, Programming & Interfacing," Pearson
2. D.V. Hall, "Microprocessors and Interfacing: Programming & Hardware," TMH.
3. Kenneth J. Ayala, "The 8051 Microcontroller: Architecture, programming & Applications", Penram International Publishers.
4. Myke Predko, "Programming and Customizing the 8051 Microcontroller," Tata McGraw Hill.
5. Daniel Tabak, "Advanced Microprocessors," Tata McGraw Hill.
6. Uffenbeck, "8086/8088 Family: The Design, Programming and Interfacing," PHI.
7. I Scott Mackenzie and Raphael C. W. Phan, "The 8051 Microcontroller," Pearson
8. Ajoy Kumar Ray and K. M. Bhurchandi, "Advanced Microprocessors and Peripherals," TMH.
9. Microprocessors & Microcontrollers : Soumitra Kumar Mandal, Mc Graw Hill
10. Advanced Microprocessors and Peripherals : A.K.Rai, K.M.Bhurchandi, Mc Graw Hill
11. A.Nagoor Kani, "8086 microprocessor and its applications", TMH

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**ECE314B      COMMUNICATION SYSTEMS & TECHNOLOGY**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-VI**

L   T   P   Credits  
3   1   -   4

Class-work Marks      : 25  
Exam Marks             : 75  
Total Marks             : 100  
Duration of Exam       : 3 Hrs.

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**SECTION-I**

**UNIT 1- INTRODUCTION TO COMMUNICATION SYSTEM:**

Modulation, Demodulation, Radio Frequency Spectrum, Signals & their classification, Limitations & Advantages of a Communication System, Comparison of Analog & Digital Communication Systems, Historical Perspective, Modes & Medias of Communication

**UNIT 2- NOISE:**Sources of Noise, External & Internal Noise, Noise Calculations, Noise Figure, Noise Figure Calculation, Noise Temperature, Noise in Communication Systems, Band Pass Noise Model, Cascaded States & its Noise Figure Calculation, Signal in presence of Noise, Pre-Emphasis & De-Emphasis, Noise Quieting Effect, Capture Effect, Noise in Modulation Systems.

**SECTION-II**

**UNIT 3- LINEAR MODULATION:**

(AM) Basic definition & derivation for Modulation & Modulation Index, Modulation & Demodulation of AM, Suppressed Carrier Modulation, Quadrature Amplitude Modulation, SSB-SC, DSB-SC, VSB Modulation & Demodulation, Comparison of various AM Systems, Generation of AM waves.

**UNIT 4 - ANGLE MODULATION:**

Basic definition & derivation for Modulation & Modulation Index, Generation of FM waves, Comparison between PM & FM, Frequency Spectrum of FM, B.W. & required spectra, Types of FM, vector representation of FM, Universal Curve, Multiple FM, Demodulation of FM waves, Demodulation of PM waves, Comparison between AM & FM.

**SECTION-III**

**UNIT 5 - PULSE ANALOG MODULATION:**

Sampling theory, TDM, FDM, PAM, PWM, PPM, Modulation & Demodulation techniques of above all.

**UNIT 6- PULSE DIGITAL MODULATION:**

Elements of Pulse Code Modulation, Noise in PCM Systems, Bandwidth of PCM Systems, Measure of Information, Channel Capacity, Channel Capacity of PCM System, Differential Pulse Code Modulation (DPCM). Delta Modulation (DM), Digital Modulation-ASK, FSK, PSK, DPSK

**SECTION-IV**

**UNIT 7 Microwave communications:** Transmit & receive antennas, link budget, line of sight systems, Satellite-link-GT ratio of earth stations, VSATS & GPSS.

**UNIT 8 OPTICAL COMMUNICATION SYSTEMS:**Types of optical fibres - step, index & graded index, multi mode & single mode, attenuation & dispersion in fibres, Optical transmitters LEDs & laser Diode, Optical Receivers-PIN & APDS, optical fiber link.

**REFERENCE BOOKS:**

- |                                     |                                      |
|-------------------------------------|--------------------------------------|
| 1. Communication Systems,           | By Manoj Duhan – I. K. International |
| 2. Electronic Communication Systems | By Kennedy – TMH                     |
| 3. Communication Systems,           | By Singh & Sapre - TMH               |
| 4. Electronic Communication,        | By Roody Coolen – Pearson            |
| 5. .Analog Communication,           | By P. Chakarbarti – DR & Co.         |
| 6. Communication Systems,           | By Simon Haykins – Wiley             |

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each section. The candidates will be required to attempt five questions in all selecting at least one from each section. All questions will carry equal marks.



**EE308B                      ELECTRIC POWER GENERATION**

**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC  
SEMESTER-VI**

L   T   P   Credits  
3   1   -   4

Class-work Marks        : 25  
Exam Marks                : 75  
Total Marks                : 100  
Duration of Exam         : 3 Hrs.

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**UNIT-I**

**INTRODUCTION:** Energy sources, their availability, Recent trends in Power Generation, Interconnected Generation of Power Plants, Load forecasting, load curves, load duration curve, Base load and Peak load Power Plants, connected Load, maximum demand, demand factor, Group diversity factor, load factor, significance of load factor, plant factor, capacity factor, selection of unit size, No. of Units, reserves, cost of power generation, Depreciation, tariff

**UNIT-II**

**CONVENTIONAL ENERGY SOURCES-I:** Selection of site, capacity calculations, classification, advantages, disadvantages, Schematic diagram and working of Thermal Power Stations & Nuclear Power Plant

**UNIT-III**

**CONVENTIONAL ENERGY SOURCES-II:** Selection of site, capacity calculations, classification, advantages, disadvantages, Schematic diagram and working of Hydro Electric Plant and Diesel Power Stations.

**UNIT-IV**

**NON-CONVENTIONAL ENERGY SOURCES:** Wind, Solar, Tidal, Ocean, and Geothermal sources of Energy, fuel cell, Magneto Hydro Dynamic (MHD) system.

**TEXT BOOKS:**

1. Electric Power Generation, B.R.Gupta
2. Power Generation, Operation and Control, Wood and Wollenberg, John Wiley & Sons,1984.
- 3.

**REFERENCE BOOKS:**

1. A Course in Electric Power System, Soni, Gupta, Bhatnagar, Dhanpat Rai & Sons
2. Power System Engineering, Nagrath & Kothari, Tata Mc-Graw Hill, New Delhi
3. Power Plant Engg: G.D. Rai
4. Electric Power: S.L. Uppal (Khanna Publishing)
5. *Electric Power Distribution and Transmission*, Luces M.Faulkenberry Walter Coffey, Pearson
6. *Generation and Utilization of Electrical Energy*, S.Sivanagaraju M.Balasubba Reddy D.Srilatha, Pearson

**NOTE:**

In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**EE310B          EMBEDDED SYSTEMS & APPLICATIONS**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-VI**

L   T   P   Credits  
3   1   -   4

Class-work Marks        : 25  
Exam Marks                : 75  
Total Marks                : 100  
Duration of Exam         : 3 Hrs.

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**UNIT-I**

**INTRODUCTION:** Different types of microcontrollers: Embedded microcontrollers, External memory microcontrollers; Processor Architectures: Harvard V/ S Princeton, CISC V/ S RISC; microcontrollers memory types; microcontrollers features: clocking, i/ o pins, interrupts, timers, peripherals. Introduction to PIC microcontrollers, Architecture and pipelining, program memory considerations,

**UNIT-II**

**INTERRUPTS AND I/O PORTS:** Addressing modes, CPU registers, Instruction set, simple operations, Interrupt logic, Timer 2 scalar initialization, IntService Interrupt service routine, loop time subroutine, External interrupts and timers, Synchronous serial port module, Serial peripheral device, O/ p port Expansion, I/p port expansion, UART.

**UNIT-III**

**SOFTWARE:** Development tools/ environments, Assembly language programming style, Interpreters, High level languages, Intel hex format object files, Debugging. Arithmetic operations, Bit addressing, Loop control, Stack operation, Subroutines, RAM direct addressing, state machines, Oscillators, Timer Interrupts, Memory mapped I/O.

**UNIT-IV**

**INTERFACING WITH 8051:** Interfacing an LCD to the 8051, 8051 interfacing to ADC, Sensors, Interfacing a Stepper Motor, 8051 interfacing to the keyboard, Interfacing a DAC to the 8051, 8255 Interfacing with 8031/51, 8051/31 interfacing to external memory

**DESIGNING USING MICROCONTROLLERS:** Music box, Mouse wheel turning, PWM motor control, Aircraft Demonstration, ultra sonic distance measuring, Temperature Sensor, Pressure Sensor, Magnetic field Sensor.

**TEXT BOOK:**

1. Design with PIC Microcontrollers by John B. Peatman, Pearson.
2. Application-Specific Integrated Circuits : Michael John Sebastian Smith, pearson

**REFERENCE BOOKS:**

1. Programming and Customizing the 8051 Microcontroller: Predko; TMH.
2. Designing Embedded Hardware: John Catsoulis; Shroff Pub. & Distr. ND.
3. Programming Embedded Systems in C and C++: Michael Barr; Shroff Pub. & Distr. ND.

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**EE322B      POWER SYSTEMS LAB**

**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC  
SEMESTER-VI**

L	T	P	Credits	Class-work Marks	: 20
-	-	2	1	Exam Marks	: 30
				Total Marks	: 50
				Duration of Exam	: 2 Hrs.

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**LIST OF EXPERIMENTS:**

1. To draw the operating characteristics of IDMT over current relay.
2. To draw the operating characteristics of IDMT under Voltage relay.
3. To draw the operating characteristics of IDMT over Voltage relay.
4. To draw the operating characteristics of Differential current relay.
5. To draw the operating characteristics of negative sequence relay.
6. To study 33KV substation.
7. Single line diagram of electrical power flow of campus.
8. To study and designing of Earthing / Grounding.
9. Study the burden effect on the performance of CT and measure ratio error.
10. Find out the sequence components of currents in three 1-Phase transformers and 3-Phase transformer and compare their results.
11. (i) Study over current relay.  
(ii) Draw the current-time characteristic of an over current relay for  
TMS=1 & 0.5 and PSM=1.25 & 1.0.
12. (i) Study percentage bias differential relay.  
(ii) Plot the characteristics of a percentage bias differential relay  
for 20%, 30% and 40% biasing.
13. To perform gas actuated Buchholz relay.
14. Design and simulation of HV transmission line .
15. Study filtration and Treatment of transformer oil.
16. Determine dielectric strength of transformer oil.

**NOTE:**

1. The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.
3. Electronic gadgets including cellular phones are not allowed in the examination.

**ECE332B      COMMUNICATION SYSTEMS & TECHNOLOGY LAB**

L   T   P   Credits  
-   -   2   1

Class-work Marks    : 20  
Exam Marks            : 30  
Total Marks            : 50  
Duration of Exam      : 2 Hrs.

---

**LIST OF EXPERIMENTS:**

1. To study and analyze various waveform of Digital modulation.
2. To study different types of Filters.
3. To study Amplitude Shift Keying (ASK) modulation.
4. To study Frequency Shift Keying (FSK) modulation.
5. To study Phase Shift Keying (PSK) modulation.
6. To study Time Division Multiplexing (TDM).
7. To study Frequency Division Multiplexing (FDM).
8. To study Binary Phase Shift Keying (BPSK) modulation.
9. To study Phase Locked Loop (PLL).
10. To study Pulse amplitude modulation and demodulation.
11. To study Pulse width Modulation(PWM).
12. To study Pulse Position Modulation(PPM)
13. To deliver seminar by each student on advance communication system

**Note:-**

1. The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.
3. Electronic gadgets including cellular phones are not allowed in the examination.

**ECE322B**

**MICROWAVE AND RADAR ENGINEERING LAB**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**  
Semester –VI

L T P Credits  
- - 2 1

Class Work : 20Marks  
Practical : 30Marks  
Total : 50Marks  
Duration of Exam. : 3 Hrs.

**LIST OF EXPERIMENTS:**

- 1 To study of Wave guide Components.
- 2 Generation of Microwave Power & Basic set-up.
- 3 To Study the characteristic of reflex klystron.
- 4 To measure frequency of Microwave source and demonstrate relationship among frequency, free space wavelength and guide wave length.
- 5 To measure VSWR of an unknown load.
- 6 To measure large standing wave ratio of a unmatched load.
- 7 To match impedance for maximum power transfer using slide screw tuner.
- 8 To measure VSWR, insertion loss and attenuation of a fixed and variable attenuator.
- 9 To measure coupling factor and directivity of Directional coupler.
- 10 To determine the insertion loss, isolation of three port circulator
- 11 To determine the insertion loss, isolation of a isolator.
- 12 To study the characteristics of Gunn Diode.

**NOTE:**

1. The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.
3. Electronic gadgets including cellular phones are not allowed in the examination.

**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC  
SEMESTER-VI**

L T P Credits  
- - 2 1

Class-work Marks : 20  
Exam Marks : 30  
Total Marks : 50  
Duration of Exam : 2 Hrs.

**LIST OF EXPERIMENTS:****(A) 8086 Microprocessor:**

1. Write a well-documented program for copying 12 bytes from source to destination, on 8086 microprocessor kit.
2. Write a program for 8086 for division of a defined double word (stored in a data segment) by another double word and verify.
3. Write a well-documented program for finding the square root of a given number, on 8086, microprocessor kit.
4. Write a program using 8086 for finding the square of a given number and verify.
5. Write a program using 8086 and verify for:
  - (i) Finding the largest number from an array.
  - (ii) Finding the smallest number from an array.
6. (i) Write a program using 8086 for arranging an array of numbers in descending order and verify.  
(ii) Write a program using 8086 for arranging an array of numbers in ascending order and verify.
7. Write a program for 8086 for finding square of a number using look-up table and verify.
8. Write a program to control the operation of stepper motor using 8086 microprocessor and 8255 chip.
9. Write a program using 8086 to add a series of 16-bit numbers.

**(B) 8051 Microcontroller:**

10. To study the architecture of 8051 microcontroller.
11. Write a program in 8051 to add and subtract two 8 bit numbers.
12. Write an ALP to generate square wave of 10 kHz frequency using timer of 8051 microcontroller.
13. To find average of Ten 8-bit numbers.
14. Write an ALP to interface LED and switches with 8051 microcontroller.
15. Write a program to find (i) largest number and (ii) smallest number from an array using 8051 microcontroller.
16. Write a program to generate square wave of 50 Hz frequency using timer of 8051 microcontroller.
17. To control the operation of DC motor using 8051 microcontroller.
18. To interface LCD with 8051 microcontroller.
19. To control the operation of stepper motor using 8051 microcontroller.

**NOTE:**

1. The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.
3. Electronic gadgets including cellular phones are not allowed in the examination.

## REPORT WRITING SKILLS

HUM- 302 B

B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)

B. Tech. Semester – VI (Common for all branches)

L	T	P	Credits
1	-	-	1

**Internal Marks: 25**

**External Marks: 50**

**Total: 75 Marks**

**Duration of Examination: 2 Hours**

### OBJECTIVE

The course aims at developing competence for report writing with a focus on its complex writing techniques and procedures.

### COURSE CONTENT

#### UNIT I

##### Report Writing

Reports: meaning, their importance and types, Structure of reports, Formats of reports, Use of illustrations

#### UNIT II

##### Writing of Business and Technical Reports:

Preliminary steps and procedure of writing report, writing various types of reports on technical, business related topics

### RECOMMENDED READING

- Borowick, Jerome. N. *Technical Communication and its Applications*. New Delhi: PHI, 2000
- Guffey, Mary Ellen. *Business Communication: Process & Product*. USA: South western College Publishing, 2000.
- Kumar, Sanjay and Pushp Lata. *Communication Skills*. Delhi: OUP, 2011

### SCHEME OF END SEMESTER EXAMINATION (MAJOR TEST) AND INSTRUCTIONS FOR THE EXAMINER

- The duration of the exam will be 2 hours.
- The Question Paper for this theory course shall have three questions in all covering both the units. All will be compulsory with internal choice.
- Question no. 1 will be of 10 marks. The question may have two/three parts with enough internal choice, covering various components of both the Units.
- Question no 2 with internal choice will be of 10 marks covering contents of the Unit I. It will be theoretical in nature.
- Question no 3 will have two parts of 15 marks each. The student will be asked to write reports on business and technical subject/ issue covering contents of Unit II.



The emphasis would be on testing the actual report writing on a given business and technical situation/ subject in letter format.

**Oral Presentation Skills**  
**HUM- 304 B**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**  
**B. Tech. Semester – VI (Common for all branches)**

L	T	P	Credits
-	-	2	1

**Internal Marks: 20**  
**External Marks: 30**  
**Total: 50 Marks**  
**Duration of Examination: 2 Hours**

**OBJECTIVE**

To enable students to develop their speaking skills with professional proficiency

**COURSE CONTENT**

**Oral Presentations:**

Group Discussion; Mock interviews

**Note for the Teacher:**

The teacher concerned, by devising her/his method, must preview and review the student's spoken proficiency at the beginning and end of the semester respectively to find the efficacy of the course and degree of improvement in the student.

**RECOMMENDED READING**

- a. Konar, Nira. *English Language Laboratories: A Comprehensive Manual*. Delhi: PHI, 2011
- b. Kumar, Sanjay and Pushp Lata. *Communication Skills*. Delhi: OUP, 2011

**SCHEME OF END SEMESTER EXAMINATION (Practical)**

An external Practical exam of 25 marks of 2 hour duration for the course will be conducted by an external examiner appointed by the university's Controller of Exams.

**NOTE: Students will be tested for their oral communication competence making them participate in Group discussion, mock situations for interview. Students may also be evaluated through a viva conducted by an external examiner.**

GPEEE 302B GENERAL PROFICIENCY & ETHICS						
B. Tech. Semester – VI (Electrical & Electronics Engineering)						
L	T	P	Credits		Examination	: 75Marks
1	--	--	2		Total	: 75 Marks

The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/ her performance / achievements in different walks of life.

A Faculty Counselor will be attached to a group of students which will remain associated with him / her during the entire period of the degree program in the University. Each faculty member will serve as a faculty counselor. They will act like a local guardian for the students associated with him / her and will help them in terms of career guidance, personal difficulties.

**B. The student will present a written report before the committee with following in view:**

The student will present before the committee his/ her achievements during the current academic session in the form of a written report highlighting followings:

- |     |  |            |
|-----|--|------------|
| I.  | Academic Performance   | -----      |
| II. | Extra Curricular Activities / Community Service, Hostel Activities | (8 Marks)  |
| III | Technical Activities / Industrial, Educational tour                | (8 Marks)  |
| IV  | Sports/games   | (14 Marks) |
| V   | Moral values & Ethics  | (15 Marks) |

**NOTE:** Report submitted by the students should be typed on both sides of the paper.

- D.** A student will support his/ her achievement and verbal & communicative skill through presentation before the committee. **(30 Marks)**

**C. Moral values & Ethics**

Syllabus - A few topics from the below mentioned books

1. R.R.Gaur, R. Sangal and G.P. Bagaria, “ Bagaria, “ A foundation course in Human Values and Professional Ethics”, Pub: Excel Books, New Delhi-110028.
2. M. Govindrajan, S Natrajan & V.S. Senthil Kumar, “ Engineering Ethics (including Human Values )” Eastern Economy Edition, Prentics Hall of India Ltd.

A minor test/Quiz will be conducted during the semester and It will be the duty of the concerned teacher assigned to teach Moral values & Ethics to submit the awards to respective chairman of the department / Director/Principal.

The evaluation of this course will be made by the following Committee.

**University Departments:**

- |   |                               |          |
|---|-------------------------------|----------|
| 1 | Chairperson of the Department | Chairman |
| 2 | Senior Most Faculty Counselor | Member   |
| 3 | Vice- Chancellor’s Nominee    | Member   |

**Affiliated Colleges:**

- |   |                    |          |
|---|--------------------|----------|
| 1 | Director/Principal | Chairman |
|---|--------------------|----------|

- |   |   |        |
|---|---|--------|
| 2 | Head of the Department/Sr. Faculty                  | Member |
| 3 | External Examiner to be appointed by the University | Member |

**Note:** Remuneration will be paid to the external examiner only (at par with the other practical examinations).

## EE401B      SENSORS AND TRANSDUCERS

### B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC, common with AEI 5<sup>th</sup> sem. SEMESTER-VII

L T P Credits  
3 1 - 4

Class-work Marks : 25  
Exam Marks : 75  
Total Marks : 100  
Duration of Exam : 3 Hrs.

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#### UNIT I

Basic concepts of sensors and transducers and their classification, characteristics and choice of transducers, factors influencing the choice of transducers. Resistive transducers, potentiometers, loading effect, construction of potentiometers, materials used for potentiometers.

Strain gauges, theory of strain gauges, types of strain gauges, semiconductor strain gauges, Rossetts, Load cells. Thermistors, thermometers, thermocouples and their applications.

#### UNIT II

Variable inductance transducers, Linear Variable Differential Transformer(LVDT), Rotary Variable Differential Transformer(RVDT), Synchros, control type synchro systems, synchros as torque transmitters.

Capacitive transducers, transducers using change in area of plates, transducers using change in distance between plates, differential arrangement, variation of dielectric constant for measurement of displacement and liquid level, frequency response of capacitive transducers. Piezoelectric transducers, modes of operation of piezoelectric crystals, properties of piezoelectric crystals, equivalent circuit of piezoelectric transducers, loading effects and frequency response, impulse response of piezoelectric crystals.

#### UNIT III

Hall Effect transducers, photovoltaic cells, photoconductive cells, semiconductor photodiode, phototransistors. Measurement of angular velocity, Electrical tachometers, Electromagnetic tachometer generators, Digital methods, Photoelectric tachometers, stroboscope and stroboscopic methods,

Measurement of low pressure using various methods, Measurement of acceleration, flow liquid level and humidity employing different transducers.

#### UNIT IV

Chemical sensors, measurement of pH values, measurement of thermal conductivity.

Data acquisition in instrumentation systems, various types of data acquisition systems, method of data transmission, general telemetry system, types of telemetry systems, Landline telemetry and Radio Frequency( R.F.) telemetry.

Recent trends in sensor technology, smart sensors, basic building blocks of smart sensors, application of smart sensors.

#### TEXT BOOKS:

1. A.K.Sawhney, "A Course in Electrical and Electronics Measurement and Instrumentation,"Dhanpat Rai & Co.

2. D.V.S.Murti, “ Transducers and Instrumentation,” PHI.
3. D.Patranabis, “ Principles of Electronic Instrumentation,” PHI
4. Electronic Instrumentation and Measurements : David A.Bell , Oxford University press.
5. Electronic Measurements and Instrumentation : K.Lal Kishore, Pearson

**REFERENCE BOOKS:**

1. D. Patranabis, “Sensors and Transducers,” PHI.
2. D.A.Bell, “Electronic Instrumentation and Measurements, “PHI.
3. Rangan, Sharma and Mani, “Instrumentation Devices and Systems,” TMH.
4. Elements of Electronic Instrumentation and Measurement: Joseph J.Carr, pearson

**NOTE:**

4. The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
5. The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.
6. Electronic gadgets including cellular phones are not allowed in the examination.

**EE403B      ELECTRIC DRIVES**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-VII**

L   T   P   Credits  
3   1   -   4

Class-work Marks      : 25  
Exam Marks              : 75  
Total Marks              : 100  
Duration of Exam        : 3 Hrs.

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**UNIT-I**

**Electrical Drives:** Introduction, advantages, choice of electrical drives, status of ac and dc drives.

**Dynamics of Electrical Drives:** Fundamental torque equations, multi-quadrant operation, equivalent values of drive parameters, load torque components, types of loads, steady state stability, load equalization.

**Control of Electrical Drives:** Modes of operation, closed loop control of drives, sensing of current and speed.

**UNIT-II**

**DC Motor Drives:** Speed-torque characteristics of different types of dc motors, starting, types of braking, transient analysis, speed control methods, static control of dc motors. Converter fed dc drive & chopper fed dc drive.

**UNIT-III**

**Induction motor Drives:** Characteristics, analysis and performance, starting methods, braking methods, transient analysis, methods of speed control, vector control. Static control techniques- stator frequency control, stator voltage control, rotor resistance control. Static Scherbius system & static Kramer system.

**UNIT-IV**

**Selection of motor power rating:** Heating and cooling, determination of motor rating, continuous, short time and intermittent duties, determination of moment of inertia of the flywheel.

**Traction Drives:** Nature of traction load, important features of traction drives, static control of traction drives; comparison between ac and dc tractions.

**TEXT BOOKS:**

1. Fundamentals of Electrical Drives, G.K.Dubey, Narosa Publishing House

**REFERENCE BOOKS:**

1. Power Semiconductor controlled drives, G.K.Dubey, Prentice Hall.
2. Electric Drives: V.Subrahmaniyam TMH
3. Electric Drives: Leonard, Narosa Pub.
4. Electric Drives: Diwan
5. Power Electronics : M.D.Singh, K.B.Knanchandani : Mc Graw Hill

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**EE405B                      DIGITAL SIGNAL & IMAGE PROCESSING**

**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC  
SEMESTER-VII**

L   T   P   Credits  
3   1   -   4

Class-work Marks        : 25  
Exam Marks                : 75  
Total Marks                : 100  
Duration of Exam         : 3 Hrs.

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**UNIT-I**

**SIGNALS AND SIGNAL PROCESSING:** characterization & classification of signals, typical Signal Processing operations, example of typical Signals, typical Signals Processing applications, discrete time random signals. Discrete Time Signals, Operations on Sequences, the sampling process, Discrete-Time systems, Time-Domain characterization of LTI Discrete-Time systems, Correlation of signals.

**UNIT-II**

**TRANSFORM-DOMAIN REPRESENTATION OF SIGNALS:** Discrete-Time Fourier Transform, Discrete Fourier Transform, DFT properties, computation of the DFT of real sequences, Linear Convolution using the DFT. FFT Algorithms.

**DIGITAL PROCESSING OF CONTINUOUS-TIME SIGNALS:** Sampling of Continuous Signals, Analog Filter Design, Anti-aliasing Filter Design, Sample-and-hold circuits, A/ D & D/ A converter, Reconstruction Filter Design.

**UNIT-III**

**DIGITAL FILTER STRUCTURE:** Block Diagram representation, Signal Flow Graph Representation, Equivalent Structures, FIR Digital Filter Structures, IIR Filter Structures, Parallel all pass realization of IIR transfer function, Digital Sine-Cosine generator.

**DIGITAL FILTER DESIGN:** Impulse invariance method of IIR filter design, Bilinear Transform method of IIR Filter Design, Design of Digital IIR notch filters, FIR filter Design based on truncated fonner sens, FIR filter design based on Frequency Sampling approach. Applications of DSP.

**UNIT-IV**

**MULTIRATE DIGITAL SIGNAL PROCESSING:** Introduction to multirate digital signal processing, sampling rate conversion, filter structures, multistage decimator and interpolators, digital filter banks.

**DIGITAL IMAGE PROCESSING:** Digital Image Representation, Fundamental Steps in Image Processing, Elements of Digital image processing systems.

**TEXT BOOKS:**

1. Digital Signal Processing : Proakis and Manolakis; PHI Pub.
2. Allan Y. Oppenheim & Ronald W. Schater , "Digital Signal Processing", PHI, 2004. REFERENCE
3. Digital Signal Processing, Amberdar, Cengage Publishers
4. Digital Signal Processing : Salivahanan & Gnanapriya; TMH Pub.

**REFERENCE BOOKS:**

1. J. R. Jhohnson, "Intorduction to Digital Signal Processing", PHI, 2000.



2. B. Somanthan Nair, "Digital Signal Processing: Theory, Analysis & Digital Filter Design", PHI, 2004
3. Sanjit K. Mitra, "DSP a Computer based approach" , TMH, 2nd Ed., 2001.
4. Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing", PHI, Second Edition, 2008.
5. C.-T. Chen, "Digital Signal Processing", Oxford, 2007.
6. S. Sridhar, "Digital Image Processing", Oxford, 2011.ws
7. Fundamentals of Speech Recognition: Lawrence Rabiner Bing-Hwang Juang B.Yegnanaryana, Pearson
8. Simon Haykin : Adaptive Filter Theory, Pearson.
9. Charles L.Phillips John Parr Eve Riskin: signal, Systems and Transforms, Pearson.
- 10.

**NOTE:**

In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**ECE407B**

**VLSI DESIGN**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), ECE, AEI**  
**Semester –VII**

L T P Credits  
3 1 - 4

Class Work : 25 Marks  
Theory : 75 Marks  
Total : 100 Marks  
Duration of Exam. : 3 Hrs.

**UNIT I**

**INTRODUCTION:**

Evolution of VLSI, Moore's Law, MOS transistor theory – MOS structure, enhancement & depletion transistor, Threshold voltage, MOS device design equations, Body Effect, Channel length modulation, Mos Transistor Trans conductance and output conductance.

**MOS FABRICATION:**

Crystal Growth, wafer preparation, epitaxy, oxidation, lithography, etching, diffusion, deposition, ion-implantation, metallization, Fabrication Process: nMOS, CMOS (n-well, p-well, twin-tub, silicon on insulator, 3-D CMOS, MOS capacitance dynamic behavior, sub-micron MOS transistors- related effects.

**UNIT II**

**MOS INVERTER:**

Introduction, nMOS inverter: resistive load, enhancement load, depletion load, determination of pull-up to pull-down ratio for an nMOS inverter driven by another nMOS inverter. CMOS inverter: DC characteristics, circuit model, latch up.

**CMOS DESIGN:**

Gate Logic: inverter, nand gate, nor gate. Ratioed logic, pseudo NMOS logic, DCVSL Logic, Switch Logic: pass transistor and transmission gate, dynamic logic, charge sharing logic, domino logic. Combination logic: Parity generator, multiplexer. Sequential logic: two phase clocking, memory-latches and registers, setup and hold time violations, causes ,effects and remedies.

**UNIT III**

**MOS circuit Design :**

MOS layer, stick diagram: nMOS Design style, CMOS design style, design rules and layout: lambda based design rule, layer representation, contact cuts, double metal MOS process rules, CMOS lambda based design rules.

**SCALING OF MOS CIRCUITS:**

Scaling models and scaling factors for device parameters, limitations of scaling: substrate doping, limits of miniaturization, limit of interconnect and contact resistance.

**UNIT IV**

**CIRCUIT CHARACTERIZATION AND PERFORMANCE ESTIMATION:**

Sheet resistance, resistance estimation, capacitance estimation, inductance, switching characteristic, propagation delays, CMOS gate transistor sizing, power dissipation: static and dynamics.

**SUB-DESIGN PROCESS:**

Design of an ALU subsystem: 4-bit shifter, barrel shifters, logarithmic shifters. Adders – ripple carry, Manchester carry, carry bypass, carry select linear, carry select square root, carry look ahead, tree and domino adder .Multiplier – binary , array, carry save, Wallace tree, Programmable logic array, random access memory, binary counter.

**Text Books :**

1. D.A.Pucknell and K. Eshraghian, "Basic VLSI Design"
2. Weste and Eshraghian, "Principle of CMOS VLSI Design" Pearson Education, 2001

**Reference Books:**

1. S. M. Kang, Y. Leblebici, "CMOS digital integrated circuits analysis & design" TMH, 3<sup>rd</sup> Edition.
2. Rabaey, "Introduction of digital integration circuit".

**NOTE:**

In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.

**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC  
SEMESTER-VII**

L	T	P	Credits	Class-work Marks	: 20
-	-	2	1	Exam Marks	: 30
				Total Marks	: 50
				Duration of Exam	: 2 Hrs.

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**LIST OF EXPERIMENTS:**

1. Speed control of dc motor using dc chopper.
2. Speed control of dc motor using single-phase converter.
3. Speed control of dc motor using 3-phase converter.
4. Speed control of dc motor using single- phase dual converter.
5. Inverter fed single-phase induction motor drive.
6. CSI fed induction motor drive.
7. Speed control of single- phase induction motor using ac regulator.
8. Regenerative braking of dc motor using single- phase converter.
9. Speed control of single-phase induction motor using cycloconverter.
10. Static rotor resistance control method.

**NOTE:**

1. The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.
3. Electronic gadgets including cellular phones are not allowed in the examination.

**EE425B          DIGITAL SIGNAL PROCESSING LAB**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE, IC**  
**SEMESTER-VII**

L	T	P	Credits	Class-work Marks	: 20
-	-	2	1	Exam Marks	: 30
				Total Marks	: 50
				Duration of Exam	: 2 Hrs.

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**LIST OF EXPERIMENTS:**

Perform the following experiments using MATLAB:

1. To represent basic signals (Unit step, unit impulse, ramp, exponential, sine and cosine).
2. To develop program for discrete convolution.
3. To develop program for discrete correlation.
4. To understand stability test.
5. To understand sampling theorem.
6. To design analog filter (low-pass, high pass, band-pass, band-stop).
7. To design digital IIR filters (low-pass, high pass, band-pass, band-stop).
8. To design FIR filters using windows technique.
9. To design a program to compare direct realization values of IIR digital filter
10. To develop a program for computing parallel realization values of IIR digital filter.
11. To develop a program for computing cascade realization values of IIR digital filter
12. To develop a program for computing inverse Z-transform of a rational transfer function.

**NOTE:**

1. The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.
3. Electronic gadgets including cellular phones are not allowed in the examination.

**EEE415B      PROJECT**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**  
**Semester-VII**

L T P  
- - 4

Class-work Marks : 100  
Total Marks : 100  
Credits : 04

The primary objective of this course is to develop in students the professional quality of synthesis employing technical knowledge obtained in the field of Engineering & Technology through a project work involving design, analysis augmented with creativity, innovation and ingenuity.

Project involving design/ fabrication/ testing/ computer simulation/ case studies,etc. which commences in the VII Semester will be completed in VIII Semester and will be evaluated through a panel of examiners consisting of the following:

Chairman of Department/HOD	: Chairperson
Project coordinator	: Member Secretary
Respective project supervisor	: Member

The student will be required to submit two copies of his / her project report to the department for record (one copy each for the department and one for participating teacher).

Project coordinator will be assigned the project load of maximum of 2 hrs. per week including his/her own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students / groups under him / her.

The format of the cover page and the organization of the body of the report for all the B.Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

**EE433B          PROFESSIONAL TRAINING – II**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**  
**B.Tech. Semester-VII**

L T P  
- - 2

Class-work Marks       : 50  
Total Marks               : 50  
Credits                     : 02

At the end of 6<sup>th</sup> semester, each student would undergo four weeks Professional Training in an Industry / Institute / Professional / Organization / Research Laboratory etc. with the prior approval of the Training and Placement Officer of the University and submit in the department a typed report along with a certificate from the organization.

The typed report should be in a prescribed format.

The report will be evaluated in the VII Semester by a Committee consisting of two to three teachers from different specializations to be constituted by the Chairperson of the department. The basis of evaluation will primarily be the knowledge and exposure of the student towards different processes and the functioning of the organization.

The student will interact with the committee through presentation to demonstrate his / her learning.

Teachers associated with the evaluation work will each be assigned 2 periods per week load.

## OPEN ELECTIVES:

### B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)

MEI 623B ENTREPRENEURSHIP						
B. Tech. Semester – VII Open Elective						
L	T	P	Credits	Class Work	:	25 Marks
4	-	--	4	Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

#### UNIT-I

**ENTREPRENEURIAL DEVELOPMENT PERSPECTIVE:** Concepts of Entrepreneurship Development, Evolution of the concept of Entrepreneur, Entrepreneur Vs. Intrapreneur, Entrepreneur Vs. Entrepreneurship, Entrepreneur Vs. Manager, Attributes and Characteristics of a successful Entrepreneur, Role of Entrepreneur in Indian economy and developing economies with reference to Self-Employment Development, Entrepreneurial Culture

#### UNIT II

**CREATING ENTREPRENEURIAL VENTURE:** Business Planning Process, Environmental Analysis - Search and Scanning, Identifying problems and opportunities, Defining Business Idea, Basic Government Procedures to be complied with.

#### UNIT III

**ENTREPRENEURSHIP DEVELOPMENT AND GOVERNMENT:** Role of Central Government and State Government in promoting Entrepreneurship - Introduction to various incentives, subsidies and grants - Export Oriented Units - Fiscal and Tax concessions available; Role of Central/State agencies in the Entrepreneurship Development - District Industries Centers (DIC), Small Industries Service Institute (SISI), Entrepreneurship Development Institute of India (EDII), National Institute of Entrepreneurship & Small Business Development (NIESBUD), National Entrepreneurship Development Board (NEDB).

#### UNIT IV

#### PROJECT MANAGEMENT AND CASE STUDIES

Technical, Financial, Marketing, Personnel and Management Feasibility, Estimating and Financing funds requirement - Schemes offered by various commercial banks and financial institutions like IDBI, ICICI, SIDBI, SFCs, Venture Capital Funding, Why do Entrepreneurs fail - The Four Entrepreneurial Pitfalls (Peter Drucker), Case studies of Successful Entrepreneurial Ventures, Failed Entrepreneurial Ventures and Turnaround Ventures.

#### Texts and References:

1. Entrepreneurship: New Venture Creation - David H. Holt.
2. Entrepreneurship - Hisrich Peters.
3. The Culture of Entrepreneurship - Brigitte Berger.
4. Project Management - K. Nagarajan.
5. Dynamics of Entrepreneurship Development - Vasant Desai.
6. Entrepreneurship Development - Dr. P.C.Shejwalkar.
7. Thought Leaders - Shrinivas Pandit.
8. Entrepreneurship, 3rd Ed. - Steven Brandt.
9. Business Gurus Speak - S.N.Char.
10. The Entrepreneurial Connection - Gurmit Narula.

#### Note:

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The Subjects and Syllabus with EE, ECE codes recommended by the Board to FET Page 111

CHAIRMAN, BOS

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.



## B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)

BME 451B MEDICAL INSTRUMENTATIONS						
B. Tech. Semester – VII – Open Elective						
L	T	P	Credits	Class Work	:	25 Marks
4	-	--	4	Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

### UNIT-I

**PHYSIOLOGY AND TRANSDUCERS:** Cell and its structure – Action and resting – Potential propagation of action potential – Sodium pump – Nervous system – CNS – PNS – Nerve cell – Synapse – Cardio pulmonary system – Physiology of heart and lungs – Circulation and respiration – Transducers – Different types – Piezo-electric, ultrasonic, resistive, capacitive, inductive transducers – Selection criteria.

### UNIT-II

**ELECTRO – PHYSIOLOGICAL AND NON-ELECTRICAL PARAMETER MEASUREMENTS:** Basic components of a biomedical system – Electrodes – Micro, needle and surface electrodes – Amplifiers – Preamplifiers, differential amplifiers, chopper amplifiers – Isolation amplifier. ECG – EEG – EMG – ERG – Lead systems and recording methods – Typical waveforms. Measurement of blood pressure – Cardiac output – Cardiac rate – Heart sound – Respiratory rate – Gas volume – Flow rate of CO<sub>2</sub>, O<sub>2</sub> in exhaust air – PH of blood, ESR, GSR measurements – Plethysmography.

### UNIT-III

**MEDICAL IMAGING AND PATIENT MONITORING SYSTEMS:** X-ray machine - Radio graphic and fluoroscopic techniques – Computer tomography – MRI – Ultrasonography – Endoscopy – Thermography – Different types of biotelemetry systems and patient monitoring – Electrical safety. Biological effects of X-rays and precautions.

### UNIT-IV

**ASSISTING AND THERAPEUTIC EQUIPMENTS:** Pacemakers – Defibrillators – Ventilators – Nerve and muscle stimulators – Diathermy – Heart – Lung machine – Audio meters – Dialyzers. Respiratory Instrumentation - Mechanism of respiration, Spirometry, Pnemuotachograph Ventilators.

### TEXT BOOKS

1. Biomedical Instrumentation and Measurements – Leslie Cromwell and F.J. Weibell, E.A. Pfeiffer, PHI, 2nd Ed, 1980.
2. Medical Instrumentation, Application and Design – John G. Webster, John Wiley, 3rd Ed., 1998.

### REFERENCE BOOKS

1. Principles of Applied Biomedical Instrumentation – L.A. Geoddes and L.E. Baker, John Wiley, 1975.
2. Hand-book of Biomedical Instrumentation – R.S. Khandpur, TMH, 2nd Ed., 2003.
3. Biomedical Telemetry – Mackay, Stuart R., John Wiley, 1

### Note:

The Subjects and Syllabus with EE, ECE codes recommended by the Board to FET Page 113

CHAIRMAN, BOS

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

## B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)

ECE 305B CONSUMER ELECTRONICS						
B. Tech. Semester – VII – Open Elective						
L	T	P	Credits		Class Work	: 25 Marks
4	-	--	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

### UNIT I

**MONOCHROME TV (INTRODUCTION):** Elements of a TV System, Picture transmission, Sound transmission, Picture reception, Sound reception, Synchronization, Receiver control, Image continuity, Scanning Process, Aspect Ratio, Flicker, Composite Video Signal, Picture Elements, Kell factor, Vertical Resolution, Horizontal Resolution, Video bandwidth, Interlacing, 625 Line System, Bandwidths for TV Transmission, Vertical and horizontal synch detail, Vestigial Side Band transmission (Advantages and Disadvantages)

**MONOCHROME TV (PICTURE AND CAMERA TUBES):** Monochrome picture tube, beam reflection, Beam focussing, Screen Phosphor, Face plate, Picture tube characteristics, picture tube circuit controls, Monochrome Camera Tubes: Basic principle, Image Orthicon, Vidicon, Plumbicon

### UNIT II

**COLOUR TV ESSENTIALS:** Compatibility, Colour perception, Three Colour theory, Luminance, Hue and Saturation, Dispersion and Recombination of light, Primary and secondary colours, luminance signal, Chrominance Signal, Colour picture tube, colour TV Camera, Colour TV display Tubes, colour Signal Transmission, Bandwidth for colour signal transmission, Colour TV controls. Cable TV, Block Diagram and principle of working of cable TV.

**PLASMA AND LCD:** Introduction, liquid crystals, types of LCD's, TN, STN, TFT, Power requirements, LCD working, Principle of operation of TN display, Construction of TN display, Behaviour of TN liquid crystals, Viewing angle, colour balance, colour TN display, limitations, advantages, disadvantages, applications.

### UNIT III

**LED AND DMD:** Introduction to LED Television, comparison with LCD and Plasma TV's, schematic of DMD, introduction to Digital MicroMirror device, Diagram of DMD, principle of working, emerging applications of DMD.

**MICROWAVE OVENS AND AIR CONDITIONERS:** Microwaves, Transit Time, Magnetron, Waveguides, Microwave Oven, Microwave Cooking. Air conditioning, Components of air conditioning systems, all water Air conditioning systems, all air air conditioning Systems, Split air conditioner.

### UNIT IV

**MICROPHONES:** Introduction, characteristics of microphones, types of microphone: carbon, moving coil, wireless, crystal, introduction to tape recorder.

**LOUDSPEAKER:** Introduction to ideal and basic loudspeaker, loudspeaker construction types of loudspeaker: Dynamic and permanent magnet, woofers, tweeters, brief introduction to baffles, equalisers.

**Text Books :**

- 1.Consumer Electronics by S. P. Bali(Pearson Education)
- 2.Complete Satellite and Cable T.V by R.R Gulati(New Age International Publishers)

**Reference Books:**

1. Monochrome and Colour Television by R. R. Gulati

**Note:**

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

## B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)

EE 451B ENERGY AUDIT						
B. Tech. Semester – VII – Open Elective						
L	T	P	Credits		Class Work	: 25 Marks
4	-	--	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

### UNIT I

**INTRODUCTION TO THE POWER DISTRIBUTION SYSTEM:** Description of the power distribution system- voltage levels, Components of the distribution system- Substation, Transformer, feeders, distribution system planning, operation & maintenance objectives, activities involved in O&M, grid management, load scheduling & dispatch, load balancing, 66-33/ 11 KV substation equipment, 11/ 0.4 KV substation equipment, Distribution transformers- reasons for DT failures.

### UNIT II

**ENERGY ACCOUNTING & ENERGY AUDIT:** Need for energy accounting, objectives & functions of energy accounting, Energy flow diagram in power distribution system, energy accounting procedure- Energy measurement, and problems in energy accounting & overcoming these problems in energy accounting, Definition, need and types of energy audit, energy audit instruments, procedure for conducting an energy audit.

### UNIT III

**AT&C LOSS REDUCTION & EFFICIENCY IMPROVEMENT:** Concepts and principles of distribution losses- transmission & distribution losses, AT&C losses in power distribution network, factors contributing to high technical & commercial losses. Technical loss reduction- Short term measures for technical loss reduction, long term plans for technical loss reduction, Commercial loss reduction- reasons for commercial losses, measures for commercial loss reduction.

### UNIT IV

**DEMAND SIDE MANAGEMENT:** An introduction, Why DSM?, Benefits of DSM, DSM in power systems: load management, DSM techniques and emerging trends, EC Act 2001, DSM on consumer side – the industrial sector, the agricultural sector, the domestic & commercial sectors, ESCO-a route for DSM.

#### TEXT BOOKS:

1. Handbook of Energy Engineering, The Fairmont Press, INC.-Albert Thumann & Paul Mehta.
2. Energy Management Supply & Conservation, Butterworth Heinemann, 2002-dr. Clive Beggs.

#### REFERENCE BOOKS:

1. Hand book on energy audit & environment management by ISBN 81-1993.0920 TERI

#### Note:

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

## B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)

EEE457B ENERGY RESOURCES & TECHNOLOGY						
B. Tech. Semester – VII – Open Elective						
L	T	P	Credits		Class Work	: 25 Marks
4	-	--	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

### UNIT-I

**ENERGY SOURCES & AVAILABILITY:** World energy situation. Indian energy scenario. Comparative study of thermal, hydro, nuclear and gas power plants. Impact of thermal, gas, hydro and nuclear power stations on environment, air and water pollution, green house effect (global warming), Plasma confinement - magnetic confinement and inertial confinement, geothermal, hydrogen energy, fuel cells, Alkaline fuel cells (AFC), Solid oxide fuel cell (SOFC), Molten carbonate fuel cells (MCFC), thermo-electric power, MHD power generation OTEC & tidal waves.

### UNIT-II

**SOLAR ENERGY:** Solar constant, solar radiation geometry, local solar time, day length, solar radiation measurement, radiation on inclined surface, solar radiation data & solar charts. Flat plate collectors, liquid and air type. Theory of flat plate collectors, advanced collectors, optical design of concentrators, selective coatings, solar water heating, solar dryers, solar stills, solar cooling and refrigeration. Thermal storage. Conversion of heat into mechanical energy. Active and passive heating of buildings. Solar cells.

### UNIT-III

**WIND ENERGY:** Wind as a Source of Energy, Characteristics of wind, wind data. Horizontal & Vertical axis wind Mills, Wind Energy: Wind energy potential measurement, general theories of wind machines, basic laws and concepts of aerodynamics, wind mill and wind electric generator. Basic electric generation schemes- constant speed constant frequency, variable speed constant frequency and variable speed variable frequency schemes. Applications of wind energy.

### UNIT-IV

**BIOMASS ENERGY:** Introduction to biomass, biofuels & their heat content, biomass conversion technologies. Aerobic & anaerobic digester, Factors affecting biogas production, biogas plants - types & description. Utilisation of biogas - Gasifiers, direct thermal application of Gasifiers. Advantages & problems in development of Gasifiers, use in I.C. engines, Energy plantation. Pyrolysis scheme. Alternative liquid fuels –ethanol and methanol. Ethanol production.

#### TEXT BOOKS:

4. Electric Power Generation, B.R.Gupta
5. Power Generation, Operation and Control, Wood and Wollenberg, John Wiley & Sons,1984.
6. Power Plant Engg: G.D. Rai

#### REFERENCE BOOKS:

1. Renewable Energy Resources: John Twidell and Tony Weir
2. Renewable Energy Resources Conventional & Non- Conventional: M.V.R Koteswara Rao
3. Science & Technology of Photovoltaics: Jayarama Reddy P.

**Note:**

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

## B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)

BT401B BIO-INFORMATICS						
B. Tech. Semester – VII – Open Elective						
L	T	P	Credits		Class Work	: 25 Marks
4	-	--	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

### UNIT-I

**Introduction:** Internet, intranet and extranet, networking, protocols, genomic data, organization, representation, data base management systems.

**Sequencing Data Bank:** Introduction, collecting and storing sequence in laboratory, nucleic acid data bank – Gen Bank, EMBL, AIDS and RNA, protein data bank (PDB), cambridge structural database CSD, genome data bank, hybridoma data bank structure and others.

### UNIT-II

**Sequence Analysis:** Analysis tools for sequence data banks, pair wise alignment: NEEDLEMAN and WUNSCH algorithms, Smith Waterman, multiple alignment – CLUSTAL-W, BLAST, FASTA, sequence patterns and motifs and profiles.

**Predictions:** Secondary and tertiary structure: algorithms Chao-Fasman algorithm, hidden Markov model, neural networking, protein classification, fold libraries, fold recognition (threading), homology detection, SRS-access to biological data banks.

### UNIT-III

**Phylogenetic Analysis**– Basic concepts in systematics, taxonomy and phylogeny, phylogenetic trees-various types and their construction, tree building methods, distance methods, multiple alignment character based method, phylogenetic software.

**Managing Scientific Data:** Introduction, challenges faced in integration of biological information, SRS, Kleisli Query System TAMBIS, P/ FDM mediator for a bioinformatics database, federation, discovery link and data management.

### UNIT-IV

**Genomics & Proteomics:** Genome mapping, assembly and comparison, functional genomics: sequence based approaches & microarray based approaches, proteomics: technology of protein expression analysis & posttranslational modifications, protein sorting, protein-protein interaction.

### TEXT / REFERENCE BOOKS:

- Developing Bioinformatics Computer Skill, ed. Gibes & Jombeck, Shroff Publication
- Bioinformatics, ed. David W. Mount

**Note:** In the semester examination, the examiner will set 08 questions in all, selecting two from each unit. The candidates will be required to attempt five questions in all, selecting at least one from each unit. All questions will carry equal marks.



## B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)

AE 417B MODERN VEHICLE TECHNOLOGY						
B. Tech. Semester – VII – Open Elective						
L	T	P	Credits	Class Work	:	25 Marks
4	-	--	4	Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

### UNIT I

**TRENDS IN POWER PLANTS:** Hybrid vehicles – stratified charged / lean burn engines – Hydrogen engines – battery vehicles – Electric propulsion with cables – magnetic track vehicles.

### UNIT II

**SUSPENSION BRAKES AND SAFETY:** Air suspension – Closed loop suspension – antiskid braking system, Retarders, Regenerative braking safety cage – air bags – crash resistance – passenger comfort

### UNIT III

**NOISE & POLLUTION:** Reduction of noise – Internal & external pollution control through alternate fuels / power plants – Catalytic converters and filters for particulate emission.

### UNIT IV

**VEHICLE OPERATION AND CONTROL:** Computer control for pollution and noise control and for fuel economy – Transducers and actuators – Information technology for receiving proper information and operation of the vehicle like optimum speed and direction.

**VEHICLE AUTOMATED TRACKS:** Preparation and maintenance of proper road network – National highway network with automated roads and vehicles – Satellite control of vehicle operation for safe and fast travel.

### TEXT BOOKS

1. Heinz Heisler, “Advanced Vehicle Technology” - Arnold Publication.

### REFERENCES

1. Beranek.L.L., Noise reduction, McGraw Hill Book Co., Inc., Newyork, 1993.
2. Bosch Hand Book, 3rd Edition, SAE, 1993.

### Note:

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

## B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)

CE451B POLLUTION & CONTROL						
B. Tech. Semester – VII – Open Elective						
L	T	P	Credits		Class Work	: 25 Marks
4	-	--	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

### UNIT – I

**WATER POLLUTION** – Classification of water pollutants, water characteristics, effluent standards, primary treatment, secondary treatment – aerobic (activated sludge, aerated lagoons, trickling filter, roughing filter, rotating biological contactor) anaerobic (contact process, UASB).

### UNIT – II

**AIR POLLUTION:** Classification of air pollutants, Particulates: Physical characteristics, mode of formation, setting properties, Control measures.

**HYDROCARBONS:** Nature; sources, control, Carbon Monoxide: Source, harmful effects on human health, control measures. Oxides of Sulphur and Nitrogen Sources, effects on human health and plants. Control measure.

### UNIT – III

**SOLID WASTE:** Types, sources and properties of solid waste, methods of solid waste treatment and disposal

**SOLID WASTE MANAGEMENT** – Generation, Collection and techniques for ultimate disposal, Elementary discussion on resource and energy recovery.

### UNIT – IV

Elementary treatment of nuclear pollution, metal pollution, noise pollution their effects & control.

Trace element: Mechanism of distribution, essential and non essential elements, trace of element in marin environment, its ecological effects and biological effects.

#### Suggested Books:

1. Environmental Engg.: by Howard s. Peavy & Others, MGH International.
2. Metacaf – EDDY – Waste-water engineering revised by George Teholonobus (TMH)
3. Environmental Chemistry by B.K. Sharma, Goel Publishing, Meerut.
4. Environmental Chemistry, A.K.DE, Wiley Eastern.
5. Air Pollution: H.C. Perking – Mc Graw Hill.

**Note:**

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

## B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)

CSE 411B MANAGEMENT INFORMATION SYSTEM						
B. Tech. Semester – VII – Open Elective						
L	T	P	Credits		Class Work	: 25 Marks
4	-	--	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

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### UNIT I

#### FOUNDATIONS:-

**INFORMATION SYSTEM:** Introduction to Information System and MIS, Decision support and decision making systems, systems approach, the systems view of business, Managing the digital firm, Electronic Commerce and Electronic business, DBMS, RDBMS , introduction to Telecommunication and Networks

**I.T.INFRASTRUCTURE:-** Managing Hardware Assets, Managing Software Assets, Managing Data Resources. Internet And New It Infrastructure .

### UNIT II

**CONCEPTUAL SYSTEM DESIGN:** Define the problems, set systems objective, establish system constraints, determine information needs determine information sources, develop alternative conceptual design and select one document the system concept, and prepare the conceptual design report. Information Systems Security and Control, Ethical and Social Impact of Information Systems.

### UNIT III

**DETAILED SYSTEM DESIGN:** Inform and involve the organization, aim of detailed design, project management of MIS detailed design , identify dominant and trade of criteria, define the sub systems, sketch the detailed operating sub systems and information flow, determine the degree of automation of each operation, inform and involve the organization again, inputs outputs and processing, early system testing, software, hardware and tools propose an organization to operate the system, documentation of detailed design

### UNIT IV

**IMPLEMENTATION, EVALUATION AND MAINTENANCE OF THE MIS:** Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train the operating personnel, computer related acquisitions, develop forms for data collection and information dissemination, develop the files test the system, cut-over, document the system, evaluate the MIS control and maintain the system. Pitfalls in MIS development, Redesigning the organization with Information systems, Managing Knowledge Work.

#### TEXT BOOKS:

- 1.Management Information System by W. S. Jawadekar, 2002, Tata McGraw Hill.
- 2.Management Information System by K.C. Laudon & J.P. Laudon 7<sup>th</sup> Edition 2003 Pearson Education Publishers Indian Reprint.
- 3.Information System for Modern Management (3<sup>rd</sup> edition)- Robert G. Murdick, Loel E. Ross & James R. Claggett. PHI

**REFERENCE BOOKS:**

- 1.Management Information System; O Brian; TMH
- 2.Management Information System by Davis Olson Mac Graw Hill
- 3.Management Information System by Stallings,(Maxwell Mc Millman Publishers)

**Note:**

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

## B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)

IT413B CYBER SECURITY						
B. Tech. Semester – VII – Open Elective						
L	T	P	Credits		Class Work	: 25 Marks
4	-	--	4		Examination	: 75 Marks
					Total	: 100 Marks
					Duration of Examination	: 3 Hours

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### UNIT I

**INTRODUCTION TO CYBERCRIME:** Cybercrime and Information Security, Classifications of Cybercrimes, The need for Cyberlaws, The Indian IT Act Challenges to Indian Law and Cybercrime Scenario in India, Weakness in Information Technology Act and its consequences, Digital Signatures and the Indian IT Act, Cybercrime and Punishment; Technology, Students and Cyberlaw; Survival tactics for the Netizens, Cyber-offenses: Cyberstalking, Cybercafe and Cybercrimes, Botnets, Attack Vector, Cloud Computing;

### UNIT II

**TOOLS AND METHODS USED IN CYBERCRIME:** Proxy Servers and Anonymizers, Phishing and identity theft, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow; Cybercrime: Mobile and Wireless Devices: Trends in Mobility, Attacks on Wireless Networks, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones.

### UNIT III

**UNDERSTANDING COMPUTER FORENSICS:** The Need for Computer Forensics, Cyberforensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Computer Forensics and Steganography, Relevance of the OSI 7 Layer Model to Computer Forensics, Forensics and Social Networking Sites: The Security/Privacy Threats, Challenges in Computer Forensics, Forensics Auditing, Antiforensics.

### UNIT IV

**CYBERSECURITY: ORGANIZATIONAL IMPLICATIONS:** Cost of Cybercrimes and IPR Issues, Web Threats for Organizations, Security and Privacy Implications from Cloud Computing, Social Media Marketing, Social Computing and the Associated Challenges for Organizations, Protecting People's Privacy in the Organization, Organizational Guidelines for Internet Usage, Safe Computing Guidelines and Computer Usage Policy, Incident Handling, Forensics Best Practices, Media and Asset Protection, Importance of Endpoint Security in Organizations.

### TEXT BOOKS:

- “Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives”, Nina Godbole, Sunit Belapur, Wiley India Publications, April, 2011

**Note:**

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

**ECE404B**

**DATA COMMUNICATION AND NETWORK**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), ECE**  
**Semester –VIII**

L T P Credits  
3 1 - 4

Class Work : 25 Marks  
Theory : 75 Marks  
Total : 100 Marks  
Duration of Exam. : 3 Hrs.

**UNIT I**

**Data Communication and Networks:**

Components, Data Representation, Data Flow, Guided and Unguided Media, Distributed Processing, Network Criteria, Physical Structure, Network Models, Category of Networks

**Data and Signals:**

Analog and Digital Data, Analog and Digital Signals, Periodic and Non Periodic Signals, Transmission Impairments- Attenuation, Distortion, Noise, Performance bandwidth, Throughput, Latency, Bandwidth-Delay Product, Jitter

**UNIT II**

**Digital Transmission:**

Digital to digital Conversion-Line Coding, Line Coding Schemes, Block Coding, Scrambling, Transmission modes- Parallel Transmission and Serial Transmission

**Multiplexing**

Frequency Division Multiplexing, Wavelength division Multiplexing, Synchronous Time division multiplexing, Statistical Time Division multiplexing

**UNIT III**

**Switching:**

Circuit Switched Networks-Three Phases, Efficiency Delay, Datagram Networks-Routing table, Efficiency delay, Virtual Circuit Networks-Addressing, Three Phases, Efficiency, Delay in Virtual Circuit Networks

**Data Link Control**

Framing-Fixed Size Framing, Variable Sized framing, Flow and Error Control-Flow Control, error control, Protocols; Noiseless Channels-Simplest protocol, stop and Wait Protocol, Noisy Channels-Stop and Wait Automatic Repeat Request, Go Back n Automatic Repeat request, Selective Repeat Automatic Repeat request, PiggyBack

**UNIT IV**

**Network Models:**

Layered Tasks-Sender, receiver and Carrier, The OSI Model-Layered Architecture, Peer to peer processes, Encapsulation, Layers in the OSI Model-Physical Layer, data Link layer, Network layer, transport layer, Session layer, Presentation layer, application layer, Summary of layers, Introduction to TCP-IP and Internetworking

**Wired Lans-Ethernet:**

IEEE Standards-Data Link Layer, Physical layer, Standard Ethernet-Mac Sublayer, Physical layer, Changes in the standard bridged Ethernet, Switched Ethernet, full duplex Ethernet, fast Ethernet-Mac sublayer, Physical layer

**Text Books :**

1. Data Communication and Networking by Behrouz.A.Forouzan(TMh Publication)

**Reference Books:**

1. Computer Networks by William Stallings

**NOTE:**

In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.



**EE404B                    COMPUTER APPLICATION TO POWER SYSTEM ANALYSIS**

**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE  
SEMESTER-VIII**

L   T   P   Credits  
3   1   -   4

Class-work Marks        : 25  
Exam Marks                : 75  
Total Marks                : 100  
Duration of Exam         : 3 Hrs.

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**UNIT-I**

**INTRODUCTION:** Power Flow equations, Circle diagram, Travelling waves in power Systems, Introduction to graph theory, Tree graph, Co-tree etc.

**UNIT-II**

**Network Analysis in Power Systems:** Bus Admittance Matrix, Formation of Y Bus, Primitive admittance matrix, Bus Incidence matrix, Formulation of Y Bus using singular transformation, Formation of twing admittance matrix, Formation of Z loop, Bus Impedance matrix, Algorithm for formulation of Z- Bus. All types of modifications.

**UNIT-III**

**LOAD FLOW STUDIES:** Load flow equations, Approximate Load flow study, Gauss-Seidel method for Load flow Study, Algorithm and flow Chart for Computer application to Load flow studies, Newton-Raphson method for Load flow studies, Algorithm and flow chart for Computer Application. Decoupled Load flow Studies, Fast Decoupled Load flow. Comparison between G-S & N-R methods.

**UNIT-IV**

**SYMMETRICAL AND UNSYMMETRICAL FAULT ANALYSIS:** Symmetrical Components, Sequence networks for synchronous machines, transforms and transmission Lines, digital technique in short circuit Studies of: Single line to ground fault, Line to Line fault, Double line to Ground fault and symmetrical fault. Consideration of Pre fault currents.

**TEXT BOOKS:**

1. Power Systems Engineering by S. K. Gupta, Umesh publication
2. Power System Analysis & Design with CD by Glover, Cengage Learning
3. Power System Engg., by B.R.Gupta: S. Chand.
4. Power System Analysis: Hadi Saadat, TMH, New Delhi.
5. Computer Techniques in Power System analysis by M. A. Pai

**REFERENCE BOOKS:**

1. Advance power system analysis and dynamics by L.P. Singh: Wiley Eastern ltd.
2. Electrical Energy system theory: An introduction by O.I.Elgerd : TMH.
3. Elements of power system analysis by W. D. Stevenson: M.G.H.
4. Power System Engineering by I.J.Nagrath & D.P.Kothari: TMH.
5. Computer methods in power system by G. W. Stagg and A. H. El-Abiad: M.G.H.
6. Power System Operation and Control: N.V.Ramana, Pearson

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**EE414B**

**COMPUTER APPLICATIONS TO POWER SYSTEM ANALYSIS LAB  
B.TECH. (ELECTRICAL & ELECTRONICS ENGG.), EE  
SEMESTER-VIII**

L T P Credits  
- - 2 1

Class-work Marks : 20  
Exam Marks : 30  
Total Marks : 50  
Duration of Exam : 2 Hrs.

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**LIST OF EXPERIMENTS:**

1. Draw the flow chart and develop the computer program for the formation of the Y Bus of a generalized network.
2. Draw the flow chart and develop the computer program for the formation of the Z Bus of a generalized network.
3. To plot the swing curve and observe the stability.
4. To perform load flow study using Gauss-Siedel method.
5. Perform short circuit study for any type of fault.
6. To observe transmission losses and efficiency with variations in power for the given example.
7. Design of distribution system
8. To study the features of EMTP
9. To study the MATLAB Power System block set features.

**NOTE:**

1. The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.
3. Electronic gadgets including cellular phones are not allowed in the examination.

**EEE415B      PROJECT**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**  
**Semester-VIII**

L T P  
- - 8

Class-work Marks	: 75
Exam Marks	: 125
Total Marks	: 200
Duration of Exam	: 3 Hrs
Credits	: 8

The project started in VII Semester will be completed in VIII Semester and will be evaluated through a panel of examiners consisting of the following:

Chairperson of Department/HOD	: Chairperson
Project coordinator	: Member
External expert	: To be appointed by the University

The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher).

Project coordinator will be assigned the project load of, maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her.

The format of the cover page and the organization of the body of the report for all the B.Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

**EEE412B SEMINAR**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**  
**Semester-VIII**

L T P  
- - 2

Class-work Marks : 50  
Total Marks : 50  
Credits : 2

The objectives of the course are:

- To learn how to carry out literature search
- To learn the art of technical report writing
- To learn the art of verbal communication with the help of modern presentation techniques

A student will select a topic in emerging areas of Engineering & Technology and will carry out the task under the observation of a teacher assigned by the department.

He/ She will give a seminar talk on the same before a committee constituted by the Chairperson of the department. The committee shall comprise of two three faculty members from different specializations. The teacher associated in the committee will be assigned 2 hours teaching load per week.

However, guiding students' seminar will not be considered towards teaching load.

The format of the cover page and the organization of the body of the seminar report for all the undergraduate programs will be finalized and circulated by the Dean, Faculty of Engineering and Technology.



**EE432B      EXTRA HIGH VOLTAGE AC / DC**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**  
**SEMESTER-VIII**

L   T   P   Credits  
4   -   -   4

Class-work Marks      : 25  
Exam Marks              : 75  
Total Marks              : 100  
Duration of Exam        : 3 Hrs.

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**UNIT-I**

**Break Down Mechanism of Gaseous Materials:** Mechanism of Breakdown of gases, Townsend's first Ionization Co-efficient, Townsend's second Ionization Co-efficient, Townsend's Breakdown Mechanism, Streamer Theory of Breakdown in gases, Paschen's law.

**UNIT-II**

**Breakdown in Liquid and Solid Dielectrics:** Suspended Particle Theory, Cavity Breakdown, Electro-convection Breakdown, Breakdown in solid Dielectrics, Intrinsic Breakdown, Electromechanical Breakdown, Breakdown due to Treeing and Tracking, Thermal Breakdown, Electrochemical Breakdown

**UNIT-III**

**Generation of High Voltage AC. and D.C:** Half wave and Full wave Rectifier, Cockroft Walton Voltage Multiplier Circuit, Ripple in Multiplier Circuit, Generation of High Alternative Voltage, Cascade Transformer, Resonant Transformer, Generation of High Frequency A.C. High Voltage, Impulse Generator, Multistage Impulse Generator, Marx's Circuit, Generation of Switching Surges, , Tripping and Control of Impulse Generator.

**UNIT-IV**

**High Voltage Testing & Measurement :** Sphere-Gap, Uniform field Spark gap, Rod Gap, Electrostatic Voltmeter, Generating Voltmeter, Impulse Voltage Measurement using Voltage divider, Measurement of high DC, AC and Impulse Current., Testing of line Insulator, Testing of Cable, Testing of Bushings, Testing of Power Capacitor, Testing of Power Transformers, Testing of Circuit Breaker.

**TEXT BOOK:**

1. High Voltage Engineering By M.S. Naidu & V. Kamaraju -TMH Publication
2. *ccHVDC Transmission*, S Kamakshaiiah/V Kamaraju, Mc Graw Hill

**REFERENCE BOOKS:**

1. J. Arrillaga, High Voltage Direct Current Transmission. Pub: Peter Peregrinus Ltd. on behalf of E.E Power Engg. Series.
2. Rakos Das Begamudre, Extra EHV A.C Transmission. PHI Publication.
3. C.L Wadhwa , High Voltage Engineering. Pub.: New Age International Ltd.

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**ECE420B**

**TELECOMMUNICATION SWITCHING SYSTEM  
B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**

**Semester –VIII**

L T P Credits  
4 - - 4

Class Work : 25 Marks  
Theory : 75 Marks  
Total : 100 Marks  
Duration of Exam. : 3 Hrs.

**UNIT I**

**EVOLUTION OF SWITCHING SYSTEM:**

What is Switching, Types of Switching, Block Diagram of Telecommunication Network, Switching System Fundamentals, Classification of Switching System, Elements of a Switching System, Basic Function of Switching System, Basic Telephone Communication, Function of a Manual Switching System, Magneto or Local Battery Switchboard, Common Battery Switchboard, Limitations of Manual Switching System, Introduction to strowger switching system.

**CROSSBAR SWITCHING SYSTEM:**

Introduction, Principle of Common Control, Touch Tone Dial Telephone, Crossbar Switch Mechanism, Principle of Crossbar Switching, Crossbar Switch Configurations, Organisation of a Crossbar Telephone Switch, A General Trunking, Electronic Switching, Classification Crosspoint Technology

**UNIT II**

**SPACE DIVISION SWITCHING:**

Stored Program control, Centralised SPC, Distributed SPC, Software Architecture, Application software, Enhanced Services, Two Stage Networks, n-Stage Networks.

**TIME DIVISION SWITCHING:**

Introduction, Analog Time Division Switching, Digital Time Division Switching, A Digital Memory Switch, Time Stages in General, Two-Dimensional Switching, Multiple Stage Time and Space Switching

**UNIT III**

**PACKET SWITCHING:**

Statistical Multiplexing, Local area & wide area networks, Large Scale Networks, Broadband Networks

**TELETRAFFIC ENGINEERING:**

Introduction, Network Traffic Load, CCITT Recommended Busy Hours, Traffic Terminology, The Unit of Traffic, Congestion, Grade of Service, Blocking Probability, Traffic Measurements, Modelling Switching System, Markov processes representing traffic. Calculation of blocking probability, stationary probability measures for Ergodic Markov processes. Combinatorial interpretation, calculation of blocking probability.

**UNIT IV**

**CONTROL OF SWITCHING SYSTEMS:**

Call Processing functions, common control, Reliability, Availability & Security.

**SIGNALLING:**

Customer Line Signalling, Audio frequency junctions & trunk circuits, FDM carrier Systems, PCM signalling, Inter – register signalling, Common channel Signalling Principles.

**Text Books:**

1. Thiagarajan Viswanathan, “Telecommunication Switching Systems and Networks”, PHI
2. Syed Riffat Ali, “Digital switching Systems, system reliability and analysis”, Tata MC Graw, 2002.

**Reference Books:**

1. Keshav S, “An Engineering Approach to Computer Network Networking”, Addison Wesley, 1998.
2. Martin, “Telecommunication & Computer 3e”, PHI

**NOTE:**

In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.



**EE424B      FUZZY CONTROL SYSTEMS**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**  
**SEMESTER-VIII**

L   T   P      Credits  
4   -   -      4

Class-work Marks      : 25  
Exam Marks              : 75  
Total Marks              : 100  
Duration of Exam        : 3 Hrs.

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**UNIT-I**

**FUZZY CONTROL & ITS MATHEMATICS :** Fuzzy control from an industrial perspective, knowledge representation in KBC's, Vagueness, fuzzy logic versus probability theory, fuzzy sets; their properties & operations on fuzzy sets, fuzzy relations & operations on fuzzy relations, the Extension Principle, Fuzzy propositions, The Compositional Rule of Inference, Different implications, Representing a set of rules.

**UNIT-II**

**FKBC DESIGN PARAMETERS:** The FKBC architecture, choice of variables & content of rules, Derivation of rules, choice of membership functions, choice of scaling factors, choice of fuzzification procedure, choice of defuzzification procedure, comparison and evaluation of defuzzification methods.

**UNIT-III**

**NONLINEAR & ADAPTIVE FUZZY CONTROL:** The Control Problem, The FKBC as a Non-Linear Transfer Element, Types of FKBC such as PID-like FKBC, Sliding Mode FKBC, Sugeno FKBC, Adaptation mechanism for FKBC Design & Performance Evaluation, Approaches to Design such as membership function tuning using gradient descent, membership function tuning using performance criteria, the self-organizing controller, model based controller.

**UNIT-IV**

**STABILITY OF FKBC & INTRODUCTION TO NEURO FUZZY CONTROLLERS:** The State space approach, Stability and robustness indices , input-output stability, circle criterion, Application of the Circle Criterion to Design, Conicity criterion, Neural networks based Fuzzy controllers & their applications.

**TEXT BOOKS:**

1. An Introduction to Fuzzy Control: D.,Driankov, H.Hellendoorn and M.Reinfrank.; Narosa Publications.
2. Klir, G.J. & Yuan,B., ' Fuzzy sets and Fuzzy logic, theory and applications', Prentice Hall India Private Limited.

**REFERENCE BOOKS:**

1. Fuzzy Control Systems by Abraham Kandel and Gideon Imngholz; Narosa Publications.
2. Bart Kosko, 'Neural Network & Fuzzy System', PHI

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

EE438B

**RECENT TRENDS IN DEREGULATED POWER SYSTEMS**

**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)  
SEMESTER-VIII**

L T P Credits  
4 - - 4

Class-work Marks : 25  
Exam Marks : 75  
Total Marks : 100  
Duration of Exam : 3 Hrs.

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**UNIT-I**

**Deregulation of the Electricity Supply Industry:** Background of deregulation and the current situation, Benefits from a competitive Electricity Market, After effects of Deregulation.

**UNIT-II**

**Power System Operation in Competitive Environment:** Role of Independent System operator, Operational Planning activities of ISO, operational planning activities of Genco.

**UNIT-III**

**Transmission open Access and Pricing Issues:** Power Wheeling, Transmission Open Access, Cost component in Transmission, Pricing of Power Transmissions, Security Management in Deregulated environment, Congestion management in Deregulation.

**UNIT-IV**

**Reliability and Deregulation:** Reliability Analysis, Optimal Power Flow as a Basic Tool, Unit Commitment, Formation of Power Pools.

**REFERENCE BOOKS:**

1. Lei Lee Lal, Power System Restructuring and Deregulation. UK: John Wiley and Sons, 2001.
2. Kankar Bhattacharya, Math H.J.Bollen and Jaap E. Daalder, Operation of Restructured Power Systems. USA: Kluwer Academic Publishers, 2001.
3. Md Shahidehpour and Muwaffaq Alomoush, Restructured Electrical Power Systems. Marcel Dekker, Inc.
4. S.S. Rao, Switch Gear Protection and Power System Analysis. Khanna Publications.

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.

**EE466B                    UTILIZATION OF ELECTRIC POWER AND TRACTION**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**  
**SEMESTER-VIII**

L   T   P   Credits  
4   -   -   4

Class-work Marks        : 25  
Exam Marks                : 75  
Total Marks                : 100  
Duration of Exam         : 3 Hrs.

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**UNIT-I**

**ILLUMINATION:** Basic laws of illumination, light sources and their characteristics, sources of light, design of lighting schemes, incandescent lamp, sodium lamp, mercury lamp and fluorescent lamp, comparison of various lamps, LED,CFL Lamp.

**UNIT-II**

**ELECTRIC HEATING & WELDING:** Principle and application of resistance, induction and dielectric heating., Resistance welding, arc welding, welding generator and welding transformer, properties of arcing electrode.

**UNIT-III**

**ELECTROLYTIC PROCESS:** Principles and applications of electrolysis. Faraday's law of electrolysis, electroplating, charging and discharging. Capacity and efficiency of battery, defects in battery, maintenance of battery.

**UNIT-IV**

**ELECTRIC TRACTION:** Systems of electric traction, traction motors, traction motor control, multi unit control, braking of electric motors, thyristor control of electric traction., Types of services, speed time and speed distance curves, average and schedule speed, Estimation of power and energy requirements: specific energy consumption. Mechanics of train movement coefficient of adhesion, Adhesive weight, effective weight.

**REFERENCE BOOKS:**

1. Utilization of Electrical Energy : Open Shaw Taylor ; ELBS
2. Art and Science of Utilization of Electrical Energy : H. Pratab ; Dhanpat Rai & Sons, Delhi.
3. Generation, Distribution and Utilization of Electrical Power : C.L. Wadhwa ; Khanna Pub.
4. H.Pratab,"Electric Traction", Dhanpat Rai & Sons.
5. *Utilization of Electrical Energy*, H.Partab, Dhanpat Rai

**NOTE:**

.In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

## B.TECH. (ELECTRICAL &amp; ELECTRONICS ENGG.)

## Semester –VIII

L	T	P	Credits
3	1	-	4

Class Work	:	25 Marks
Theory	:	75 Marks
Total	:	100 Marks
Duration of Exam.	:	3 Hrs.

## UNIT I

**Introduction to Wireless Communication Systems:**

Evolution of Mobile Radio Communications : Introduction, First Generation (1G), Second Generation (2G), Generation (2.5G) , Third Generation (3G), Evolution from 2G To 3G, Fourth Generation (4G), Examples of Wireless Communication Systems , Difference Between Fixed Telephone Network and Wireless Telephone Network, Wireless Local Loop [WLL], Wireless Local Area Networks (WLAN) , Personal Area Network(PAN), Bluetooth.

**The Cellular Concept-System Design Fundamentals**

Introduction, Frequency Reuse, Channel Assignment Strategies, Hand-Off Strategies, Interference and System Capacity, Trunking and Grade of Service, Improving Coverage and Capacity in Cellular Systems.

## UNIT II

**Mobile Radio Propagation: Large Scale Path Loss :**

Introduction to Radio Wave Propagation, Free Space Propagation Model, Practical Link Budget Design Using Path Loss Models, Outdoor Propagation Models, Indoor Propagation Models, Signal Penetration into Buildings.

**Mobile Radio Propagation: Small Scale Fading and Multipath:**

Small Scale Multipath Propagation, Impulse Response Model of a Multipath Channel, Small Scale Multipath Measurements, Parameters of Mobile Multipath Channels ,Types of Small Scale Fading, Rayleigh and Ricean Distributions.

## UNIT III

**Equalization and Diversity :**

Fundamentals of Equalization, Equalizer in a Communication Receiver, Linear Equalizer, Non Linear Equalization, Diversity Techniques, Rake Receiver, Interleaving

**Multiple Access Techniques for Wireless Communication :**

Introduction, Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Spread Spectrum Multiple Access, Space Division Multiple Access (SDMA), Capacity of Cellular System.

## UNIT IV

**Wireless Networking :**

Introduction to Wireless Networks, Development of Wireless Networks, Traffic Routing in Wireless Networks, Wireless Data Services, Common Channel Signaling, Integrated Services Digital Network (ISDN), Signalling System No.7(SS 7),Personal Communication Services/Networks.(PCS/PCN)

**Wireless Systems and Standards:**

Global System for Mobile (GSM),Cdma Digital Cellular Standard(IS-95),GPRS,EDGE,W-Cdma,Cdma2000

**Text Books :**

1. T.S. Rappaport, “Wireless Communication, Principles & Practice,” PHI .
2. Rajeshwar Dass, “Wireless Communication Systems,” I.K International Pvt. Ltd
3. Jochen Schiller, “Mobile Communication,” Pearson Education

**Reference Books:**

1. William, C Y Lee, “Mobile Cellular Telecommunications,” Mc Graw Hill
2. Dr. Kamilo Feher “Wireless and Digital Communication,” PHI

**NOTE:**

In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.

**EE444B      ELECTRICAL POWER QUALITY**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**  
**SEMESTER-VIII**

L   T   P   Credits  
4   -   -   4

Class-work Marks      : 25  
Exam Marks              : 75  
Total Marks              : 100  
Duration of Exam        : 3 Hrs.

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**UNIT-I**

**Introduction to Electrical Power Quality:** Power Quality, Concern in Power System, Power Quality Issues, Standards of Power Quality.

**Voltage Sags and Interruptions:** Sources of Sags and Interruptions, Fundamental Principles of Protection, Solutions at End User Level, Comparison of Different Ride-Through Alternatives.

**UNIT-II**

**Transient Overvoltages:** Sources of Transient Overvoltages, Principles of Overvoltage Protection, Devices for Overvoltage Protection, Strategies for Utility System Lightning Protection, Switching Transient Problems with Loads.

**Harmonics:** Harmonics Distortion, Power System Quantities under Nonsinusoidal Conditions, Harmonic Indices, Harmonics Sources from Commercial and Industrial Loads, Effects of Harmonic Distortion on Power System Equipments.

**UNIT-III**

**Wiring and Grounding:** Reasons for Grounding, Typical Wiring and Grounding Problems, Solutions to wiring and Grounding Problems.

**Power Quality Monitoring and Evaluation:** Power Quality Monitoring and its Objective, Power Quality Measurement Equipments, Power Quality Evaluation, Different Power Quality Indices used in Power Quality Evaluation.

**UNIT-IV**

**Power Quality Conditioners:** Passive Filters, Active Filters, Hybrid Filters, STATCOM, DSTATCOM, DVR, UPQC.

**Distributed Generation and Power Quality:** Distributed Generation and its Advantages and Disadvantages, Different Distributed Generation Technologies, Different Interfacing Electrical Systems, Power Quality Issues in Distributed Generation.

**TEXT BOOKS:**

1. Electric Power Systems Quality : R.C. Dugan, M. F. McGranaghan and H.W. Beaty, McGraw-Hill.

**REFERENCE BOOKS:**

1. Power System Harmonics: J. Arrillaga, D.A. Bradely and P.S. Bodger, Wiley.
2. Electric Power Quality: G.T. Heydt, Stars in a Circle.
3. Embedded Generation: N. Jenkins, R. Allan, P. Crossley, D. Kirschan and G. Strbac, IEEE Power and Energy Series.
4. Power Quality: C. Sankaran, CRC press.
5. IEEE Recommended Practices and Requirements for Harmonic Control in Electric Power Systems, IEEE Std. 519, 1992.
6. IEEE Recommended Practices on Monitoring Electric Power Quality, IEEE Std.1159, 1995.

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**EE446B      ARTIFICIAL INTELLIGENCE**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**  
**SEMESTER-VIII**

L   T   P   Credits  
4   -   -   4

Class-work Marks      : 25  
Exam Marks              : 75  
Total Marks              : 100  
Duration of Exam        : 3 Hrs.

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**UNIT-I**

**FOUNDATIONAL ISSUES IN ARTIFICIAL INTELLIGENCE:** Foundation and history of AI, AI problems and techniques, AI programming languages, introduction to LISP and PROLOG, problem spaces and searches, blind search strategies, Breadth first- Depth first - heuristic search techniques, Hill climbing, best first - A\* algorithm, AO\* algorithm- game tree, Min max algorithms, game playing- alpha beta pruning.

**UNIT-II**

**KNOWLEDGE REPRESENTATION:** Issues, predicate logic, logic programming, semantic nets, frames and inheritance, constraint propagation, representing knowledge using rules, rules based deduction systems.

**APPROXIMATE REASONING:** Reasoning under uncertainty, review of probability, Baye's probabilistic inferences and Dempster Shafer theory, Heuristic methods, symbolic reasoning under uncertainty, Statistical reasoning, Fuzzy reasoning, Temporal reasoning, Non-monotonic reasoning.

**UNIT-III**

**PLANNING & LEARNING:** Planning in situational calculus, Representation for planning, Partial order planning algorithm, Learning from examples, Discovery as learning, Learning by analogy, Explanation based learning, Introductory remarks on learning by Neural Networks and Genetic Algorithms.

**UNIT-IV**

**APPLICATIONS:** Rule based systems architecture, Expert systems, Knowledge acquisition concepts, AI application to robotics, and current trends in intelligent systems.

**TEXT BOOK:**

1. Artificial Intelligence: A Modern Approach,. Russell & Norvig. Prentice Hall, 1995.

**REFERENCE BOOKS:**

1. Elain Rich and Kevin Knight, "Artificial Intelligence", TMH, 1991.
2. Staurt Russel and Peter Norvig, "Artificial Intelligence - A modern approach", PHI, 1998.
3. Patrick Henry Winston, "Artificial intelligence", 3<sup>rd</sup> Ed., Addition Wesley, 1992.
4. Dan W. Patterson, "Artificial Intelligence", PHI, 1990

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

ECE416B

**DIGITAL IMAGE PROCESSING**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**  
Semester –VIII

L T P Credits  
4 - - 4

Class Work : 25 Marks  
Theory : 75 Marks  
Total : 100 Marks  
Duration of Exam. : 3 Hrs.

**UNIT I**

**Introduction to Digital Image processing :**

Development of Digital Image processing, Components of an Image Processing System, Fundamental steps in Image Processing, Different Levels of Processing, Lower Level Processing Techniques, Applications of Image Processing

**Introduction to Image Acquisition:**

Capturing Devices, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition: Image Acquisition using a single sensor, Image Acquisition using sensor strips, Image Acquisition using sensor arrays, A simple Image formation model.

**UNIT II**

**Elements of Visual Perception:**

Structure of the Human Eye, Image Formation in Eye, Brightness Adaptation and Discrimination.

**Image Digitization and Pixels:**

Basic Concepts in sampling and quantization, Representing Digital Images, Spatial and Intensity Resolution, Image Interpolation, Some Basic Relationships between pixels: Neighbours of a Pixel, Adjacency, Connectivity, Regions, and Boundaries, Distance Measures.

**UNIT III**

**Image processing tools:**

Array versus Matrix Operations, Linear vs Nonlinear Operations, Arithmetic Operations, Set & Logical Operations, Spatial Operations, Vector and Matrix Operations, Probabilistic methods.

**Image Transforms & Image Registration:**

Unitary Transforms: Separable Unitary Transforms, Basis Images, Orthogonal Transforms, Basic Information Theory; Fourier Transform, Discrete Fourier Transform, Properties of Fourier Transform, Convolution & Correlation, Convolution in Frequency domain.

Geometrical Transformations: Basic Transformations, Applications of Geometrical Transformations; Image mapping: Determining a set of Landmarks, Image Transformation Matrices, Computing Transformation Coefficients; Problems of Transforming Digital Images: Direct mapping, Reverse mapping, Grey Level Interpolation.

**UNIT IV**

**Image Enhancement in Spatial Domain:**

Pixel Grey Level Transformation: Linear & Nonlinear Transformations, Grey Level Slicing, Bit-Plane Slicing, Image Averaging; Mask Based Processing: Smoothing Linear filter, Geometric Mean Filter, Harmonic Mean Filter, Median Filter, Max & Min Filters, Sharpening Filters, Image blurring and deblurring; Histogram Processing: Histogram Equalization, Contrast Stretching.

**Image Enhancement in Frequency Domain:**

Basics of Filtering in the frequency domain: Frequency domain filtering fundamentals, Steps for frequency domain filtering, correspondence between filtering in the spatial and frequency domains, Image smoothing: Ideal Low pass filter, Butterworth Low pass Filter, Gaussian filter; Image sharpening: Ideal High Pass Filter, Butterworth High Pass Filter, Gaussian high pass filter.

**Text Books:**

1. Rafael C. Gonzalez and Richard E. Woods, "Digital Image Processing", Pearson
2. M. K. Pakhira, "Digital Image Processing and Pattern Recognition", PHI

**Reference Books:**

1. Anil K Jain, "Fundamentals of Digital Image Processing", PHI Edition 1997.
2. Keenneth R Castleman, " Digital Image Processing", Pearson
3. Chanda & Majumder, "Digital Image Processing & Analysis", PHI

**NOTE:**



In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.

**EE450B            POWER MANAGEMENT**  
**B.TECH. (ELECTRICAL & ELECTRONICS ENGG.)**  
**SEMESTER-VIII**

L    T    P    Credits  
4   -   -        4

Class-work Marks        : 25  
Exam Marks                : 75  
Total Marks                : 100  
Duration of Exam         : 3 Hrs.

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**UNIT-I**

**INTRODUCTION:** Power Scenario, Power Development, Planning, Power resources, Environment-Power matters Plan, Pre-feasibility and feasibility studies, State relations for Power etc. **Aspects of Risk & Hazard Health & risk assessment visit to site.**

**UNIT-II**

**RESOURCES & PROCUREMENT:** Resources, Geophysical study, Seismic Considerations, Environmental Restraints, Resettlement and Rehabilitation. Contracting and Procurement, Consulting Services, Contracts, Project Management.

**UNIT-III**

**ENGINEERING:** Engineering & General Layout of Equipments, Generator, Transformer and Switch Gear and Control Equipment, Construction Methods, Operation and Maintenance Principle, Maintenance organization and planning, Availability, life cycle cost & future development. Visits to sites.

**UNIT-IV**

**POWER SECTOR & STATION:** Power sector structure in different states, Regulatory Regime in those states, Power utilities in Haryana, Grid management, Power financing, Visit to sites. Management of Fuel, water Resource Electricity deviend scenario storage and handling, Pricing, Contract etc, Human resource management, Visit to sites.State and Central Power boards / Power corporations.

**REFERENCE BOOKS:**

1. Electricity Bill, Safety & Conservation Act
2. Arora & Dom Kundwar, A Course in Power Plant Engineering, Pub.: Dhanpat Rai Pub, 2000.
3. Jain & Bala Subranmanyam, "Power Plant Engineering", Dhanpat Rai Pub.,
4. Butter Worth, A.B. Gill, "Power Plant Performance Management", Pub:1984.
5. P.C. Sharma, "Power Plant Engineering", Dhanpat Rai Pub.,
6. David A. Decenzo, Stephen P. Robbins, Human Resource Management. New Delhi: PHI Pvt. Ltd., 2004.
7. P.K. Nag, Power Plant Engg. N.Delhi: TMH, 2003.

**NOTE:**

1. In the semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.