SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

(Affiliated to J.N.T. University Anantapur)

ACADEMIC REGULATIONS

B.Tech. Regular Four Year Degree Programme

(for the batches admitted from the academic year 2010–11)

&

B.Tech. (Lateral Entry Scheme)

(for the batches admitted from the academic year 2011–12)

For pursuing four year undergraduate Bachelor Degree programme of study in Engineering (B.Tech) offered by Sree Vidyanikethan Engineering College under Autonomous status and herein after referred to as SVEC (Autonomous):

1. Applicability : All the rules specified herein, approved by the Academic Council, will be in force and applicable to students admitted from the academic year 2010-2011 onwards. Any reference to "College" in these rules and regulations stands for Sree Vidyanikethan Engineering College (Autonomous).

2. Extent : All the rules and regulations, specified herein after shall be read as a whole for the purpose of interpretation and as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, Principal, Sree Vidyanikethan Engineering College shall be the Chairman, Academic Council.

3. Admission :

3.1. Admission into first year of Four Year B.Tech. Degree programme of study in Engineering:

3.1.1. Eligibility : A candidate seeking admission into the First Year of four year B.Tech. Degree Programme should have

(i) passed either Intermediate Public Examination (I.P.E) conducted by the Board of Intermediate Education, Andhra Pradesh, with Mathematics, Physics and Chemistry as optional subjects (or any equivalent examination recognized by JNTUA, Anantapur) or a Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Andhra Pradesh (or equivalent Diploma recognized by JNTUA, Anantapur) for admission as per the guidelines of APSCHE.

(ii) secured a rank in the EAMCET examination conducted by A.P. State Council for Higher Education for allotment of a seat by the Convener, EAMCET, for admission.

3.1.2. Admission Procedure: Admissions are made into the first year of four year B.Tech. Degree programme as per the stipulations of A.P State Council of Higher Education (APSCHE), Government of Andhra Pradesh.

(a) By the Convener, EAMCET, (for Category-A Seats).

(b) By the Management (for Category-B Seats).

3.2. Admission into the Second Year of Four year B.Tech. Degree programme in Engineering

3.2.1. Eligibility: Candidates qualified in ECET (FDH) and admitted by the Convener, ECET (FDH).

In all such cases for admission, when needed, permissions from the statutory bodies are to be obtained.

3.2.2. Admission Procedure: 10% of the sanctioned strength in each programme of study as lateral entry students or as stipulated by APSCHE shall be filled by the Convener, ECET (FDH).

4. Programmes of study offered leading to the award of B.Tech. degree

Following are the four year undergraduate Degree programmes of study offered in various branches in SVEC (Autonomous) leading to the award of B.Tech. (Bachelor of Technology) Degree:

1) B.Tech. (Biotechnology)
2) B.Tech. (Civil Engineering)
3) B.Tech. (Computer Science & Engineering)
4) B.Tech. (Computer Science & Systems Engineering)
5) B.Tech. (Electrical & Electronics Engineering)
6) B.Tech. (Electronics & Communication Engineering)
7) B.Tech. (Electronics & Control Engineering)
8) B.Tech. (Electronics & Instrumentation Engineering)
9) B.Tech. (Information Technology)
10) B.Tech. (Mechanical Engineering)

5. Academic Year: The College shall follow Year-wise pattern for First year course of four year B.Tech programme and Semester system from second year onwards for conducting all its curricula. An academic year shall consist of a first semester and a second semester from second year onwards and the summer term follows in sequence.

The first year of four year B.Tech programme shall have a duration to accommodate a minimum of 31 instructional weeks. The first and second semesters (from second year onwards) shall have the duration to accommodate a minimum of 17 instructional weeks per semester.

First Year B.Tech (38 weeks)	Instruction Period: I Spell :11 weeks II Spell :10 weeks III Spell :10 weeks Mid Examinations: I Mid :1 week II Mid :1 week III Mid :1 week	34 weeks
	Preparation & Practical Examinations	2 weeks
	External Examinations	2 weeks
	Summer vacation	4 weeks
First Semester (23 weeks)	Instruction Period: I Spell :9 weeks II Spell :8 weeks Mid Examinations: I Mid :1 week II Mid :1 week	19 weeks
	Preparation & Practical Examinations	2 weeks
	External Examinations	2 weeks
Second Semester (23 weeks)	Semester Break	2 weeks
	Instruction Period: I Spell :9 weeks II Spell :8 weeks Mid Examinations: I Mid :1 week II Mid :1 week	19 weeks
	Preparation & Practical Examinations	2 weeks
	External Examinations	2 weeks
	Summer vacation	4 weeks

6. Course Structure : Each programme of study shall consist of:

- General Courses comprising of the following:
  - i. Language / Communication Skills
  - ii. Humanities and Social Sciences
  - iii. Economics and Principles of Management
  - iv. Environmental Sciences

The above courses are common to all branches.

- Basic Science Courses comprising of the following:
    i. Computer Literacy with Numerical Analysis
    ii. Mathematics
    iii. Physics
    iv. Chemistry

The above courses are common to all branches.

- Core Engineering Courses comprising of the following, depending on the branch:
    i. Engineering Graphics
    ii. Workshop Practice
    iii. Engineering Mechanics
    iv. Electrical Sciences
    v. Thermodynamics and Heat Transfer
    vi. Material Sciences and Engineering
    vii. Engineering Systems Design
    viii. Building Materials
    ix. Surveying
    x. Transport Phenomena
    xi. Basic Electronics
    xii. Computer Programming
- Compulsory Discipline Courses:

The list of professional subjects are chosen as per the suggestions of the experts, to impart broad based knowledge needed in the concerned branch of study.

- Elective Courses:

Electives will be offered to the students to diversify the spectrum of knowledge. The electives can be chosen based on the interest of the student to broaden his individual skill and knowledge.

The students shall complete:

- A mini project in an industry during the summer term following the second semester of third year B.Tech. programme for a period of 4 weeks. A report shall be submitted to the Department after successful completion of the mini project.

Every programme of study shall be designed to have 40-42 theory courses and 14-16 laboratory courses. Distribution of types of courses is indicated below:

General Courses	5-10%
Basic Science Courses	15-25%
Core Engineering Courses	15-25%
Compulsory Discipline Courses	45-55%
Elective Courses	10-15%

Note: All components prescribed in the curriculum of any programme of study shall be conducted and evaluated.

Contact Periods : Depending on the complexity and volume of the course, the number of contact periods per week will be assigned.

7. Credit System: Credits are assigned based on the following norms.

Norms for assigning credits are shown below :

Subject	Year Pattern		Semester Pattern	
	Period(s)/ Week	Credits	Period(s)/ Week	Credit(s)
Theory	01	02	01	01
Practical	03	04	03	02
Mini Project	--	--	--	02
Seminar	--	--	--	02
Comprehensive Viva-Voce	--	--	--	02
Final Year Project	--	--	--	12

i. As a norm, for the theory subjects, **one credit** for one contact period per week is assigned in semester system. In yearly pattern **two credits** for one contact period per week is assigned.

ii. As a norm, for practical courses **two credits** will be assigned for three contact periods per week in semester pattern. In yearly pattern **four credits** will be assigned for three contact periods per week.

iii. Tutorials do not carry any credits. However, each of the analytical and problem oriented courses will have one tutorial hour per week. Audit courses do not carry any credits.

iv. For courses like Mini Project/Project/Seminar/Comprehensive Viva-Voce, where formal contact hours are not specified, credits are assigned based on the complexity of the work to be carried out.

- The four year curriculum of any B.Tech. programme of study shall have total of 220 credits. The exact requirements of credits for each course will be as recommended by the concerned Board of Studies and approved by the Academic Council.
- In the case of lateral entry students, B.Tech. programme for II, III, IV years of study shall have a total 170 credits.

8. Examination System : All components in any programme of study will be evaluated continuously through internal evaluation and an external evaluation component conducted as year-end/semester-end examination.

8.1. Distribution of Marks:

<table>
<tr><th>S.No.</th><th>Examination</th><th>Marks</th><th colspan="2">Examination and Evaluation</th><th>Scheme of examination</th></tr>
<tr><td rowspan="3">1</td><td rowspan="3">Theory</td><td>70</td><td colspan="2">Year-end / Semester-end examination (external evaluation)</td><td>The examination question paper in theory subjects will be for a maximum of 70 marks. The question paper shall be of descriptive type with 8 questions out of which 5 are to be answered in 3 hours duration of the examination.</td></tr>
<tr><td rowspan="2">30</td><td rowspan="2">20</td><td rowspan="2">Mid - Examination of 90 Min. duration (Internal evaluation). The question paper shall be of descriptive type with 5 questions out of which 3 are to be answered and evaluated for 20 marks.</td><td><u>For I B.Tech:</u> Three (03) mid-term exams, each for 20 marks are to be conducted. For a total of 20 marks, average of the best two mid-term exams shall be considered.
Mid-I: After first spell of instructions (I and II Units).
Mid-II: After second spell of instructions (III to V Units).
Mid-III: After third spell of instructions (VI to VIII Units)</td></tr>
<tr><td><u>For a Semester:</u> Two midterm exams , each for 20 marks are to be conducted. For a total of 20 marks, better of the two shall be considered.
Mid-I: After first spell of instructions (I to IV Units).
Mid-II: After second spell of instructions (V to VIII Units).</td></tr>
</table>

			10	Assignment Tests (Internal evaluation)	For I B.Tech: Three assignment tests each of 10 marks shall be conducted. Average of best two assignment tests shall be taken as internal marks for the assignments. For a Semester: Two assignment tests each of 10 marks shall be conducted. Better of the two assignments shall be internal marks for the assignments.
2	Laboratory	50	Year-end / Semester-end Lab Examination (External evaluation)		50 marks are allotted for laboratory/drawing examination during year-end / semester-end.
		25	15	Day-to-Day evaluation	Performance in laboratory experiments/ drawing and record.
			10	Internal evaluation	Practical Tests. (For first year three tests and for semester two tests.)
3	a) Seminar	75	75	Internal evaluation	Continuous evaluation during a semester by the Departmental Committee (DC).
	b) Comprehensive Viva-Voce	100	100	Internal evaluation	Viva-Voce examination will be conducted during IV year II semester by a committee consisting of HOD and two senior faculty members of the department
4	Mini Project	75	50	External evaluation	Semester-end Mini-Project Viva-Voce examination will be conducted in the manner similar to external evaluation of laboratory course by HOD and supervisor as examiners.
			25	Internal evaluation	Continuous evaluation by the DC

5	Project Work	225	150	External evaluation	Semester-end Project Viva-Voce Examination by Committee as detailed under 8.2.
			75	Internal evaluation	Continuous evaluation by the DC

8.2 Seminar/ Project Work / Machine Drawing/Audit Course Evaluation:

i. There shall be a seminar presentation in III year II Semester. For the seminar, the student shall collect information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the Department before presentation. The report and the presentation shall be evaluated by the Departmental Committee (**DC**) consisting of Head of the Department, supervisor and a senior faculty member. There shall be no external examination for seminar.

ii. The Semester-End Examination (Project viva-voce) shall be conducted by a Committee consisting of an External examiner nominated by the Chief Controller of Examinations, HOD & Supervisor. The evaluation of project work shall be conducted at the end of the IV year. The Internal Evaluation shall be made by the Departmental Committee, on the basis of two seminars presented by each student on the topic of his project.

iii. For the subject Machine Drawing, the distribution shall be 30 marks for internal evaluation and 70 marks for end examination. The internal evaluation will be 15 marks for day-to-day work in the class that shall be evaluated by the concerned subject teacher based on the reports/ submissions prepared in the class. And there shall be two midterm exams in a Semester for a duration of 3 hours each, evenly distributed over the syllabi for 15 marks and the better of the two shall be considered as internal test marks. The sum of day to day evaluation and the internal test marks will be the final sessionals for the subject. End examination will be conducted for 4 hours.

iv. For audit courses, attendance has to be considered like in case of any regular subject. For theory subjects course files and for laboratory subjects laboratory manuals and student observations have to be maintained. Two internal tests per semester (three in case of yearly pattern) have to be conducted by the subject teacher, preferably just before regular mid-term examinations. Students may be encouraged to give seminars on the course topics.

8.3. Eligibility to appear for the Year-end / Semester-end examination:

1. A student shall be eligible to appear for year-end / semester-End examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in a year/ semester.
2. Condonation of shortage of attendance in aggregate upto 10% (65% and above and below 75%) in first year or each semester may be granted by the College Academic Committee.
3. Shortage of Attendance below 65% in aggregate shall in no case be condoned.
4. Students whose shortage of attendance is not condoned in First year/any semester are not eligible to take their Semester-end examination of that class and their registration shall stand cancelled.
5. A student will not be promoted to the next semester unless he satisfies the attendance requirements of the current year/semester, as applicable. The student may seek readmission for the year/ semester when offered next. He will not be allowed to register for the subjects of the semester while he is in detention. A student detained due to shortage of attendance, will have to repeat that semester when offered next.
6. A stipulated fee shall be payable towards condonation of shortage of attendance to the College.

8.4. Evaluation: Following procedure governs the evaluation.

8.4.1. Marks for components evaluated internally by the faculty should be submitted to the Controller of Examinations one week before the commencement of the semester-end examinations. The marks for the internal evaluation components will be added to the external evaluation marks secured in the year/semester-end examinations, to arrive at total marks for any subject in that year/semester.

8.4.2. Performance in all the courses is tabulated course-wise and will be scrutinized by the Examination Committee and moderation is applied if needed, and course-wise marks lists are finalized. Total marks obtained in each course are converted into letter grades.

8.4.3. Student-wise tabulation is done and student-wise memorandum of grades (Grade Sheet) is generated which is issued to the student.

8.5. Personal verification / Revaluation / Recounting :

Students shall be permitted for personal verification/request for recounting/ revaluation of the semester-end examination answer scripts within a stipulated period after payment of prescribed fee.

After recounting or revaluation, records are updated with changes if any and the student will be issued a revised grade sheet. If there are no changes, the student shall be intimated the same through a letter or a notice.

8.6. Supplementary Examination:

In addition to the regular year-end / semester-end examinations conducted, the College may also schedule and conduct supplementary examinations for all the subjects of other year/ semesters when feasible for the benefit of students. Such of the candidates writing supplementary examinations may have to write more than one examination per day.

9. Academic Requirements for promotion/ completion of regular B.Tech Programme of study:

The following academic requirements have to be satisfied in addition to the attendance requirements for promotion/ completion of regular B.Tech Programme of study.

For students admitted into B.Tech. (Regular) programme:

i. A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, design, drawing subject or project, if he secures not less than 40% of marks in the semester-end examination and a minimum of 40% of marks in the sum total of the internal evaluation and semester-end examination taken together. For the seminar he should secure 40% of marks in the internal evaluation.

ii. A student shall be promoted from second year to third year of programme of study only if he fulfils the academic requirement of securing 39 credits from

a. One regular and one supplementary examinations of first year

b. One regular examination of second year first semester

irrespective of whether the candidate appear the semester-end examination or not as per the normal course of study.

iii. A student shall be promoted from third year to fourth year of programme of study only if he fulfils the academic requirements of securing 67 credits from

a. Two regular and two supplementary examinations of first year

b. Two regular and one supplementary examinations of second year first semester

c. One regular and one supplementary examinations of second year second semester

d. One regular examination of third year first semester

irrespective of whether the candidate appear the semester-end examination or not as per the normal course of study and in case of getting detained for want of credits by sections 9(ii) and 9(iii) above, the student may make up the credits through supplementary examinations before the date of commencement of class work for III year I semester or IV year I semester respectively.

iv A student shall register for all the 220 credits and earn all the 220 credits. Marks obtained in all the 220 credits shall be considered for the award of the class basing on CGPA.

v. A student who fails to earn 220 credits as indicated in the course structure within **eight** academic years from the year of their admission shall forfeit their seat in B.Tech. programme and their admission stands cancelled.

vi. Students who are detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same (or) equivalent subjects as and when subjects are offered, and pursue the remaining course work with the academic regulations of the batch into which such students are readmitted. However, all such readmitted students shall earn all the credits of subjects they have pursued for completion of the course.

For Lateral Entry Students (batches admitted from 2011–2012):

i. A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, design, drawing subject or project if he secures not less than 40% of marks in the semester-End examination and a minimum of 40% of marks in the sum total of the internal evaluation and semester-end examination taken together. For the seminar he should secure 40% of marks in the internal evaluation.

ii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing 42 credits from :

   a. Two regular and one supplementary examinations of II year I semester
   b. One regular and one supplementary examinations of II year II semester
   c. One regular examination of III year I semester.

   irrespective of whether the candidate appear the Semester-End examination or not as per the normal course of study and in case of getting detained for want of credits the student may make up the credits through supplementary exams of the above exams before the date of commencement of class work for IV year I semester.

iii. A student shall register for all 170 credits and earn all the 170 credits. Marks obtained in all 170 credits shall be considered for the award of the class basing on CGPA.

iv. A student who fails to earn 170 credits as indicated in the course structure within **six** academic years from the year of their admission shall forfeit their seat in B.Tech. programme and their admission stands cancelled.

v. Students who are detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of classwork with the same (or) equivalent subjects as and when subjects are offered, and pursue the remaining course work with the academic regulations of the batch into which such students are readmitted. However, all such readmitted students shall earn all the credits of subjects they have pursued for completion of the course.

10. Transitory Regulations:

Students who are detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same (or) equivalent subjects as and when subjects are offered, and pursue the remaining course work with the academic regulations of the batch into which such students are readmitted.

A regular student has to satisfy all the eligibility requirements within the maximum stipulated period of **eight years**, and a lateral entry student within **six years**, for the award of B.Tech. Degree.

11. Grades, Grade Point Average and Cumulative Grade Point Average:

11.1. Grade System: After all the components and sub-components of any subject (including laboratory subjects) are evaluated, the final total marks obtained will be converted to letter grades on a "**10 point scale**" described below.

Grades conversion and Grade points attached

% of Marks obtained	Grade	Description of Grade	Grade Points (GP)
≥ 95	O+	Extraordinary	10
≥ 90 & < 95	O	Outstanding	9
≥ 80 & < 90	A+	Excellent	8
≥ 70 & < 80	A	Very Good	7
≥ 60 & < 70	B	Good	6
≥ 50 & < 60	C	Fair	5
≥ 40 & < 50	D	Pass	4
Less than 40	F	Fail	0
Not Appeared	N	Absent	0

- **Pass Marks:** A student is declared to have passed theory and/ or laboratory subject, if he secures minimum of 40% marks in external examination, and a minimum of 40% marks in the sum total of internal evaluation and external examination taken together. Otherwise he will be awarded fail grade - **F** in such a course irrespective of internal marks.

  F is considered as a fail grade indicating that the student has to pass the semester-end examination in that course in future and obtain a grade other than **F** and **N** for clearing this subject.

11.2. Grade Point Average (GPA):

Grade Point Average (GPA) will be calculated as given below on a "10 point scale" as an index of the student's performance at the end of I year/ each semester:

$$GPA = \frac{\sum(C \times GP)}{\sum C}$$

where ***C*** denotes the credits assigned to the courses undertaken in that Year/ semester and ***GP*** denotes the grade points earned by the student in the respective courses.

Note:GPA is calculated for the candidates who passed all the courses in that Year/Semester.

11.3. Cumulative Grade Point Average (CGPA):

At the end of every year / semester, a Cumulative Grade Point Average (CGPA) on a 10 point scale is computed considering all the courses done up to that point as an index of overall performance up to that point as given below:

$$CGPA = \frac{\sum(C \times GP)}{\sum C}$$

where ***C*** denotes the credits assigned to courses undertaken upto the end of the current year/semester and *GP* denotes the grade points earned by the student in the respective courses.

Note: The CGPA is awarded only when the student passes in all the courses prescribed for the programme.

Grade Sheet: A grade sheet (Marks Memorandum) will be issued to each student indicating his performance in all courses registered in that semester/year indicating the GPA.

12. Transcripts: After successful completion of the entire programme of study, a transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued, if required, after payment of requisite fee.
Partial transcript will also be issued upto any point of study to a student on request.

13. Award of Degree: The Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Anantapur on the recommendations of the Principal of SVEC (Autonomous).

13.1. Eligibility: A student shall be eligible for the award of B.Tech. Degree, if he fulfills all the following conditions:

- Registered and successfully completed all the components prescribed in the programme of study to which he is admitted.
- Successfully acquired the minimum required credits as specified in the curriculum corresponding to the branch of study within the stipulated time.
- Obtained CGPA greater than or equal to 4.0 (Minimum requirement for declaring as passed).
- Has no dues to the College, Hostel, Library etc. and to any other amenities provided by the College.
- No disciplinary action is pending against him.

13.2. Award of Class: Declaration of Class is based on CGPA.

Cumulative Grade Point Average	Class
> = 7.0	First Class with Distinction
> = 6.0 and < 7.0	First Class
> = 5.0 and < 6.0	Second Class
> = 4.0 and < 5.0	Pass Class

14. Additional academic regulations:

i. A student can appear for any number of supplementary examinations till he clears all courses in which he could not clear in the first attempt.

ii. A regular student has to complete all the eligibility requirements within the maximum stipulated period of **eight** years, and a lateral entry student within **six** years.

iii. A grade sheet (marks memorandum) will be issued to the student indicating his performance in all the courses of that year/semester along with the GPA and CGPA.

iv. A transcript containing the performance in all the components required for eligibility for award of the Degree will be issued to the student.

v. Any attempt to impress upon the examiners, faculty and staff or Controller of Examinations, canvassing in any form either for marks or attendance will be treated as malpractice and the student shall be summarily debarred from the College.

vi. Courses like Projects / Mini-Projects / Seminars can be repeated only by re-registering for all the components in that semester.

vii. When a student is absent for any examination (internal or external) he is treated as to have appeared and obtained **zero** marks in that component (course) and grading is done accordingly.

viii. When a component is cancelled as a penalty, he is awarded zero marks in that component.

15. Amendments to regulations:

The Academic Council of Sree Vidyanikethan Engineering College (Autonomous) reserves the right to revise, amend, or change the Regulations, Scheme of Examinations, and / or Syllabi or any other policy relevant to the needs of the society or industrial requirements etc., without prior notice.

16. General:

Where the words "he", "him", "his", "himself" occur in the regulations, they include "she", "her", "herself".

Note : ***Failure to read and understand the regulations is not an excuse.***

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2010-2011)

I Year B.Tech. (yearly pattern)

Electrical and Electronics Engineering

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
10BT1HS01	Technical English	2	-	-	4	30	70	100
10BT1BS01	Engineering Physics	2	1	-	4	30	70	100
10BT1BS02	Engineering Chemistry	2	1	-	4	30	70	100
10BT1BS03	Engineering Mathematics	3	1	-	6	30	70	100
10BT1BS04	Mathematical Methods	3	1	-	6	30	70	100
10BT1EC01	Problem Solving and Computer programming	3	1	-	6	30	70	100
10BT1EC02	Engineering Drawing	-	1	3	4	25	50	75
10BT1EC03	Computer programming Lab	-	-	3	4	25	50	75
10BT1BS06	Engineering Physics and Engineering Chemistry Lab	-	-	3	4	25	50	75
10BT1HS02	English Language and Communication skills Lab	-	-	3	4	25	50	75
10BT1EC04	Engineering and IT workshop	-	-	3	4	25	50	75
	TOTAL	**15**	**6**	**15**	**50**	**305**	**670**	**975**

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(Autonomous)
Sree Sainath Nagar, Tirupati - 517 102

Department of Electrical and Electronics Engineering

B.Tech. (EEE) Course Structure
2010 - 2011

II YEAR : I SEMESTER

Subject Code	Subject	Periods per Week			C	Scheme of Examination Maximum Marks		
		L	T	P		Internal	External	Total
10BT3BS03	Special Functions and Complex Analysis	4	1	-	4	30	70	100
10BT30121	Fluid Mechanics and Hydraulic Machinery	4	1	-	4	30	70	100
10BT30401	Semiconductor Devices and Circuits	4	1	-	4	30	70	100
10BT40404	Switching Theory and Logic Design	4	1	-	4	30	70	100
10BT30201	Electrical Circuits	4	1	-	4	30	70	100
10BT30202	DC Machines	4	1	-	4	30	70	100
10BT40112	Fluid Mechanics and Hydraulic Machinery Lab	-	-	3	2	25	50	75
10BT30211	DC Machines Lab	-	-	3	2	25	50	75
	Total	**24**	**6**	**6**	**28**	**230**	**520**	**750**

II YEAR : II SEMESTER

Subject Code	Subject	Periods per Week			C	Scheme of Examination Maximum Marks		
		L	T	P		Internal	External	Total
10BT40421	Analog Electronic Circuits	4	-	-	4	30	70	100
10BT40201	Network Analysis and Synthesis	4	-	-	4	30	70	100
10BT40202	Electromagnetic Fields	4	1	-	4	30	70	100
10BT40203	Generation of Electrical Power	4	-	-	4	30	70	100
10BT40204	Electrical Measurements	4	1	-	4	30	70	100
10BT40205	Transformers and Induction Machines	4	1	-	4	30	70	100
10BT30411	Semiconductor Devices and Circuits Lab	-	-	3	2	25	50	75
10BT40211	Electrical Circuits and Simulation Lab	-	-	3	2	25	50	75
10BT4HS02	**Audit Course:** Advanced English Communication Skills	-	3	-	-	-	-	-
	Total	**24**	**6**	**6**	**28**	**230**	**520**	**750**

III YEAR : I SEMESTER

Subject Code	Subject	Periods per Week			C	Scheme of Examination Maximum Marks		
		L	T	P		Internal	External	Total
10BT3BS02	Environmental Sciences	4	1	-	4	30	70	100
10BT40501	Computer Architecture and Organization	4	1	-	4	30	70	100
10BT41301	Control Systems	4	1	-	4	30	70	100
10BT50201	Power Electronics	4	1	-	4	30	70	100
10BT50202	AC Machines	4	1	-	4	30	70	100
10BT50203	Electrical Power Transmission	4	1	-	4	30	70	100
10BT50211	Transformers and AC Machines Lab	-	-	3	2	25	50	75
10BT50212	Measurements and Testing Lab	-	-	3	2	25	50	75
	Total	**24**	**6**	**6**	**28**	**230**	**520**	**750**

III YEAR : II SEMESTER

Subject Code	Subject	Periods per Week			C	Scheme of Examination Maximum Marks		
		L	T	P		Internal	External	Total
10BT4HS01	Managerial Economics and Principles of Accountancy	4	1	-	4	30	70	100
10BT60401	Digital Signal Processing	4	1	-	4	30	70	100
10BT50422	Linear and Digital IC Applications	4	1	-	4	30	70	100
10BT60404	Microprocessors and Microcontrollers	4	1	-	4	30	70	100
10BT60201	Utilization of Electrical Energy	4	1	-	4	30	70	100
10BT60202	Power Semiconductor Drives	4	1	-	4	30	70	100
10BT60211	Control Systems and Simulation Lab	-	-	3	2	25	50	75
10BT60212	Power Electronics and Simulation Lab	-	-	3	2	25	50	75
10BT60213	Seminar	-	-	-	2	75	-	75
	Total	**24**	**6**	**6**	**30**	**305**	**520**	**825**

IV YEAR : I SEMESTER

Subject Code	Subject	Periods per Week			C	Scheme of Examination Maximum Marks		
		L	T	P		Internal	External	Total
10BT6HS01	Management Science	4	-	-	4	30	70	100
10BT70201	Switchgear and Protection	4	-	-	4	30	70	100
10BT70202	Power System Operation and Control	4	1	-	4	30	70	100
10BT70203	Power System Analysis	4	1	-	4	30	70	100
	Elective - I	4	1	-	4	30	70	100
	Elective - II	4	1	-	4	30	70	100
10BT60411	Microprocessors and Microcontrollers Lab	-	-	3	2	25	50	75
10BT70211	Power Systems and Simulation Lab	-	-	3	2	25	50	75
10BT70212	Mini Project	-	-	-	2	25	50	75
10BT7HS01	**Audit Course:** Professional Ethics	-	2	-	-	-	-	-
	Total	**24**	**6**	**6**	**30**	**255**	**570**	**825**

Subject Code	Subject
	ELECTIVE - I
10BT71302	Programmable Logic Controllers
10BT50423	Principles of Communication
10BT60405	VLSI Design
10BT70421	Advanced Microprocessors and Microcontrollers
	ELECTIVE - II
10BT51301	Advanced Control Systems
10BT70204	Flexible AC Transmission
10BT70205	High Voltage DC Transmission
10BT70206	Renewable Energy Sources

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24 6

IV YEAR : II SEMESTER

Subject Code	Subject	Periods per Week			C	Scheme of Examination Maximum Marks		
		L	T	P		Internal	External	Total
10BT70405	Embedded and Real Time Systems	4	1	-	4	30	70	100
	Elective – III	4	1	-	4	30	70	100
	Elective – IV	4	1	-	4	30	70	100
10BT80211	Comprehensive Viva-Voce	-	-	-	2	100	-	100
10BT80212	Project	-	-	12	12	75	150	225
	Total	**12**	**3**	**12**	**26**	**265**	**360**	**625**

Subject Code	Subject
	ELECTIVE - III
10BT50503	Database Management Systems
10BT70521	Operating System Principles
10BT71301	Neural Networks and Fuzzy Systems
10BT4EC01	Optimization Techniques
	ELECTIVE - IV
10BT80201	EHVAC Transmission
10BT80202	Distribution of Electrical Power
10BT80203	High Voltage Engineering
10BT80204	Reliability Engineering and Applications to Power Systems

B.Tech., I Year	L	T	P	C
10BT1HS01: TECHNICAL ENGLISH	**2**	**-**	**-**	**4**

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITE: Basic Grammar and Fundamentals of Writing Skills.

COURSE DESCRIPTION: Heaven's Gate and Mokshagundam Visvesvaraya; Sir C.V.Raman and Mother Teresa; The Connoisseur and Dr. Amartya Kumar Sen; The Cuddalore Experience and Kalpana Chawla; Bubbling Well Road and Nandan Nilekani; The Odds Against us and Charles Chaplin; Exercises on Reading and writing skills and Remedial Grammar.

COURSE OUTCOMES: After completion of the course, a successful student will be able to**:**

1. Acquire fundamental and functional knowledge of English Language, Grammar and Communication Skills.

2. Analyze and judge the situation through productive skills (speaking and writing) and receptive skills (listening and reading) of English Language for effective communication and practice.

3. Communicate effectively with the engineering community and society to deliver effective solutions for professional practice.

Detailed Syllabus:

UNIT – I:

Lesson entitled **Heaven's Gate** from **Enjoying EverydayEnglish,** Published by Sangam Books, Hyderabad.
Lesson entitled **Mokshagundam Visvesvaraya** from **Inspiring Lives,** Published by Maruthi Publications, Guntur.

UNIT – II:

Lesson entitled **Sir CV Raman: a Path breaker in the Saga of Indian Science** from **Enjoying Everyday English,** Published by Sangam Books, Hyderabad.
Lesson entitled **Mother Teresa** from **Inspiring Lives,** Publishedby Maruthi Publications, Guntur.

UNIT – III:

Lesson entitled **The Connoisseur** from **Enjoying Everyday English,** Published by Sangam Books, Hyderabad
Lesson entitled **Dr. Amartya Kumar** Sen from **Inspiring Lives,** Published by Maruthi Publications, Guntur

UNIT – IV:
Lesson entitled **The Cuddalore Experience** from **Enjoying Everyday English,** Published by Sangam Books, Hyderabad
Lesson entitled Kalpana Chawla from Internet

UNIT – V:
Lesson entitled **Bubbling Well Road** from **Enjoying Everyday English,** Published by Sangam Books, Hyderabad
Lesson entitled **Nandan Nilekani** from Internet.

UNIT – VI:
Lesson entitled **The Odds against** Us from E**njoying Everyday English,** Published by Sangam Books, Hyderabad
Lesson en tit led **Charles Chaplin** from **Inspiring Lives,** Published by Maruthi Publications, Guntur
Exercises from the lessons not prescribed shall also be used for classroom tasks.

UNIT – VII:
Exercises on Reading and Writing Skills :
Reading Comprehension
Letter writing
Essay writing

UNIT – VIII:
Practice Exercises on Remedial Grammar :
Common errors in English
Subject-Verb agreement
Articles
Prepositions
Tenses
Active/Passive Voice
Reported Speech

TEXT BOOKS:
1. **Detailed study :** Enjoying Everyday English, Sangam Books, 2009.
2. **Non-detailed study :** Inspiring Lives, Maruthi Publications, 2009.

REFERENCE BOOKS:
1. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books
2. English Grammar Practice, Raj N Bakshi, Orient Longman, 2005
3. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, and P Sreehari, Published by Pearson.

4. Handbook of English Grammar & Usage, Mark Lester and Larry Beason, Tata Mc Graw-Hill, 2008.
5. Spoken English, R.K. Bansal & JB Harrison, Orient Longman, 1989
6. Technical Communication, Meenakshi Raman and Sangeetha Sharma, Oxford University Press, 2009.
7. Objective English, Edgar Thorpe & Showick Thorpe, Pearson Education, 2009.
8. Grammar Games, Renuvolcuri Mario, Cambridge University Press, 2008.
9. Murphy's English Grammar with CD, Murphy, Cambridge University Press, 2004.
10. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt. Ltd., 2005.
11. ABC of Common Errors, Nigel D Turton, Mac Millan Publishers
12. Effective Technical Communication, M Ashraf Rizvi, Tata McGraw-Hill, 2009.
13. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO.
14. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education, 2003
15. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt. Ltd.
16. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers, 2008.
17. Learning English A Communicative Approach, Orient Longman, 2005.

B.Tech., I Year	L	T	P	C
10BT1BS01: ENGINEERING PHYSICS	**2**	**1**	**-**	**4**

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITE: Intermediate/Senior Secondary Physics

COURSE DESCRIPTION: Crystallography; principles of quantum mechanics; band theory of solids; semiconductors, properties; applications of magnetic materials; dielectric materials; acoustics of buildings; superconductors; different lasers; optical fibers ; holograms; nano materials.

COURSE OUTCOMES: After completion of the course, a successful student will be able to**:**

1. Acquire basic knowledge of crystallography, quantum mechanics, semiconductors, magnetic materials, dielectrics, acoustics, superconductors, lasers, optical fibers, holography, and nanomaterials.
2. Develop skills in designing of lasers, fiber optic cable, holograms, acoustically good hall, semiconductor devices and nanomaterials.
3. Develop problem solving skills in engineering context

Detailed Syllabus:

UNIT – I:

Crystal Structures and X-Ray Diffraction : Introduction, space lattice, basis, unit cell, lattice parameter, Bravais lattices, crystal systems, structure of simple cubic, body centered cubic, face centered cubic crystals, Miller indices of planes and directions in crystals, separation between successive (hkl) planes.

Crystal Defects: Point defects, line defects, Burger's vector, X-ray diffraction by crystal planes, Bragg's law, Laue and powder methods.

UNIT – II:

Principles of Quantum Mechanics: Waves and particles, de-Broglie's hypothesis, G.P.Thomson experiment, He Isenberg's uncertainty principle, significance of wave function, Schrödinger's one dimensional wave equation (time independent), particle in a one dimensional potential box, Fermi-Dirac distribution and effect of temperature (qualitative treatment only), scattering-source of electrical resistance.

Band Theory of Solids: Electron in a periodic potential, Kronig-Penney model (qualitative treatment only), origin of energy band formation in solids, distinction between metals, semiconductors and

insulators based on band theory.

UNIT – III:

Semiconductors : Introduction, intrinsic and extrinsic semiconductors, carrier concentration, electrical conductivity in semiconductors, drift and diffusion, Einstein's relation, Hall effect, direct and indirect band gap semiconductors, p-n junction, energy diagram of p-n diode, diode equation, LED, LCD and photo diode.

UNIT – IV:

Magnetic Properties: Introduction, origin of magnetic moment, classification of magnetic materials into dia, para, ferro, anti-ferro and ferri magnetism, hysteresis, soft and hard magnetic materials, magnetic bubbles memory.

Dielectric Properties: Introduction, dielectric constant, electronic, ionic and orientation polarizations (qualitative treatment only), local field , Clausius-Mossotti equation, frequency dependence of polarisability (qualitative treatment only), ferro and piezo electricity.

UNIT – V:

Acoustics of Buildings and Acoustic Quieting: Basic requirement of acoustically good hall, reverberation and time of reverberation, Sabine's formula for reverberation time (qualitative treatment), easurement of absorption coefficient of a material, factors affecting the architectural acoustics and their remedies.

Acoustic Quieting: Aspects of acoustic quieting, methods of quieting, quieting for specific observers, mufflers and sound proofing.

UNIT – VI:

Superconductivity: General properties, Meissner effect, penetration depth, Type-I and Type-II superconductors, flux quantization, Josephson effects, BCS theory, applications of superconductors.

Lasers: Introduction, characteristics of laser, spontaneous and stimulated emission of radiation, Einstein's coefficients, population inversion, ruby laser, Helium-Ne on laser, semiconductor laser, applications of lasers in industry, scientific and medical fields.

UNIT – VII:

Fiber Optics: Introduction, principle of optical fiber, acceptance angle and acceptance cone, numerical aperture, types of optical fibers and refractive index profiles, optical fiber communication systems, application of optical fibers.

Holography: Introduction, construction of a hologram, reconstruction of image from hologram and applications.

UNIT – VIII:

Nanomaterials: Introduction, basic principles of nanomaterials, preparation of nanomaterials, ball milling, plasma arching, chemical vapour deposit ion method, sol-gel method , fabrication of nanomaterials, properties of nanomaterials, carbon nanotubes, properties and applications of carbon nanotubes, applications of nanomaterials.

TEXT BOOKS:

1. Applied Physics, S. Mani Naidu, Pearson Education, 1st Edition.
2. Engineering Physics, P.K. Palaniswamy, Scitech Publications India Private Limited, 2009.
3. Engineering Physics, M.R. Srinivasan, New Age Publications International (P) Limited, 1st Edition.

REFERENCE BOOKS:

1. Applied Physics, S.O. Pillai and Sivakami, New Age International (P) Ltd., 2nd Edition.
2. Introduction to Nanoscience and Nano technology , K .K. Chatopadhyaya and A.N. Benarjee, Prentice Hall of India, 1st Edition.
3. Introduction to Solid State Physics, C. Kittel, John Wiley & Sons, Inc., 7th Edition.
4. Solid State Physics, A.J. Dekker, Macmillan India Limited, 1996
5. Engineering Physics, V. Rajendran an d K. T hyagarajan, TataMcGraw Hill Education, 2010.

B.Tech., I Year	L	T	P	C
10BT1BS02: ENGINEERING CHEMISTRY	**2**	**1**	**-**	**4**

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITE: Intermediate/Senior Secondary Chemistry.

COURSE DESCRIPTION: Chemistry of Engineering materials; Polymer science and technology; Electrochemistry; Corrosion and its control; Surface chemistry; Chemistry of nanomaterials; Analytical techniques and Water technology.

COURSE OUTCOMES: After completion of the course, a successful student will be able to**:**

1. Acquire basic knowledge in chemistry of Engineering materials, Polymer science and technology, Electro chemistry, Corrosion and its control, Surface chemistry , Chemistry of nanomaterials, Analytical techniques and Water technology.

2. Develop analytical skills in:

a. Determination of hardness of water.

b. Determination of viscosity, flame and fire points, cloud and pour points.

3. Develop skills in design of:

a. Methods for control of corrosion

b. Chemical methods for the synthesis of Nanomaterials.

c. Analysis of the structure of compounds using various Analytical techniques.

4. Develop skills for providing solutions through:

a. Newer Nanomaterials for specific applications

b. Mitigation of hardness of water

5. Acquire awareness to societal issues on:

a. Quality of water.

b. Chemical materials utility and their impact.

c. Phenomenon of corrosion.

Detailed Syllabus:

UNIT – I:

Chemistry of Engineering Materials:

Lubricants: Definition, functions of lubricants, mechanism of lubrication, classification of lubricants, properties of lubricant s-viscosity, flash and fire points, cloud and pour points, Aniline point, neutralization number and mechanical strength.

Liquid Crystals: Definition, structure, classification and engineering applications of liquid crystals.

Insulators: Definition, classification, characteristics of insulating material and their engineering applications.

UNIT – II:

Polymer Science and Technology: Introduction, classification of polymers, functionality, polymerization and types of polymerization, plastics-thermoplastics, thermo settings, composition, preparation and engineering applications of PVC, Teflon and Bakelite.

Rubber: Vulcanization of rubber.

Elastomers: BUNA-N, BUNA-S and polyurethane.

Conducting Polymers: Definition, classification and engineering applications.

UNIT – III:

Electrochemistry: Introduction, conductivity, equivalent conductivity and molar conductivity. Redox reactions, electrode potential and measurement of elect rode potential (Nernst equation). Electrochemical series, electrochemical cell and measurement of EMF of electrochemical cell. Concentration cell, **Reference Electrodes:** hydrogen and calomel electrodes. **Batteries:** Introduction, Ni-Cd batteries, Lithium batteries. **Fuel cells:** Introduction, Hydrogen-Oxygen fuel cell, Methanol-Oxygen fuel cell.

UNIT – IV:

Corrosion and its Control: Introduction, definition, types of corrosion; dry corrosion, wet corrosion, concentration cell corrosion, galvanic series, galvanic corrosion , pitting corrosion , factors influencing the corrosion. Control of corrosion; cathodic protection, sacrificial anodic protection, impressed current cathodic protection, uses of inhibitors, electroplating and electroless plating**.**

UNIT – V:

Surface Chemistry: Adsorption, types of adsorption, adsorption of gases on solids, adsorption from solutions, applications of adsorption, Langmuir theory of adsorption. Colloids, types of colloidal systems, applications of colloids. Emulsions and micelles.

UNIT – VI:

Chemistry of Nanomaterials: Introduction to nanochemistry, classification of nanomaterials, size and scale, units, scaling laws, properties of nanomaterials, methods of synthesis - top down and bottom up methods, sol-gel process, plasma enhanced vapor decomposition process, applications of nanomaterials.

UNIT – VII:

Analytical Techniques: Introduction to spectroscopy.

U.V.Visible Spectroscopy: Basic principle, origin of absorption bands, chromophores and their absorption values.

I.R. Spectroscopy: Principle, modes of vibration, group frequencies.

NMR Spectroscopy: Principle, shielding and deshilding of protons, chemical shift and applications of NMR spectroscopy.

Atomic Absorption Spectroscopy: Principle and applications.

Flame photometry: Principle and applications.

UNIT – VIII:

Water Technology: Introduction, sources of water, types of impurities in water, hardness of water- temporary and permanent hardness, u nits of hardness, disadvantages of hard water. Estimation of hardness by EDTA method, boiler troubles.

Softening methods: Internal treatment, external treatment; zeolite process, ion exchange process, desalination of brackish water - reverse osmosis.

TEXT BOOKS:

1. A Text Book of Engineering Chemistry, Jain and Jain, Dhanpat Rai Publishing Company, 15th Edition.
2. Engineering Chemistry, K.N. Jayaveera, G.V.Subba Reddy and C.Ramachandraiah, Tata McGraw Hill Education, 1st Edition.
3. A Text Book of engineering Chemistry, Shashi Chawla, Dhanpat Rai Publishing Company, 15th Edition.

REFERENCE BOOKS:

A Text Book of Engineering Chemistry, S.S.Dara, S.Chand and Co., 10th Edition.

2. Engineering Chemistry (Vol 1&2), J.C.Kuriacose and Rajaram, Tata McGraw Hill, 2nd Edition.
3. Chemistry of Engineering Materials, C.V. Agarval, Tara Publication, 15th Edition.
4. Nanomaterials, A.K.Bandyopadhyay, New Age International publishers, 2nd Edition.
5. Hand book of Nanostructured Materials and Nanotechnology, H.S. Nalwa, Volumes - (I to V), Academic press, 2001.

B.Tech., I Year	L	T	P	C
10BT1BS03: ENGINEERING MATHEMATICS	**3**	**1**	**-**	**6**

(Common to CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITE: Intermediate/ senior secondary Mathematics.

COURSE DESCRIPTION: Differential equations of first and higher order; Partial differentiation; Applications of derivatives, integrals; Laplace transforms; fundamentals of vector calculus.

COURSE OUTCOMES: After completion of the course, a successful student will be able to**:**

1. Acquire knowledge in

a) Different types of higher order differential equations.
b) Finding maxima and minima values of functions of several variables with constrains.
c) Finding center, radius, and circle of curvatures for different curves.
d) Solving differential equations through Laplace transforms.
e) Differentiation and integration of vector functions.

2. Develop analytical skills in providing solutions for

a) Higher order differential equations.
b) Work done, Flux , linear, surface and volume integrals vector methods.
c) Line, surface and volume integrals.
d) Length of curve, area of surface and volume of solids of revolution
e) Problems involving LRC oscillatory circuits, deflection of beams,
f) Problems involving maxima and minima for functions of two variables with constraints.
g) Circle of curvature, evolutes and envelopes for families of curves.
h) Differential equations using Laplace transform.

3. Design mathematical model equations which involve

a) LRC circuits.
b) Deflection of beams.
c) Newton's laws of cooling and heat transfer

Detailed Syllabus:

UNIT – I:

First Order Differential Equations: Ordinary differential equations of first order and first degree: Linear and Bernoulli type equations, exact equations and reducible to exact. Applications of first order equations to orthogonal trajectories (both Cartesian and polar forms), law of natural growth and decay, Newton's law of cooling.

UNIT – II:

Higher Order Differential Equations: Non-homogeneous linear differential equations of second and higher order with constant coefficient s. Methods of finding the particular integrals for $Q(x)=e^{ax}$, sin ax, cos ax, x^n, $e^{ax}V(x)$, $xV(x)$ and $x^nV(x)$. Method of variation of parameters. Applications to L-R-C circuits, deflection of beams.

UNIT – III:

Partial Differentiation : Functions of two or more variables, homogeneous functions, total derivatives, derivatives of implicit function, jacobian, errors and approximations, maxima and minima of functions of two variables with and without constraints, Lagrange's method of undetermined multipliers.

UNIT – IV:

Applications of Derivatives : Radius, centre and circle of curvature, evolutes and envelopes. Tracing of curves in cartesian, parametric and polar forms.

UNIT – V:

Laplace Transformations: Laplace transforms of standard functions. Properties of LTs, first and second shifting theorems, LTs of derivatives and integrals, LTs of periodic functions. Unit step function, dirac delta function. Inverse transforms and convolution theorem.

UNIT – VI:

Applications of Laplace Transformations : Applications of LTs to ordinary differential equations of first and second order, Heaviside's partial fraction expansion theorem.

UNIT – VII:

Applications of Integration: Applications of integration to lengths of curves, areas of surfaces and volumes of solids and to surfaces and solids of revolutions. Double and Triple integrals - change of variables, change of order of integration and volume as double integral.

UNIT – VIII:

Vector Calculus : Vector differentiation, tangent and normal to curves, gradient, divergence, curl and vector identities. Laplacian operator, vector integration. Line integrals independent of path, work done, conservative field and scalar potential functions. Surface integrals, flux and volume integrals, verifications and applications of vector integral theorems: Greens theorem, Stokes theorem and Gauss divergence theorem (without proof).

TEXT BOOKS:

1. Engineering Mathematics volume-1, T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N. Prasad, S. Chand and Company, 9th Edition.

REFERENCE BOOKS:

1. Higher engineering mathematics, B.S.Grewal, Khanna publishers, 36th Edition.
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & sons, Inc. 8th Edition.
3. Engineering Mathematics for JNTU, B.V.Ramana, Tata McGraw Hill, 3rd Edition.

B.Tech., I Year	L	T	P	C
10BT1BS04: MATHEMATICAL METHODS	**3**	**1**	**-**	**6**

(Common to CSE, CSSE, ECE, EConE, EEE, EIE and IT)

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITE: Intermediate/ senior secondary Mathematics.

COURSE DESCRIPTION: Matrices and systems of linear equations; Eigen values, Eigen vectors; Solutions for algebraic and transcendental equations; interpolation; Numerical differentiation and integration; Numerical solutions of differential equations; Z - transforms; Fourier series and Fourier transforms.

COURSE OUTCOMES: After completion of the course, a successful student will be able to**:**

1. Acquire knowledge in

a. Ranks of matrices and linear equations.

b. Eigen values and Eigen vectors of matrices.

c. Algebraic and transcendental equations numerically.

d. Interpolating the data.

e. Numerical differentiation and numerical integration.

f. Numerical solutions of differential equations.

g. Z. transforms, Fourier series and Fourier transforms.

2. Design mathematical equations and arrive at the numerical solutions to the problems involving

a. Fitting of different types of curves to the given data.

b. Estimation of missing numerical values in the given data.

c. Integration of higher complexity

d. Differential equations.

3. Develop skills in solving engineering problems involving

a. Linear equations with higher complexity.

b. Complex Eigen values and Eigen vectors.

c. Algebraic and transcendental equations.

d. Interpolating polynomials.

e. Differentiation and integration of functions.

f. Differential equations of higher complexity through numerical values

g. Z-transforms, Fourier series and Fourier transforms.

Detailed Syllabus:

UNIT – I:

Matrices and Linear System of Equations : Rank of a matrix, echelon form, normal form, inverse of a matrix by normal form. Homogenous and non-homogenous linear systems, consistency and solutions of linear system of equations. Direct methods, Gauss elimination method, Gauss Siedel, Gauss Jordan method, factorization method.

UNIT – II:

Eigen Values and Eigen Vectors : Definitions, evaluation of eigen values, eigen vectors and properties. Cayley Hamilton theorem (without proof), inverse and powers of a matrix by Cayley Hamilton theorem, diagonalization of a matrix, quadratic forms and reduction to its normal form (problems dealing with distinct eigen values only).

UNIT – III:

Algebraic, Transcendental Equations and Curve Fitting: Solutions of algebraic and transcendental equations by bisection method, false position method, Newton-Raphson's method, iterative method.Curve fitting by the principle of least squares, fitting of a straight line, parabola, exponential and power curves.

UNIT – IV:

Interpolation: Interpolation, forward difference operator, backward difference operator, central difference operator, relationship between operators, Newton's forward formula, Newton's backward formula, Gauss forward formula, Gauss backward formula, Lagrange's interpolation formula.

UNIT – V:

Numerical Differentiation and Integration: Numerical values of derivatives using Newton's forward formula, Newton's backward formula.

Numerical Integration: Trapezoidal rule, Simpsons 1/3 rule, Simpsons 3/8 rule

UNIT – VI:

Numerical Solutions of Ordinary Differential Equations: Numerical solutions of ordinary differential equations using Taylor series, Euler's method, modified Euler's method, Runge-Kutta method (2nd and 4thorders only), Milne's predictor corrector method.

UNIT – VII:

Z - Transformations: Z -transforms, inverse Z-transform, properties, damping rule, shifting rule, initial and final value theorems. Convolution theorem, solution of difference equations by Z-transforms.

UNIT – VIII:

Fourier Series and Fourier Transforms: Definition, Dirichlets conditions, determination of Fourier coefficients (Euler's formulae), even and od d function , half-rang e Fourier sine an d cosine expansions. Fourier integral theorem (statement only), Fourier sine and cosine integrals, Fourier sine and cosine transforms, properties, inverse transform, finite Fourier transforms.

TEXT BOOK:

1. Mathematical Methods, T. K.V. Iyenger, B. Krishna Gandhi, S.Ranganadham and M.V.S.S.N. Prasad, S.Chand and Company, 5th edition.

REFERENCE BOOKS:

1. Higher engineering mathematics, B.S.Grewal, Khanna publishers, 36th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley and Sons, Inc., 8th Edition
3. Introductory methods of Numerical Analysis , S.S.Sastry, Prentice Hall of India, 3rd Edition
4. Engineering Mathematics for JNTU, B.V.Ramana, Tata McGraw Hill, 3rd Edition.

B.Tech., I Year	L	T	P	C
10BT1EC01: PROBLEM SOLVING AND COMPUTER PROGRAMMING	**3**	**1**	**-**	**6**

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITE: Logical thinking and Aptitude.

COURSE DESCRIPTION: Algorithm, Flowchart; Top-down design concepts; Types of operators, Structure of C program; Control statements; Searching and Sorting, String manipulation functions; Structures, Unions; Pointer arithmetic; Operations on Files, Overview of data structures.

COURSE OUTCOMES: After completion of the course, a successful student will be able to**:**

1. Gain knowledge on developing algorithms and problem solving techniques.
2. Analyze and develop programs using the basic elements like control statements, arrays, functions and strings.
3. Develop C Programs for software applications.
4. Skills to solve problems using pointers and strings.
5. Implement the concepts of data structures like stacks, queues and linked lists for solving real time problem

Detailed Syllabus:

UNIT – I:

Introduction to Computers: Computer system s, computer hardware, computer software, computing environments, computer languages, writing, editing, compiling and linking programs, program execution, algorithm and flowchart.

Introduction to Problem Solving: The problem solving aspect, top-down design, implementation of algorithms, program verification and efficiency of algorithms.

UNIT – II:

Introduction to the C Language: C programs, identifiers, types, variables, types of operators, constants, coding constants, type casting and conversion, formatted input and output. Structure of a C program - expressions, precedence and associativity, evaluation of expressions, mixed type expressions.

UNIT – III:
Selection - Making Decisions: Two way selection: if, if-else and nested if-else.
Multi-way selection: else-if ladder and switch statements.
Repetition : concept of loop, pre-test an d post -test loops, initialization and updating, event and counter controlled loops, loops in C, break, continue and goto statements.

UNIT – IV:
Fundamental Algorithms: Exchanging the values of two variables, counting, summation of a set of numbers, factorial computation, generation of the Fibonacci sequence, reversing the digits of an integer, number base conversion, character to number conversion, the smallest divisor of an integer, greatest common divisor of two integers and generating prime numbers.

UNIT – V:
Arrays: Arrays in C, one, two and multidimensional arrays, linear search, binary search, bubble sort, selection sort and insertion sort.
Strings: Concepts, strings in C, string input/output functions, array of strings and string manipulation functions.

UNIT – VI:
Functions: Designing structured programs, functions in C, user-defined functions, types of functions, call by value and call by reference, recursion, factorial using recursion, standard library functions, scope, storage classes and preprocessor directives.
Derived Types: Type definition (typedef), enumerated types, structure , accessing structures,
Complex Structures: Nested structures, structures containing arrays, array of structures.
Structures and Functions: Sending individual members, sending the whole structure, unions and bit fields.

UNIT – VII:
Pointers: Concepts, pointer variables, accessing variables through pointers, pointer declaration and definition, initialization, pointer arithmetic, array of pointers, pointers to array s, pointer s and functions, pointers to pointers, pointers to structures and memory allocation functions.

UNIT – VIII:
Files :introduction and classification of files, opening and closing of files, read and write operations, conversion of files and command line arguments.

Basic Data Structures: Overview of data structures, implementation of stack operations (push, pop), implementation of linear queue operations (insertion, deletion), circular queues, singly linked list, doubly linked list and circular linked list.

TEXT BOOKS:

1. A Structured Programming Approach using C, Behrouz A. Forouzan and Richard F. Gilberg, Cengage Learning, 2nd Edition.
2. How to Solve it by Computer, R.G. Dromey, Pearson Education, 1st Edition.

REFERENCE BOOKS:

1. Classic Data Structures, D. Samanta, Prentice Hall of India rivate Limited, 2004.
2. C and Data Structures, P. S. Deshpande and O. G. Kakde, ILEY-dreamtech India Pvt. Ltd. 2005.
3. Programming in C, Pradip Dey and Manas Ghosh , Oxford University Press, 2007.
4. C Programming with Problem Solving, Jacqueline A. Jones and Keith Harrow, Dreamtech Press, 2007.

B.Tech., I Year	L	T	P	C
10BT1EC02: ENGINEERING DRAWING	**-**	**1**	**3**	**4**

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITE: Nil

COURSE DESCRIPTION: Essentials of engineering drawing; free hand sketching; geometrical constructions; projection of points; line; planes; solids; development of surfaces; interpenetration of solids; perspective projections; isometric views and projections; orthographic views; introduction to basic AutoCAD commands.

COURSE OUTCOMES: After completion of the course, a successful student will be able to**:**

1. Convey visual perception information regarding relative locations of objects through an orthographic/isometric view.

2. Analyze a drawing and bring out any inconsistencies to put forth inferences graphically.

3. Create feasible designs of simple objects with drawing tools and/or free-hand.

Detailed Syllabus:

UNIT – I:

Scales and Curves :

Scales: Full size, reduced and enlarged scales, representative fraction, plain, diagonal scales, scale of chords.

Curves: Curves used in engineering practice, conic sections-ellipse, parabola and hyperbola, construction-general method only**.**

UNIT – II:

Projections of Points and Lines : Introduction, representation of three dimensional objects, general principles of orthographic projection, importance of multiple views and their placement, first angle and third angle projections, projections of points, two view and three view projections. Projection of lines inclined to one plane, inclined to both the planes, finding true lengths, true inclinations and traces of lines.

UNIT – III:

Projections of Planes and Solids : Projections of regular plane surfaces, planes parallel to one plane, planes inclined to one plane and inclined to both the planes, projections on auxiliary planes. Projections of regular solids (prism, cylinder, pyramid and cone), solids inclined to one plane and both planes, auxiliary views.

UNIT – IV:

Sections of Solids and Development of Surfaces :

Sections of Solids: Section planes and sectional views of right regular solids - prisms, cylinder, pyramids and cone. True shapes of the sections.

Development of surfaces : Right regular solids- prisms, cylinder, Pyramids, cone and their sectional parts.

UNIT – V:

Isometric Projections: Principles of isometric projections, isometric scale, isometric views, conventions. Isometric views of planes, simple solids. Isometric projections of spherical parts. Conversion of isometric views into orthographic views.

UNIT – VI:

Perspective Projections : Perspective view of plane figures and simple solids, vanishing point method and visual ray methods.

UNIT – VII:

Introduction to Computer Aided Drafting : Introduction to AutoCAD, beginning a new drawing, exploring and interacting with the drawing window, saving and opening a file, coordinate systems (Cartesian, polar and relative co-ordinate system) , introduction to draw commands and modify commands, dimension commands, display commands and miscellaneous commands.

UNIT – VIII:

Drafting Of 2D and 3D Figures : Generation of curves, points, lines, polygons, simple solids with dimensioning. Drawing of simple building plans.

TEXT BOOKS:

1. Engineering Drawing, P. Khanniah, K.L. Narayana and K. Venkata Reddy, Radiant Publishing House, 2009.

2. Engineering Drawing, N.D. Bhatt, Charotar Publishing House Private Limited, 2008.

REFERENCE BOOKS:

1. Engineering Drawing, Johle, Tata McGraw Hill, 2009.
2. Engineering Drawing, Shah and R ana, Pearson Education, 2nd Edition.
3. Engineering Drawing and Graphic s, K. Venugopal, New age International Publishers, 5thEdition.
4. Computer Aided Engineering Drawing, Trymbaka Murthy, I.K.International, 1st Edition.
5. AutoCAD, Shyam Tikko, Autodesk Press, 1st Edition.

B.Tech., I Year	L	T	P	C
10BT1EC03: COMPUTER PROGRAMMING LAB	-	-	3	4

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITE: --

COURSE DESCRIPTION: This course deals with hands on experience in developing simple programs and implementing basic data structures - stack and queue, searching and sorting in C language. Each exercise is designed to reinforce the theory through practical hands on experience.

COURSE OUTCOMES: After completion of the course, a successful student will be able to**:**

1. Select the appropriate data structure and algorithm design method for a specified problem.
2. Design, code, test, debug, and execute programs in C.
3. Implement and use common features found in C programs -arrays, pointers, strings, stacks and Queues, linked list

Detailed Syllabus:

WEEK– 1:

a. Let a and b are two integer variables whose values are 10 and 13 respectively. Write a program to evaluate the following arithmetic expressions.

   i. a + b
   ii. a - b
   iii. a * b
   iv. a / b
   v. a % b

b. Write a program that evaluates the following algebraic expressions after reading necessary values from keyword.

   i) $(ax + b)/(ax - b)$

   ii) $2.5 \log x + \text{Cos } 32^0 + | x^2 + y^2| + \sqrt{2xy}$

   iii) $x^5 + 10 x^4 + 8 x^3 + 4 x + 2$

   iv) ae^{kt}

WEEK– 2:

a. Mr. Gupta deposited Rs.1000 in a bank. The bank gives simpleinterest at the rate of 15% per annum. Write a program to determine the amount in Mr. Gupta's account at the end of 5 years. (Use the formula I = P T R / 100)

b. A cashier has currency notes of denominations Rs. 10, Rs. 50 and Rs. 100. If the amount to be withdrawn is input in hundreds, find the total number of notes of each denomination the cashier will have to give to the withdrawer.

c. In a town, the percentage of men is 52. The percentage of total literacy is 48. If total percentage of literate men is 35 of the total population, write a program to find the total number of illiterate men and women if the population of the town is 8000.

WEEK– 3:

a. Write a program that prints the given 3 integers in ascending order using if - else.

b. Write a program to calculate commission for the input value of sales amount.

Commission is calculated as per the following rules:

i. Commission is NIL for sales amount Rs. 5000.

ii. Commission is 2% for sales when sales amount is >Rs. 5000 and < = Rs. 10000.

iii. Commission is 5% for sales amount > Rs. 10000.

c. A character is entered through keyboard. Write a program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol. The following table shown the range of ASCII values for various characters.

Characters	**ASCII values**
A - Z	65 - 90
A - z	97 - 122
0 - 9	48 - 57
Special Symbols	0 - 47, 58 - 64, 91 - 96, 123 - 127

WEEK– 4:

a. If cost price and selling price of an item is input through the keyboard, write a program to determine whether the seller has made profit or incurred loss. Also determine how much profit or loss he incurred in percentage.

b. An insurance company calculates premium as follows:

i. If a person's health is excellent and the person is between 25 and 35 years of age and lives in a city and is a male then premium is Rs.4 per thousand and the policy amount cannot exceed Rs.2 lacks.

ii. If a person satisfies all the above conditions and is female then the premium is Rs.3 per thousand and the policy amount cannot exceed Rs. 1 lack.

iii. If a person's health is poor and the person is between 25 and 35 years of age and lives in a village and is a male then premium is Rs.6 per thousand and the policy cannot exceed Rs. 10000

iv. In all other cases the person is not insured.

Write a program to determine whether the person should be insured or not, his/her premium rate and maximum amount for which he/ she can be insured.

WEEK– 5:

a. Write a program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*,/,%, use switch statement)

b. Write a program to find the grace marks for a student using switch. The user should enter the class obtained by the student and the number of subjects he has failed in. Use the following rules:

i. If the student gets first class and the number of subjects failed in is >3, then no grace marks are awarded.. If the number of subjects failed in is < or = 3 then the grace is 5 marks per subject.

ii. If the student gets second class and the number of subjects failed in is >2, then no grace marks are awarded. If the number of subjects failed in is < or = 2 then the grace is 4 marks per subject.

iii. If the student gets third class and the number of subjects failed in is >1, then no grace marks are awarded. If the number of subjects failed in is = 1 then the grace is 5 marks per subjects.

WEEK– 6:

a. Write a program to find the sum of individual digits of a positive integer.

b. A Fibonacci sequence is defined as follows: The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.

Write a program to generate the first N terms of the sequence.

c. Write a program to generate all the prime numbers between 1 and N, where N is a value supplied by the user.

WEEK– 7:

a. Write a program to calculate the following sum:

$sum=1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$

b. i) A perfect number is a number that is the sum of all its divisors except itself. Six is the perfect number. The only numbers that divide 6 evenly are 1, 2, 3 and 6 (i.e., 1+2+3=6).

ii) An abundant number is one that is less than the sum of its divisors (Ex: 12<1+2+3+4+6).

iii) A Deficient number is one that is greater than the sum of its divisors (Ex: 9>1+3).

Write a program to classify N integers (Read N from keyboard each as perfect, abundant or deficient.

WEEK– 8:

a. Write a program to find the largest and smallest number in a list of integers.

b. Write a program to perform the following:

i. Addition of two matrices.

ii. Multiplication of two matrices.

WEEK– 9:

a. Write a program to perform the following:

i) Linear search ii) Binary search

WEEK– 10:

a. Write a program to perform the following:

i) Bubble sort ii) Selection sort iii) Insertion sort

WEEK– 11:

a. Write a program that uses functions to perform the following operations:

i. To insert a sub-string in main string at a specified position.

ii. To delete N characters from a given string from a specified position.

b. Write a program to determine whether the given string is palindrome or not.

WEEK– 12:

a. Write a program to display the position or index in the main string S where the sub string T begins. Display - 1 if S does not contain T.

b. Write a program to count the number of lines, words and characters in a given text.

WEEK– 13:

a. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of 1. Ex: 2's complement of 11100 is 00100. Write a program to find the 2's complement of a given binary number using functions.

b. Write a program to convert a roman number in to its decimal equivalent using functions.

WEEK– 14:

Write programs to perform the following using recursion.

i) To find the factorial of a given integer.

ii) To find the GCD (Greatest common Divisor) of two given integers.

iii) To solve Towers of Hanoi problem.

WEEK– 15:

Write a program that uses functions to perform the following operations:

i) Reading a complex number

ii) Writing a complex number

iii) Addition of two complex numbers

iv) Multiplication of two complex numbers

(Note: Represent complex number using a structure.)

WEEK– 16:

a. Write a program to accept the elements of the structure as :

Employee-name

Basic pay

Display the same structure along with the DA, CCA, and Gross salary for 5 employees.

Note: DA=51% of Basic pay, CCA = Rs.100 consolidated.

b. Define a structure to store employee's data with the following specifications:

Employee-Number, Employee-Name, Basic pay, Date of Joining

i) Write a function to store 10 employee details.

ii) Write a function to implement the following rules while revising the basic pay.

If Basic pay <=Rs. 5000 then increase it by 15%.

If Basic pay > Rs. 5000 and < = Rs.25000 then it increase by 10%

If Basic pay > Rs. 25000 then there is no change in basic pay.

iii) Write a function to print the details of employees who have completed 20 years of service from the date of joining.

WEEK– 17:

a. Write a program which copies one text file to another.

b. Write a program to reverse the first N characters of a given text file.

Note: The file name and N are specified through command line.

WEEK– 18:

Consider the following text file:

Input File:

S.No	Customer ID	Item No.	Qty.	Price Per Item (Rs.)
1.	C01	11	2	10
2.	C02	12	5	50
3.	C03	12	5	50
4.	C04	14	10	10

Write a program to print the output in following format by giving the Customer_ID as an input.

OUTPUT:

S.V.PROVISION STORES
TIRUPATI

Customer_ID:C01 **Date: 12-08-2010**

Item	Qty	Price
11	2	20
	Total	**20**

WEEK– 19:

Write a program to implement stack operations using:
i) Arrays ii) Pointers

WEEK– 20:

Write a program to implement linear queue operations using:
i) Arrays ii) Pointers

WEEK– 21:

Write a program to implement circular queue operations using arrays.

WEEK– 22:

Write a program to implement the following operations on singly linked list.
a. List Creation b. Insertion c. Deletion d. Display

WEEK– 23:

Write a program to implement the following operations on Doubly Linked List.
a. List Creation b. Insertion c. Deletion d. Display

WEEK– 24:

Write a program to implement the following operations on circular linked list.
a. List Creation b. Insertion c. Deletion d. Display

TEXT BOOKS:

1. A Structured programming Approach using C, Behrouz A. Forouzan and Richard F.Gilberg, Cengage Learning, 2nd Edition.
2. How to Solve it by computer, R.G.Dromey, Pearson Education, 1st Edition.

REFERENCE BOOKS:

1. Classic Data Structures, D.Samanta, Prentice Hall of India Private Limited, 2004.
2. C and Data Structures, P.S.Deshpande and O.G.Kakde, WILEY-Dreamtech India Private Limited, 2005.
3. Programming in C, pradip Dey and Manas Ghosh, Oxford University Press, 2007.
4. C programming with problem Solving, Jacqueline A. Jones and Keith Harrow, Dreamtech Press, 2007.

B.Tech., I Year	L	T	P	C
10BT1BS06: ENGINEERING PHYSICS & ENGINEERING CHEMISTRY LABORATORY	-	-	3	4

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITE: Intermediate / Senior secondary Physics and Chemistry.

COURSE DESCRIPTION:

Engineering Physics : Experimental verification of characteristics of p-n junction diode, Photodiode, LED, Thermistor ,semiconductor laser diode; Determination of energy gap, carrier concentration of a semiconductor material, wave length of a laser source, B-H curve, size of fine particle, dielectric constant, numerical aperture and bending losses of optical fiber, frequency of a electrically vibration tuning fork, magnetic field along axial line of a current carrying coil; verification of transverse laws of stretched string.

Engineering Chemistry: Estimation of hardness, alkalinity, dissolved oxygen of water samples and estimation of copper by volumetric methods; instrumental methods like potentiometer, conductivity meter and colorimeter, synthesis of polymers.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to**:**

Engineering Physics :

1. **Acquire analytical skills in the determination of**

a) Wave length of laser.
b) Divergence angle for laser beam.
c) Numerical aperture and bending losses of an optical fibre.
d) Hall coefficient for semiconductor material.
e) Energy gap of semiconductor material.
f) Verifying the laws of stretched string.
g) Dielectric constant
h) B - H Curve
i) Characteristics of p.n. junction diode, photodiode, thermistor and light emitting diode.

Engineering Chemistry:

1. a) Acquire analytical skills in the estimation of hardness of water, alkalinity of water, dissolved oxygen in water and estimation of iron through wet laboratory methods

   b) Acquire hands-on experience on different instrumental methods for the determination of PH of a solution, EMF of a solution and estimation of iron in cement.
2. Develop skills in the designing of synthetic methods for the preparation of polymers.

List of Experiments:

Engineering Physics:

Conduct a minimum of any Twelve experiments.

1. I-V characteristics of a P-N Junction diode
2. Characteristics of LED source.
3. Determination of wavelength of a laser source-diffraction grating
4. Determination of particle size by using a laser source
5. Photo diode - characteristics
6. Thermistor characteristics.
7. Hall effect
8. Magnetic field along the axis of a current carrying coil-Stewart and Gee's method.
9. Energy gap of a material of a P-N junction
10. B - H curve
11. Determination of dielectric constant
12. Verification of laws of stretched string - sonometer
13. Melde's experiment- transverse and longitudinal modes
14. Characteristics of laser sources.
15. Determination of numerical aperture of an optical fiber
16. Determination of bending losses of an optical fibre

List of Experiments:

Engineering Chemistry:

Conduct a minimum of any Ten experiments.

1. Preparation of standard EDTA and estimation of hardness of water
2. Preparation of standard EDTA and estimation of copper
3. Estimation of alkalinity of water
4. Preparation of standard potassium dichromate and estimation of ferrous iron
5. Preparation of standard potassium dichromate and estimation of copper by iodometry
6. Estimation of iron in cement by colorimetry
7. Conductometric titration of strong acid and strong base.
8. Preparation of phenol-formaldehyde resin.
9. Determination of viscosity of the oils through redwood -viscometer
10. Determination of pH of a given solution by pH metry.
11. Estimation of dissolved oxygen
12. Determination of calorific value of fuel using bomb calorimeter.

TEXT BOOKS:

1. Vogel's Book of Quantitative Inorganic Analysis, ELBS 5th edition
2. Chemistry laboratory manual, K.N. Jayaveera and K.B.Chandra sekhar, S.M. Enterprizes Ltd, 2009.

B.Tech., I Year	L	T	P	C
10BT1HS02: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB	-	-	3	4

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITE: Basic Grammar and Functional English.

COURSE DESCRIPTION: Introduction to Phonetics; Consonants, Vowels and Diphthongs; Accent and Rhythm; Functional Grammar; Situational Dialogues; Story Telling; Describing People, Objects and Places; Movie Review; Just A Minute and Elocution; Public Speaking and Presentation Skills.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to**:**

1. Acquire knowledge in.
   a. Speech Sounds
   b. Stress Patterns
   c. Intonation and Rhythm
2. Analyze the functional knowledge of English Grammar for writing and speaking correct English in academic, professional and personal contexts.
3. Interpret and synthesize the language functions through:
   a. Just A Minute
   b. Impromptu
   c. Elocution
   d. Role Plays
   e. Project Presentations
4. Use and create techniques and language lab software for enhancing the language skills.
5. Communicate effectively with engineering community and society in formal and informal situations.
6. Inculcate attitude to upgrade communicative competence for meeting global challenges.

Detailed Syllabus:

The following course content is prescribed for the English language laboratory sessions.

1. Introduction to Phonetics.
2. Introduction to Consonants, Vowels and Diphthongs.
3. Introduction to Accent and Rhythm.
4. Functional Grammar.
5. Conversation Starters.
6. Situational Dialogues.
7. Just a Minute (JAM), Elocution, Debate and Impromptu.
8. Story telling.
9. Describing people, places and objects.
10. Movie Review.
11. Public speaking.
12. Presentation Skills.

Suggested Softwares:

- Cambridge Advanced Learners' English Dictionary withCD
- The Rosetta stone English Library.
- Clarity Pronunciation Power - Part-I.
- Mastering English in Vocabulary, Grammar, Punctuation and Composition.
- Dorling Kindersley series of grammar, Punctuation, Composition etc.
- Language in use. Foundation Books Pvt Ltd with CD.
- Oxford Advanced Learner's Compass, 7th Edition.
- Learning To speak English - 4 CDs.
- Microsoft Encarta CD.
- Murphy's English Grammar, Cambridge with CD
- English in Mind, Herbert Puchta and Jeff Strank s with Meredith Levy, Cambridge.
- English Pronunciation Dictionary
- Speech Solutions
- Sky Pronunciation
- Tense Buster

B.Tech., I Year	L	T	P	C
10BT1EC04: ENGINEERING AND IT WORKSHOP	-	-	3	4

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITE: --

COURSE DESCRIPTION:

Engineering Workshop: The course provides hands-on training in the trades Carpentry, Fitting, House-wiring, Tin Smithy, Foundry. Overview of metal cutting processes, plumbing and welding is provided through live demonstrations.

IT workshop : This course deals with practice sessions on PC hardware, Internet, World Wide Web, MS-Word, Excel, Power Point, Publisher and LaTex Tool. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber attacks are included.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to**:**

Engineering workshop :

1. Utilize workshop tools for engineering practice.
2. Analyze and find out suitable method of fabrication of a given simple component.
3. Employ skills acquired to provide quick fixes for routine domestic and/or industrial problems.
4. Appreciate the hard work and intuitive knowledge of the manual workers.

IT Workshop :

1. Acquire analytical skills in:

(a) Identification of functional parts of PC

(b) Internet and World Wide Web.

(c) Computer security issues and preventive measures.

(d) Operating Systems.

2. Design document and presentations effectively.
3. Apply modern tools to develop IT based applications.
4. Gain effective communication skills through IT tools.
5. Update knowledge and skills in PC maintenance and usage of latest Operating Systems and Office automation tools.

Detailed Syllabus:

Engineering Workshop:

1. Trades for Exercise:

a. **Carpentry Shop:** Two joints: bridle joint, mortise and tenon T-joint.

b. **Fitting Shop:** Two joints: Square joint and V-joint.

c. **Sheet Metal Shop:** Two jobs: Trapezoidal tray and square tin.

d. **House Wiring:** Two jobs: Wiring for two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp.

Earthing: Concept and establishment, safety precautions while house wiring.

e. **Foundry:** Preparation of two moulds: For a single pattern and a double pattern.

2. Trades for Demonstration:

i. Welding

ii. Metal Cutting

iii. Plumbing

In addition to the above, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, plastics, steels, meters, gauges, equipment, first-aid and shop safety shall be demonstrated through charts, layouts, figures, circuits, CD or DVD.

IT Workshop:

PC Hardware:

1. Identifying the peripherals of a Computer, components in a CPU and its functions, block diagram of CPU along with the configuration of each peripheral.
2. Disassembling and assembling the PC back to working condition, videos for assembling and disassembling a PC.

3. Introduction to Operating System (OS) as system software, features of OS, need of OS, components of OS, installation of Microsoft Windows XP Operating System on the personal computer, examples of operating systems.
4. Introduction to UNIX OS and basic commands in UNIX such as cat, ls, pwd,, rm, rmdir, ln, head, tail, cd, cp, mv, who, date, cal, clear, man, tty, wc, diff, cmp, grep etc. and vi editors and sample C programs.
5. Hardware and Software Troubleshooting: PC symptoms when computer malfunctions, types of faults, common errors and how to fix them, basic hardware and software troubleshooting steps, PC diagnostic tools.

MS Office 2007: MS Word:

6. Introduction to MS Word, importance of Word as Word Processor, overview of toolbars, saving, accessing files, using help and resources.

   Create a word document using the features: Formatting fonts, drop cap, applying text effects, using character spacing, borders and shading, inserting headers and footers, using date and time option.
7. Create a project using MS Word using the features: Inserting tables, bullets and numbering, changing text direction, hyperlink, images from files and clipart, drawing toolbar and word art, mail merge.

MS Excel:

8. Introduction to MS Excel as a Spreadsheet tool, overview of toolbars, accessing, saving excel files, using help and resources. Create a spreadsheet using the features: Gridlines, format cells, summation, auto fill, formatting text, formulae in excel charts.
9. Create a spreadsheet using the features: Split cells, Sorting, Conditional formatting, freeze panes, pivot tables, data validation.

MS Powerpoint:

10. Introduction to MS PowerPoint, utilities, overview of toolbars, PPT orientation, slide layouts, types of views. Create a PowerPoint presentation using the features: Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows.
11. Create a PowerPoint presentation using the features: Auto content wizard, hyperlinks, Inserting images, clip art, audio, video, custom animation, slide hiding, tables and charts.

MS Publisher:

12. Introduction to MS Publisher, overview of toolbars, saving files, templates, layouts.

    Create a website using the features: Home page, about us, Department, Contact page etc.

LaTex:

13. Introduction to LaTeX tool: Importance of LaTeX as document preparation system for high quality typesetting, accessing, overview of toolbars, saving files, overview of features like typesetting of article, journal, books, control over large documents, using help and resources..

Internet and World Wide Web:

14. Web Browsers, Search Engines: Introduction to types of networks, customizing web browsers with LAN proxy settings, bookmarks, search toolbars and popup blockers, types of search engines and how to use search engines.
15. Cyber Hygiene: Introduction to various threats on Internet, types of attacks and how to overcome, installation of antivirus software, configuration of personal firewall and Windows update on Computers.

REFERENCE BOOKS:

Engineering Workshop:

1. Engineering Workshop practice, V. Ramesh Babu, VRB Publishers Private Limited, 2009.
2. Work shop Manual, P.Kannaiah and K.L.Narayana, SciTech Publishers, 2009.
3. Workshop Practice Manual, K. Venkata Reddy, BS Publications, 2008.

IT Workshop:

1. Introduction to Computers, Peter Norton, Tata McGraw Hill, 4th Edition.
2. IBM PC and Clone-Hardware, Troubleshooting and Maintenance, B. Govindarajulu, Tata McGraw Hill, 2nd Edition
3. Comdex Information Technology Course Kit, Vikas Gupta, WILEY Dreamtech, 2nd Edition.
4. PC Hardware and A + Handbook, Kate J. Chase, Prentice Hall India, 2004.
5. A Document Preparation System LaTeX User's Guide and Reference Manual, Leslie Lamport, Pearson Education, 2nd Edition.

II B.Tech., I-Semester, EEE

10BT3BS03: SPECIAL FUNCTIONS AND COMPLEX ANALYSIS	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

(Common to EEE, ECE, EIE & EConE)

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES:
Intermediate / Senior Secondary mathematics, Engineering Mathematics and Mathematical Methods of I. B.Tech

COURSE DESCRIPTION:
Limits, continuity and analyticity of complex functions; Integration; power series; singularities, residues and conformal mappings; Partial differential equations; special functions with engineering applications.

COURSE OUTCOMES: After completion of the course, a successful student is able to

1. Acquire knowledge in
   - Linear partial differential equations, heat equation, wave and Laplace with boundary conditions.
   - Integrals through beta and gamma functions.
   - Analytic nature of complex functions.
   - Integration of complex functions on different types of curves.
   - Residues of complex functions.
   - Properties of complex functions through mappings.
2. Design mathematical models for
   - Fluid flow patterns.
   - Evaluation of complicated real integrals
   - Integrations through complex variable techniques
3. Develop skills in solving problems involving
   - Improper integrals through beta and gamma functions
   - Flow patterns of fluids.
   - Magnetic and electrical potential functions.
   - Evaluation of real and improper integrals through complex variable technique.
   - Integration of complex functions on complicated curves.
   - Investigating the behavior of complex function in a given region.
   - Contour integration of complex functions
   - Heat transfer and wave motions.

DETAILED SYLLABUS:

UNIT-I : PARTIAL DIFFERENTIAL EQUATIONS
Formation of partial differential equations, solutions of first order partial differential equations using Lagrange's method, method of separation of variables - solutions of one dimensional wave equation - heat equation- two dimensional Laplace equation under boundary conditions.

UNIT-II : SPECIAL FUNCTIONS
Euler's Integrals - beta and gamma functions - properties - relationship between beta and gamma functions- applications - evaluation of improper integrals using Beta and Gamma functions
Bessel function: Generating function-properties of Bessel functions - recurrence relations-Orthogonality.

UNIT-III : LIMITS AND CONTINUITY - ANALYTIC FUNCTIONS
Exponential, Trigonometric, logarithmic, Hyperbolic and general power (Z^c) - separation of real and imaginary parts - Limits and Continuity of functions. Differentiability - Analyticity - Cauchy Riemann equations- conjugate and harmonic conjugate functions - Milne Thompson method- potential functions.

UNIT-IV : COMPLEX INTEGRATION
Line integral - evaluation of line integrals along curves and closed contours - Cauchy's Integral theorem - Cauchy's integral formula - Derivatives of analytic function - generalized integral formula.- Evaluation of integrals using integral formulae.

UNIT-V : COMPLEX POWER SERIES
Taylor theorem (with proof) - Laurent's theorem (without proof) - Taylor and Laurent series expansions of complex functions - Singularities - types - residues - poles of order m.

UNIT-VI : RESIDUE CALCULUS
Residue theorem - proof - applications - evaluation of integrals using residue theorem - evaluation of improper and real integrals of the type

i) $\int_{-\infty}^{\infty} f(x)dx$ ii) $\int_{0}^{2\Pi} f(\cos\theta, \sin\theta)d\theta$ iii) $\int_{-\infty}^{\infty} e^{imx} f(x)dx$

UNIT-VII : ROUCHE'S THEOREM - APPLICATIONS

Argument principle - Rouche's theorem - determination of number of zeros of complex polynomials - maximum modules principle - Fundamental theorem of Algebra - Cauchy's inequality - Liouville's theorem.

UNIT-VIII : CONFORMAL MAPPING

Definitions and examples, Mappings defined by $w = e^z$, ln z, z^2, sinz, cosz. Translation, Rotation, Inversion and Bilinear transformation - properties - fixed point - cross ratio - invariance of circles under bilinear transformation - determination of bilinear transformation using three given points.

TEXT BOOKS:

1. T.K.V. Iyenger, B. Krishna Gandhi, S.Ranganatham and M.V.S.S.N. Prasad, *Mathamatical Methods*, 5th Revised Edition, S. Chand & Company, 2010.
2. T.K.V. Iyenger, B. Krishna Gandhi..et al., *Text book of Engineering Mathematics*, Vol-III, 8th edition, S. Chand & Company, 2011.

REFERENCE BOOKS:

1. Grewal, B.S., *Higher engineering Mathematics*, 36th edition, Khanna Publishers, Delhi.
2. Kreyszig, E., *Advanced Engineering Mathematics*, 8th edition, John-Wiley.

10BT30121: FLUID MECHANICS AND HYDRAULIC MACHINERY	L	T	P	C
	4	1	-	4

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Engineering Mathematics and Mathematical Methods of I. B.Tech

COURSE DESCRIPTION:
Properties of fluids and pressure measurement; hydrostatic forces; fluid kinematics; fluid dynamics; closed conduit flow; measurement of flow; laminar and turbulent flow; hydraulic similitude and model testing

COURSE OUTCOMES: After completion of the course, a successful student is able to

1. demonstrate knowledge on:
   - properties and laws of fluid mechanism
   - flow through pipes and its measurements.
   - different types of jets & turbines and their performance & applications in power plants.
   - operational aspects of different pumps.
2. analyze
   - various instruments to measure the flows and estimate the losses.
   - performance of different types of jets and turbines used in power plants.
   - operational characteristics of different types of pumps.
3. demonstrate skills in
   - solving problems related to hydrostatic pressure using fundamentals of hydraulics.
   - evaluating flow discharge, losses in pipes using flow measuring instruments.
   - evaluating characteristic parameters of different jets and turbines used for power plants
   - evaluating characteristic parameters of pumps.

DETAILED SYLLABUS:

UNIT-I : PROPERTIES OF FLUIDS AND PRESSURE MEASUREMENT

Dimensions and units: physical properties of fluids- mass density, specific weight, specific volume - specific gravity, viscosity surface tension- capillarity, bulk modulus, compressibility-ideal and real fluids- Newtonian and non Newtonian fluids - vapor pressure and its influence on fluid motion- atmospheric gauge and vacuum pressure -measurement of pressure- Piezometer, U-tube and differential manometers.

UNIT-II : FLUID KINEMATICS AND DYNAMICS

Stream line, path line and streak lines and stream tube, classification of flows-steady & unsteady, uniform, non uniform, laminar, turbulent, rotational, and irrotational flows-equation of continuity for one dimensional flow. Surface and body forces -Euler's and Bernoulli's equations for flow along a stream line, momentum equation and its application on force on pipe bend.

UNIT-III : FLOW THROUGH PIPES AND ITS MEASUREMENT

Reynold's experiment- Darcy Weisbach equation- Minor losses in pipes- pipes in series and pipes in parallel- total energy line-hydraulic gradient line. Measurement of flow: pilot tube, venturimeter, and orifice meter, Flow nozzle-power transmission through transmission through pipes.

UNIT-IV : IMPACT OF JETS

Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, work done and efficiency, flow over radial vanes.

UNIT-V : HYDROELECTRIC POWER STATIONS

Layout of hydro electric power station - types-concept of pumped storage plants - storage requirements, mass curve (explanation only) estimation of power developed from a given catchment area, heads and efficiencies.

UNIT-VI : HYDRAULIC TURBINES

Classification of turbines, impulse and reaction turbines - construction and working of Pelton wheel, Francis turbine and Kaplan turbine-working proportions, work done, efficiencies , hydraulic design - draft tube theory - functions and efficiency.

UNIT-VII : PERFORMANCE OF HYDRAULIC TURBINES

Geometric similarity, Performance under unit head - specific speed - characteristic curves, governing of turbines, selection of type of turbine, cavitation, surge tank, water hammer.

UNIT-VIII : PUMPS

Classification, working, work done - manometric head- losses and efficiencies, specific speed - pumps in series and parallel-performance characteristic curves, Net Positive Suction Head - Reciprocating pumps - Working, Discharge, slip, indicator diagrams, Machinery.

TEXT BOOKS:

1. Modi and Seth, *Hydraulics, fluid mechanics and Hydraulic Machinery,* 18th edition, Standard book house, New Delhi.
2. Rajput, *Fluid Mechanics and Hydraulic Machines*, 4th edition, S. Chand Publications, New Delhi.

REFERENCE BOOKS:

1. D.S. Kumar, *Fluid Mechanics and Fluid Power Engineering*, 2nd edition, Kotaria & Sons.
2. R.K. Bansal, *Fluid Mechanics and Hydraulic Machinery,* 9th edition, Laxmi Publications Pvt., Ltd., New Delhi.

II B.Tech., I-Semester, EEE

10BT30401: SEMICONDUCTOR DEVICES AND CIRCUITS	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

(Common to EEE, ECE, EIE & EConE)

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Engineering Physics of I. B.Tech

COURSE DESCRIPTION:

Characteristics of general and special purpose electronic devices; Rectifiers and regulators; Biasing and small signal analysis of BJT and FET

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. Demonstrate fundamental knowledge on
   - Electronic devices and circuits
   - Characteristics of electronic devices
2. Analyze numerical and analytical problems in
   - Regulated Power Supplies
   - Transistor biasing circuits
   - Transistor amplifiers
   - FET biasing circuits and
   - FET amplifiers
3. Design the electronic circuits like
   - Regulated Power Supplies
   - Transistor biasing circuits
   - Transistor amplifiers
   - FET biasing and
   - FET amplifiers
4. Solve engineering problems and arrive at solutions pertaining to electronic circuits.

DETAILED SYLLABUS:

UNIT-I : PN JUNCTION DIODE

PN junction diode equation, Volt-Ampere (V-I) characteristics, temperature dependence of V-I characteristics, ideal versus practical, static and dynamic resistances, diode equivalent circuits, junction capacitances, break down mechanisms in semiconductor diodes, Zener diode characteristics.

UNIT-II : RECTIFIERS, FILTERS AND REGULATORS

Halfwave rectifier and fullwave rectifiers (Qualitative and quantitative analysis), harmonic components in a rectifier circuit, inductor filter, capacitor filter, L - section filter, $\prod$ - section filter, comparison of various filter circuits in terms of ripple factors. Simple circuit of a regulator using Zener diode. Problems on rectifier circuits.

UNIT-III : BIPOLAR JUNCTION TRANSISTOR

Transistor construction, BJT operation, transistor as an amplifier, transistor currents and their relations, input and output characteristics of a transistor in common emitter, common base and common collector configurations, BJT specifications.

UNIT-IV : TRANSISTOR BIASING AND STABILIZATION

Operating point, DC and AC load lines, importance of biasing, fixed bias, emitter feedback bias, collector to emitter feedback bias, voltage divider bias, bias stability, stabilization against variations in V_{BE} and β, bias compensation using diodes and transistors, thermal runaway, condition for thermal stability in CE configuration, problems on biasing circuits.

UNIT-V : SMALL SIGNAL ANALYSIS OF BJT AMPLIFIERS

BJT Modeling, hybrid modeling, determination of h-parameters from transistor characteristics, measurement of h-parameters, analysis of CE, CB and CC configurations using h-parameters, comparison of CB, CE and CC configurations, simplified hybrid model, Millers theorem, dual of Millers theorem.

UNIT-VI : FIELD EFFECT TRANSISTOR

Construction, principle of operation and characteristics of JFET and MOSFET (enhancement & depletion), small signal model of JFET and MOSFET.

UNIT-VII : FET AMPLIFIERS

Common source and common drain amplifiers using FET, generalized FET amplifier, biasing of FET, FET as voltage variable resistor, comparison between BJT and FET.

UNIT-VIII : SPECIAL PURPOSE ELECTRONIC DEVICES

Principle of operation and characteristics of tunnel diode, uni-junction transistor (UJT), varactor diode, Silicon Control Rectifier (SCR). principle of operation of Schottky barrier diode.

TEXT BOOKS:

1. J. Millman, Christos C. Halkias, *Electronic Devices and Circuits,* 1991 edition, Tata McGraw-Hill, 2008.
2. R.L. Boylestad and Louis Nashelsky, *Electronic Devices and Circuits,* 9th edition, Prentice Hall India, 2006.
3. David A. Bell, *Electronic Devices and Circuits,* 5th edition, Oxford University press, 2008.

REFERENCE BOOKS:

1. J. Millman and C.C. Halkias, *Integrated electronic*, 2nd edition, Tata McGraw-Hill, 1998.
2. K. Lal Kishore, *Electronic Devices and Circuits*, 2nd edition, BSP, 2005.
3. Robert T. Paynter, *Introductory Electronic Devices and Circuits*, 7th edition, Prentice Hall India, 2005.
4. S. Salivahana, N. Suresh Kumar, A. Vallavaraj, *Electronic Devices and Circuits*, 2nd edition, Tata McGraw-Hill, 2008.
5. Henry and Jeager, *Semiconductor Devices and Circuits,* Mc-Graw Hill.

II B.Tech., I-Semester, EEE

10BT40404: SWITCHING THEORY AND LOGIC DESIGN	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

(Common to EEE, EIE & EConE)

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: —

COURSE DESCIRPTION:

Number theory – Boolean algebra; Basic theorems and properties switching functions; combinational logic gates; PLD's, Threshold functions; Sequential Circuits; ASM charts, weighing machines

COURSE OUTCOMES: after successful completion of the course student will be able to

1. demonstrate knowledge in
   - · number systems, Boolean algebra, logic gates.
   - · minimization of switching functions using K-Map and Tabular methods.
   - · combinational and sequential circuits.
   - · PLDs and Boolean function realization using PLDs.
   - · ASM charts.
2. analyze boolean functions for minimization and implementation using PLDs
3. design and develop various combinational and sequential circuits
4. demonstrate skills to optimize the hardware, synthesize the functions using logic gates and threshold gate

DETAILED SYLLABUS:

UNIT-I : NUMBER SYSTEMS & CODES
Philosophy of number systems – complement representation of negative numbers, binary arithmetic, binary codes, error detecting & error correcting codes, hamming codes.

UNIT-II : BOOLEAN ALGEBRA AND SWITCHING FUNCTIONS
Fundamental postulates of boolean algebra, basic theorems and properties, switching functions, canonical and standard forms, algebraic simplification, digital logic gates, properties of XOR gate, universal gates, multilevel NAND/NOR realizations.

UNIT-III : MINIMIZATION OF SWITCHING FUNCTIONS
Map method, prime implicants, don't care combinations, minimal SOP and POS forms, tabular method, prime-implicant chart, simplification rules.

UNIT-IV : COMBINATIONAL LOGIC DESIGN
Design using conventional logic gates- binary adders, subtractors, look ahead carry generator, decimal adder-BCD adder, binary multiplier, modular design using IC chips- magnitude comparator, encoder, decoder, multiplexer- MUX realization of switching functions, De-multiplexer, parity bit generator, code-converters, hazards and hazard free realizations.

UNIT-V : PROGRAMMABLE LOGIC DEVICES, THRESHOLD LOGIC
Basic PLD's-ROM, PROM, PLA, PAL, realization of switching functions using PLD's, capabilities and limitations of threshold gate, synthesis of threshold functions, multigate synthesis.

UNIT-VI : SEQUENTIAL CIRCUITS - I
Classification of sequential circuits (synchronous, asynchronous, pulse mode, level mode with examples), basic flip-flops, triggering and excitation tables, steps in synchronous sequential circuit design, design of synchronous counters – modulo-N, up/down counter, ring counter, Johnson counter, design of asynchronous counter-modulo-N , sequence detector, serial binary adder.

UNIT-VII : SEQUENTIAL CIRCUITS - II
Finite state machine-capabilities and limitations, Mealy and Moore models, minimization of completely specified and incompletely specified sequential machines, partition techniques and Merger chart methods, concept of minimal cover table.

UNIT-VIII : ALGORITHMIC STATE MACHINES

Salient features of the ASM chart, Simple examples, system design using data path and control subsystems, control implementations, examples of weighing machine and binary multiplier.

TEXT BOOKS:

1. Morris Mano, *Digital Design,* 3rd edition, Prentice Hall India.
2. Zvi Kohavi, *Switching & Finite Automata theory,* 2nd edition, Tata McGraw-Hill.

REFERENCE BOOKS:

1. Charles H. Roth, *Fundamentals of Logic Design*, 5th edition, Thomson Publications, 2004.
2. Fletcher, *An Engineering Approach to Digital Design,* 1st edition, Prentice Hall India, 2005.
3. John M. Yarbrough, *Digital Logic Applications and Design,* Thomson Publications, 2006.
4. A Anand Kumar, *Switching Theory and Logic Design,* Prentice Hall India, 2008.

II B.Tech., I-Semester, EEE

10BT30201: ELECTRICAL CIRCUITS	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Engineering Physics of I. B.Tech

COURSE DESCRIPTION:

Concepts of Electrical Circuit parameters; Nodal and Mesh analysis; single phase AC circuits and analysis; Poly phase systems; analysis of coupled circuits; study and application of Network Theorems

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge on
   - V-I relationships for various electric elements.
   - network reduction techniques.
   - concepts of $1\text{-}\Phi$ and $3\text{-}\Phi$ electric circuits.
   - concepts of phasors and complex power.
   - concepts of Magnetic circuits.
   - various network theorems.
2. analyze electrical and magnetic circuits.
3. design circuits to meet the required specifications.
4. demonstrate skills to
   - solve electrical circuits for voltage, current and power using conventional circuit analysis methods and Network theorems.
   - solve magnetic circuits.

DETAILED SYLLABUS:

UNIT-I : FUNDAMENTALS OF ELECTRICAL CIRCUITS

Concepts of charge, current, voltage and power, active & passive elements, reference concepts of direction for voltages & currents, voltage and current relationships for passive elements, Ohm's law, Kirchoff Laws, current division and voltage division rules, Network reduction techniques - series, parallel, series-parallel circuits, star-delta and delta-star transformations, source transformation.

UNIT-II : BASIC NODAL & MESH ANALYSIS

Basic definitions: node, path, loop, branch - nodal analysis and super node concept - mesh analysis and super mesh concept - problems.

UNIT-III : FUNDAMENTALS OF AC CIRCUITS

Introduction - advantages of AC supply, types of waveforms, importance of sinusoidal waveforms, basic definitions: waveform, cycle, time period, frequency, amplitude- determination of average, RMS value, form factor & peak factor for different alternating waveforms, phase and phase difference.

UNIT-IV : SINGLE PHASE AC CIRCUITS

Sinusoidal response of R, L, C and combination of R, L, C circuits, concept of impedance and power triangles, power factor, resonance, bandwidth and quality factor for series and parallel networks, locus diagram.

UNIT-V: POLYPHASE SYSTEMS

Advantages of polyphase system over single phase system, phase sequence, star & delta connections, relationship between phase and line quantities, balanced and unbalanced circuits, power measurement in three phase systems using two wattmeter method-problems.

UNIT-VI : MAGNETICALLY COUPLED CIRCUITS

Coupled circuits, self & mutual inductance, DOT convention, co-efficient of coupling, analysis of magnetic circuits: series, parallel and composite, comparison of electrical and magnetic circuits.

UNIT-VII : NETWORK THEOREMS - I

Thevenin's, Norton's, Maximum Power Transfer and Superposition theorems for DC and sinusoidal excitations-applications.

UNIT-VIII : NETWORK THEOREMS - II

Tellegen's, Millman's, Reciprocity, Substitution and Compensation theorems for DC and sinusoidal excitation-applications.

TEXT BOOKS:

1. A. Sudhakar & Shyam Mohan, *Electric Circuits,* 3rd Edition, McGraw Hill Company, 2007.
2. A. Chakrabarthi, *Circuit Theory*, Dhanpat Rai & Co, New Delhi, 2009.

REFERENCE BOOKS:

1. M.E. Van Valkenberg, *Network Analysis*, Pearson Publications, 3rd edition, New Delhi 2006.
2. William H. Hayt & Jack E. Kennedy & Steven M. Durbin, *Engineering Circuit Analysis*, 6th edition, Tata Mc GrawHill Company, 2009.
3. J.A. Edminister & M.D.Nahvy, *Theory and Problems of Electric Circuits, Schaums Outline series*,4th edition, TATA Mc Graw Hill company, New Delhi, 2004.
4. G. K. Mittal, Ravi Mittal, *Network Analysis*, 14th Edition, Khanna Publishers, New Delhi, 1997.
5. C. K. Alexander and M. N. O. Sadiku, *Fundamentals of Electric Circuits,* 3rd Edition, Tata Mc Graw hill Publishing Company Limited, New Delhi, 2010.

II B.Tech., I-Semester, EEE

	L	T	P	C
10BT30202: DC MACHINES	**4**	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Engineering Physics, Engineering Chemistry and Engineering Physics and Engineering Chemistry Lab of I B.Tech.

COURSE DESCRIPTION:

Basics of energy conversion; Types, Operation and applications of DC Machines; performance evaluation of various DC machines

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge on
   - different types of single- and multi- excited magnetic field systems.
   - construction, operation and various types of DC machines.
   - starting and speed control of DC motors
   - testing of DC machines
   - Parallel operation of DC generators.
   - characteristics of DC machines
   - armature reaction and commutation
2. analyze the operation of DC machine for various operating conditions.
3. design
   - armature windings for DC machines
   - starter for DC motors
4. evaluate the performance of DC Machines
5. Select suitable DC machine for domestic and industrial applications.

DETAILED SYLLABUS:

UNIT-I : ELECTROMECHANICAL ENERGY CONVERSION

Electromechanical energy conversion, forces and torque in magnetic field systems, energy balance, energy and force in a singly excited magnetic field system, determination of magnetic force and co-energy, multi excited magnetic field systems.

UNIT-II : DC GENERATORS - CONSTRUCTION & OPERATION

DC Generators - principle of operation, function of commutator, constructional features, armature windings: lap and wave windings, simplex and multiplex windings, single and multi layer windings, equalizer rings and dummy coils, EMF equation, losses- constant & variable losses, calculation of efficiency, condition for maximum efficiency, reduction of losses - problems.

UNIT-III: TYPES OF DC GENERATORS

Methods of excitation - separately excited and self excited generators, build-up of EMF, critical field resistance and critical speed, causes for failure of self excitation and remedial measures.

UNIT-IV : ARMATURE REACTION IN DC MACHINES

Armature reaction, cross magnetizing and demagnetizing AT/pole, compensating winding, commutation, reactance voltage, methods of improving commutation-problems.

UNIT-V : CHARACTERISTICS OF DC GENERATORS AND PARALLEL OPERATION

Load characteristics of shunt, series and compound generators, parallel operation of DC generators, use of equalizer bar and cross connection of field windings, load sharing-problems.

UNIT-VI : DC MOTORS

DC Motors - principle of operation, back EMF, torque equation, characteristics and applications of shunt, series and compound motors, armature reaction and commutation-problems.

UNIT- VII : SPEED CONTROL OF DC MOTORS

Speed control of DC motors (Shunt & Series), armature voltage and field flux control methods, Ward-Leonard system, 3-point and 4-point starters - problems.

UNIT-VIII : TESTING OF DC MACHINES

Brake test, Swinburne's test, Hopkinson's test, Field's test, Retardation test, separation of stray losses - problems.

TEXT BOOKS:

1. JB Gupta, *Theory and Performance of Electrical Machines (DC Machines, Polyphase circuits & AC Machines) in SI Units,* 14th edition, S.K. KATARIA & Sons, New Delhi, 2006.
2. I.J. Nagrath & D.P. Kothari, *Electric Machines*, 7th edition, Tata McGraw-Hill Publishers, New Delhi, 2005.

REFERENCE BOOKS:

1. Albert E Clayton & N N Hancock, *Performance and Design of Direct Current Machines*, 3rd edition, CBS Publishers, New Delhi, 2004.
2. S.K. Bhattacharya, *Electrical Machines*, Tata McGraw-Hill Publish ers, New Delhi, 2001.
3. P.S. Bimbhra, *Electrical Machinery*, 7th edition, Khanna Publishers Delhi, 2005.
4. A.E. Fitzgerald, C.Kingsley and S.Umans, *Electric Machinery*, 6th edition, McGraw-Hill Companies, New Delhi, 2008.

II B.Tech., I-Semester, EEE

10BT40112: FLUID MECHANICS AND HYDRAULIC MACHINERY LAB	**L**	**T**	**P**	**C**
	-	**-**	**3**	**2**

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITES: Engineering Mathematics and Mathematical Methods of I. B.Tech

COURSE DESCRIPTION:
Calibration of flow meters; Bernoulli's apparatus; performance of turbines and pumps; loss through pipes.

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge on different types of flow and discharge measuring instruments, turbines and pumps.
2. analyze
   - calibration of different types of flow and discharge measuring instruments.
   - different models for estimating the losses in pipes.
   - performance of different types of jets, turbines and pumps.
3. able to design a suitable piping system to meet the needs of industry and domestic applications

Any TWELVE experiments are to be conducted

1. Calibration of venturimeter
2. Calibration of orificemeter
3. Determination of coefficient of discharge for small orifice by con stant head method
4. Determination of coefficient of discharge for external mouthpiece by variable head method
5. Calibration of rectangular notch
6. Calibration of triangular notch
7. Determination of loss of head due to sudden contraction
8. Determination of loss of head due to sudden expansion
9. Determination of friction factor for pipes
10. Verification of Bernoulli's equation
11. Impact of jet on vanes
12. Study of hydraulic jump
13. Performance test on Pelton wheel turbine
14. Performance test on Francis turbine
15. Performance test on Kaplan turbine
16. Performance test on single stage centrifugal pump
17. Performance test on multi stage centrifugal pump
18. Performance test on reciprocating pump

II B.Tech., I-Semester, EEE

10BT30211: DC MACHINES LAB	**L**	**T**	**P**	**C**
	-	**-**	**3**	**2**

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITES: DC Machines of II B.Tech., I-Semester

COURSE DESCRIPTION:

Speed control and Performance characteristics of DC Machines; Determination of losses in a DC machine.

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. Identify various parts of DC machine and different starters
2. analyze the performance of various DC machines
3. design the circuit based on loading and rating of the DC machine.
4. demonstrate skills in
   - obtaining the various characteristics of DC machines.
   - determining the performance characteristics of DC machine.
   - determining and separating losses in a DC machine.
5. function effectively as individual and as member in a team
6. Communicate effectively both oral and written

PART A: (for demo only):

1. Demonstration of parts of DC Machine-explaining their significance and the materials used
2. Demonstration of DC windings
3. Study of DC motor starters

The following experiments are required to be conducted as compulsory experiments:

PART B:

1. Magnetization characteristics of DC shunt generator. Determination of critical field resistance and critical speed
2. Load test on DC shunt generator. Determination of characteristics
3. Load test on DC series generator. Determination of characteristics
4. Load test on DC compound generator (cumulative and differential connection). Determination of characteristics
5. Hopkinson's test on DC shunt machines. Predetermination of efficiency
6. Field's test on DC series machines. Determination of efficiency
7. Swinburne's test on DC shunt machine. Predetermination of efficiencies
8. Speed control of DC shunt motor by
    a. Armature control method
    b. Field flux control method
9. Brake test on DC compound motor. Determination of performance curves.
10. Brake test on DC shunt motor. Determination of performance curves
11. Brake test on DC series motor. Determination of performance curves
12. Separation of losses in DC shunt machine

II B.Tech., II-Semester, EEE

10BT40421: ANALOG ELECTRONIC CIRCUITS

L	T	P	C
4	-	-	4

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Semiconductor Devices and Circuits of II B.Tech., I-Semester

COURSE DESCRIPTION:

Classification of amplifiers; analysis of low and high frequencies; characteristics of various feed back amplifiers; operation and analysis of various oscillators; large signal amplifiers; wave shaping circuits; switching characteristics of various devices; analysis and design of multivibrator circuits.

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge on:
   - ·different amplifier configurations
   - ·operation and principles in Oscillators.
   - ·applications of diodes and transistors for different applications.
   - ·transistor based multivibrators for triggering circuits.
2. analyze
   - ·various signal parameters of different amplifier configurations.
   - ·different types of multivibrator circuits.
   - ·frequency domain specifications of oscillators.
   - ·time domain specifications of active and passive components.
3. demonstrate skill in designing
   - · different amplifier configurations.
   - · multivibrator circuits.
4. demonstrate skills in evaluating
   - · parameters of amplifiers, Oscillators and multivibrators.
   - · Time and frequency domain specifications of RLC circuits.

DETAILED SYLLABUS:

UNIT-I : SINGLE STAGE AMPLIFIERS

Classification of amplifiers – distortion in amplifiers, analysis of CE, CC and CB configurations with simplified hybrid model, analysis of CE amplifier with emitter resistance and emitter follower, design of single stage RC coupled amplifier using BJT.

UNIT-II : BJT FREQUENCY RESPONSE

Logarithms, decibels, general frequency considerations, frequency response of BJT amplifier, analysis at low and High frequencies, Effect of coupling and bypass capacitors, the hybrid –Pi (π) – common emitter transistor model, CE short circuit current gain, current gain with resistive load, single stage CE transistor amplifier response, gain – bandwidth product, emitter follower at higher frequencies.

UNIT-III : FEEDBACK AMPLIFIERS

Concept of feedback, classification of feedback amplifiers, general characteristics of negative feedback amplifiers, effect of feedback on amplifier characteristics- voltage series- voltage shunt, current series and current shunt feedback configurations- simple problems.

UNIT-IV : OSCILLATORS

Conditions for oscillations, RC and LC type oscillators, crystal oscillators, frequency and amplitude stability of oscillators, feneralized analysis of LC oscillators, Quartz, Hartley and Colpitts oscillators, RC-phase shift and Wein- bridge oscillator

UNIT-V : LARGE SIGNAL AMPLIFIERS

Class-A aower amplifier, maximum value of efficiency of class-A amplifier, transformer coupled amplifier- push pull amplifier- complimentary symmetry circuits (Transformer less class B power amplifier)- phase inverters, transistor power dissipation, thermal runway, heat sinks.

UNIT-VI : LINEAR AND NON – LINEAR WAVE SHAPING

Linear wave shaping: High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs.

Non- linear wave shaping: Diode clippers, transistor clippers, clipping at two independent levels, comparators, applications of voltage comparators, clamping operation, clamping circuits taking source and diode resistances into account, clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage.

UNIT-VII : SWITCHING CHARACTERISTICS OF DEVICES

Diode as a switch, piecewise linear diode characteristics, Diode switching times, transistor as a switch, break down voltages, transistor in saturation, temperature variations of saturation parameters, transistor-switching times, silicon-controlled-switch circuits.

UNIT-VIII : MULTIVIBRATOR CIRCUITS

Analysis and design of bistable, monostable, astable multivibrators and schmitt trigger

Circuit using BJT, concept of triggering, symmetrical and asymmetrical configurations.

TEXT BOOKS:

1. Jacob Milliman, Christors C Halkias, *Integrated Electronics,* 1s edition, Tata McGraw-Hill, 2004.
2. R. L. Boylestad and Louis Nashelsky, *Electronic Devices and Circuits*, 9th edition, Pearson Education, 2007.
3. J. Millman and H. Taub, *Pulse, Digital and Switching Waveforms*, McGraw-Hill, 1991.

REFERENCE BOOKS:

1. S. Salivahana, N. Suresh Kumar, A. Vallavaraj, *Electronic Devices and Circuits*, 2nd edition, Tata McGraw-Hill, 2008.
2. David A. Bell, *Solid State Pulse Circuits*, 4th edition, Prentice Hall of India, 2002.
3. Robert T. Paynter, *Introductory Electronic Devices and Circuits*, 7th edition, Prentice Hall India, 2005.
4. A. Anand Kumar, *Pulse and Digital Circuits*, 2nd edition, Prentice Hall India, 2005.

II B.Tech., II-Semester, EEE

10BT40201: NETWORK ANALYSIS AND SYNTHESIS	**L**	**T**	**P**	**C**
	4	**-**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Engineering Mathematics and Engineering Chemistry of I B.Tech.,

COURSE DESCRIPTION:
Concept of network Topology; Laplace and Fourier Transforms; Two-Port networks; transient analysis of DC and AC circuits; network functions and synthesis

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate conceptual knowledge on:
   - graph theory and its applications,
   - Fourier and Laplace transforms and their applications.
   - parameters of two port networks
   - Transient behavior of various circuits.
   - Network functions and their properties.
2. analyze
   - a circuit using graph theory
   - a two port network for various network parameters
   - the transient behavior of the circuits.
   - a transfer function for stability analysis.
3. design
   - Two port network from the parameters.
   - Networks from the transfer functions.
4. demonstrate skills to
   - evaluate various incidence matrices of a network.
   - evaluate Laplace and Fourier transforms of various signals.
   - evaluate the transient response of a circuit for different excitations.
   - evaluate network functions and synthesizing of networks.

DETAILED SYLLABUS:

UNIT-I : NETWORK TOPOLOGY

Concept of network graph, basic definitions: branch, graph, tree, node, twigs, links-properties of a tree, incidence matrix - properties, reduced incidence matrix- cutset and tieset matrices - examples, Dual networks.

UNIT-II : FOURIER SERIES

Introduction-trigonometric Fourier series, evaluation of Fourier coefficients, waveform symmetry, Exponential form, effective value, Fourier transforms, effective value of non sinusoidal wave, relationship with Laplace transforms.

UNIT-III : LAPLACE TRANSFORMS

Definition of Laplace transform, advantages, basic theorems(differentiation and integration), Laplace transform of important functions, inverse Laplace transform, transform impedance of network elements (R, L & C), application of Laplace transform- series RL, RC, RLC, parallel RLC circuits, initial and final value theorem.

UNIT-IV : TWO PORT NETWORKS

Two port networks - Z-parameters, Y-parameters, ABCD parameters and H-parameters - symmetry and reciprocity property in two port networks - interrelationships of different parameters , interconnection of two port networks.

UNIT-V : DC TRANSIENT ANALYSIS

Transient response of RL, RC and RLC series circuits- initial conditions- solution method using differential equation and Laplace transforms, response of RL and RC networks to pulse excitation.

UNIT-VI : AC TRANSIENT ANALYSIS

Transient response of RL, RC and RLC series circuits - initial conditions-solution method using differential equation and Laplace transforms.

UNIT-VII : NETWORK FUNCTIONS

Introduction -network functions, determinants and co-factors for determining network function , necessary conditions for driving point function and transfer functions, applications of network analysis in deriving network functions, transient response.

UNIT-VIII : NETWORK SYNTHESIS

Introduction - positive real functions, driving point and transfer impedance function, LC network, synthesis of dissipative networks, two terminal RL and RC network.

TEXT BOOKS:

1. A. Sudhakar, Shyammohan S Palli, *Circuits and Networks (Analysis and Synthesis),* 3rd edition, Tata McGraw-Hill Publishing.
2. D. Roy Chowdary, *Networks and Systems*, 1st Edition, New Age International Publishers.

REFERENCE BOOKS:

1. A. Chakrabarthi, *Circuit Theory (Analysis and Synthesis)*, 1st edition, Dhanpat Roi & Co. New Delhi, 2009.
2. M.E. Van Valkenburg, *Network Analysis*, 3rd edition, Prentice Hall India.
3. William H Hayt, Jr. Jack E. Kemmerly, Steven M. Durbin, *Engineering Circuit Analysis*, 6th edition, Tata McGraw-Hill publishing Company Ltd.,
4. Umesh Sinha, *Network Analysis and Synthesis*, 5th edition, Satyaprakashan, New Delhi.

II B.Tech., II-Semester, EEE

10BT40202: ELECTROMAGNETIC FIELDS	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Engineering Physics and Engineering Mathematics of I B.Tech.,

COURSE DESCRIPTION:

Concept of Electrostatics and magneto statics; potential gradient for various charge distributions; behaviour of various materials in electric and Magnetic fields; statically and dynamically induced EMF's; Lorentz force equation; Self and Mutual inductance calculations.

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. Gain knowledge on:
   - static electric fields due to electric charges
   - static magnetic fields due to steady currents
   - time varying electric and magnetic fields
2. Analyze the Maxwell's equations for both time variant and time invariant electric and magnetic fields.
3. evaluate
   - Electric field and capacitance by applying Gauss's law.
   - Magnetic field and inductance by applying Ampere's circuital law.

DETAILED SYLLABUS:

REVIEW OF VECTOR ALGEBRA:
Scalar and vector fields, Vector algebra, Cartesian, Circular Cylindrical and Spherical co-ordinate systems, Divergence Theorem, Stoke's Theorem

UNIT-I : ELECTROSTATICS
Electrostatic fields-Coulomb's law, Electric Field Intensity (EFI), various charge distributions, EFI due to a continuous line charge, surface charge and volume charge distribution, electric flux density,Gauss's Law, applications of Gauss law to symmetrical charge distributions and differential volume element, Maxwell's first equation (point and integral form).

UNIT-II : ENERGY & POTENTIAL IN ELECTRIC FIELDS
Energy expended in moving a point charge in an electric field, Maxwell's second equation (point and integral form), concept of potential and potential gradient-potential for different charge distributions, energy density in electrostatic fields, electric dipole, dipole moment, potential and EFI due to an electrical dipole, torque on an electric dipole in an electric field.

UNIT-III : CONDUCTORS, DIELECTRICS AND CAPACITANCE
Current density, conduction and convection current density, Ohm's law in point form, current continuity equation, conductors and dielectric materials, behaviour of conductors in an electric field, boundary conditions, polarization, capacitance, capacitance of parallel plate, spherical and co-axial capacitors with composite dielectric Laplace and Poisson's equations, solutions of Laplace equation in one variable.

UNIT-IV : MAGNETOSTATICS
Static magnetic fields - Biot-Savart's law, Oesterd's experiment, Magnetic Field Intensity(MFI), MFI due to a straight current carrying filament, circular, square, solenoid and toroid current carrying wire, relation between magnetic flux, magnetic flux density and MFI, Maxwell's third equation (point and integral form), magnetic dipole and dipole moment, torque on a current loop placed in a magnetic field.

UNIT-V : AMPERE'S CIRCUITAL LAW AND ITS APPLICATIONS

Ampere's Circuital law, Maxwell's fourth equation(point and integral form), applications of Ampere's circuital law to infinite line current, infinite sheet of current, infinitely long co-axial transmission line, solenoid and toroid, field due to a circular loop, rectangular and square loops, scalar magnetic potential and its limitations, vector magnetic potential due to simple configurations, vector Poisson's equation.

UNIT-VI : FORCE IN MAGNETIC FIELDS

Magnetic forces, forces due to magnetic fields, force: on charged particle, current element and between two current elements - Lorentz force equation, force on a straight and long current carrying conductor in a magnetic field, force between two straight, long and parallel current carrying conductors, magnetic dipole and dipole moment, torque on a current loop placed in a magnetic field.

UNIT-VII : MAGNETIC MATERIALS AND INDUCTANCE

Magnetization, classification of magnetic materials, B-H curve, magnetic boundary conditions, self and mutual inductance,coefficient of coupling(K), Neumann's formulae, self-inductance of a solenoid, toroid, co-axial cable, two wire transmission line, energy stored and density in magnetic field, analogy between Electric and magnetic circuits.

UNIT-VIII : TIME VARYING FIELDS

Time varying fields, Faraday's laws of electromagnetic induction,displacement current, statically and dynamically induced EMF, Maxwell's four equations in point and integral form for time varying fields - simple problems, Poynting theorem and Poynting vector.

TEXT BOOKS:

1. William H. Hayt & John A. Buck, *Engineering Electromagnetics*, 7th edition, McGraw-Hill Companies, 2006.
2. Sadiku, *Elements of Electro Magnetic Fields*, 4th edition, Oxford Publications.

REFERENCE BOOKS:

1. J D Kraus, *Electromagnetics*, 4th edition, McGraw-Hill, 1992.
2. K.A.Gangadhar & P.M. Ramanathan, *Field Theory*, 5th edition, Khanna Publishers, New Delhi, 2003.

II B.Tech., II-Semester, EEE

10BT40203: GENERATION OF ELECTRICAL POWER	**L**	**T**	**P**	**C**
	4	**-**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Electrical Circuits, Fluid Mechanics & Hydraulic Machines and Fluid Mechanics & Hydraulic Machines lab of II B.Tech I Semester

COURSE DESCRIPTION:

Overview of Conventional and Non-conventional sources of energy; generation of electric power using hydro, thermal, Nuclear power plants; AC and DC distribution systems; operation of various equipment and Classification of Substations; economic aspects of power generation; methods of improving power factor

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge on
   - layout of various power plants and their operation
   - distribution system and its configurations.
   - economical aspects of power generation.
   - importance of power factor and methods to improve pf.
2. analyze the criteria for economical power factor.
3. design proper ratings of power factor improving devices to improve power factor.
4. skills to evaluate
   - tariffs by different methods
   - economical power factor
   - ratings of synchronous condensers , capacitor banks

DETAILED SYLLABUS:

UNIT-I : INTRODUCTION
Overview of conventional and non-conventional sources of energy, structure of electric power system, growth of power system in India, requirements of an electric power system, concept of GRID formation, different types of energy sources and efficiency in their use.

UNIT-II : HYDROELECTRIC POWER STATIONS
Location of hydroelectric power station, types of hydroelectric power stations, reserve plant components, concept of pumped storage plants, storage requirements, mass curve.

UNIT-III : THERMAL POWER STATIONS
Layout of thermal plant, use of lignite and coal, showing paths of coal, steam, water, air, ash and flue gases, brief description of thermal power station components: economizer, boilers, super heaters, turbines and condenser, chimney and cooling towers.

UNIT-IV : NUCLEAR POWER STATIONS
Nuclear fission, chain reaction, principle of operation of nuclear reactor, nuclear fuel, moderator, control rods, reflectors and coolants, shielding and safety precautions, radiation hazards, nuclear reactors, PWR, BWR and breeder reactor, overview of gas power stations: principle of operation and components.

UNIT-V : DISTRIBUTION SYSTEMS
Classification of distribution systems-comparison of DC and AC, AC single phase and three phase three wire and four wire systems, Kelvin's law, most economical size of conductor, voltage drop calculations(numerical problems) in AC and DC for radial and ring main distribution.

UNIT-VI: SUBSTATIONS
Classification of substations: indoor and outdoor substation, substation layouts, various equipment of substations, bus bar arrangements: single sectionalized, main and transfer, ring main and group switching schemes, line diagram of gas insulated substations, working mechanism, comparison of air insulated substations and gas insulated substations.

UNIT-VII : ECONOMIC ASPECTS OF POWER GENERATION

Load curve, load duration and integrated load duration curve, load, demand - diversity - capacity - utilization and Plant use factors. Costs of generation - depreciation - methods of calculations - Tariffs - flat rate - block rate - two part - three part and power factor tariffs - numerical problems

UNIT-VIII: POWER FACTOR IMPROVEMENT

Disadvantages of low power factor - methods of improving power factor - static capacitors, synchronous condensers and phase advancers - most economical power factor for constant kW and constant kVA type loads.

TEXT BOOKS:

1. V.K.Mehta and Rohith Mehta, *Principles of Power Systems*, Schand & Company Ltd, New Delhi 2004.
2. M.L.Soni, P.V.Gupta, U.S.Bhatnagar and A.Chakraborti, *A Text Book on Power System Engineering,* Dhanpat Rai & Co. Pvt. Ltd., 1999.

REFERENCE BOOKS and WEBSITE:

1. C.L.Wadhwa, *Electrical Power Systems*, New Age international (P) limited, 2005.
2. M.V.Deshpande, *Elements of Power Station Design and Practice*, Wheeler publishing, 1999.
3. http://www.nlcindia.com.

II B.Tech., II-Semester, EEE

10BT40204: ELECTRICAL MEASUREMENTS	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Electrical Circuits of II B.Tech I Semester

COURSE DESCRIPTION:

Basic principles of all measuring instruments; measurement of RLC parameters; voltage, current, Power factor, power and energy measurements; magnetic measurements and Digital Meters

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge in
   - principle and operation of various measuring instruments and instrument transformers.
   - concepts of various bridges for measurement of electrical parameters.
   - calibration of instruments.
   - concepts of magnetic quantities and measurements.
   - various sensors, gauges and transducers.
2. analyze
   - errors in various instruments and instrument transformers.
   - various bridges for measuring parameters.
3. design circuits for extension of meter ranges.
4. demonstrate skill to
   - evaluate different electrical quantities by suitable instruments.
   - evaluate the errors in the process of measurements.
5. apply measuring techniques for industrial and domestic applications.

DETAILED SYLLABUS:

UNIT-I : DC MEASUREMENTS

Measurements-significance of measurements, methods of measurements, classification of instruments, D' Arsonval galvanometer, deflecting, control and damping torques, types of damping systems, ammeters and voltmeters, PMMC, errors and compensations, extension of range using shunts and series resistance, Ballistic galvanometer constructional details, equation of motion - problems.

UNIT-II : AC MEASUREMENTS

Moving iron type instruments, expression for deflecting torque and control torque, extension of range using shunts and series impedances, Errors and Compensations, electrostatic voltmeters, electrometer type and attracted disc type, extension of range of electrostatic voltmeters.

Instrument transformers- CT & PT - ratio and phase angle errors, constructional details, characteristics of CT and PT, Testing of CT's-Silsbee's method, variable mutual induction methods-problems.

UNIT-III : MEASUREMENT OF POWER

Power measurements in DC circuits, single phase dynamometer wattmeter, LPF and UPF, double element and three element dynamometer wattmeter, constructional details, expression for deflecting and control torques, errors and compensations, extension of range of wattmeter using instrument transformers, Measurement of three phase active and reactive powers in balanced and unbalanced systems-problems.

UNIT-IV : MEASUREMENT OF ENERGY

Single phase induction type energy meter, driving and braking torques, errors and compensations, testing by phantom loading using RSS meter, three phase energy meter, trivector meter, maximum demand meters-problems.

UNIT-V : DC AND AC POTENTIOMETERS

Crompton potentiometer, principle and operation of DC Crompton's potentiometer, standardization, applications of DC potentiometer for measurement of resistance, calibration of ammeter, voltmeter and wattmeter - problems.

AC Potentiometers: Polar and coordinate potentiometers, AC potentiometer Standardization, applications of AC Potentiometer for calibration of voltmeter, ammeter - problems.

UNIT-VI : RESISTANCE MEASUREMENTS

Method of measuring low, medium and high resistances, sensitivity of Wheatstone's bridge, Carey Foster's bridge, Kelvin's double bridge for measuring low resistance, measurement of high resistance, loss of charge method, ohmmeter, Meggar for measurement of earth and insulation resistance - problems.

UNIT-VII : AC BRIDGES

Measurement of inductance, quality factor, Maxwell's bridge, Hay's bridge, Anderson's bridge, Owens's bridge. Measurement of capacitance and loss angle, Desauty's bridge, Wien's bridge, Schering bridge, Modified Schering bridge, loss factor - problems.

UNIT-VIII : SPECIAL INSTRUMENTS

Power factor meters, dynamometer and moving iron type, single phase and three phase meters, frequency meters, resonance type and Weston type, synchroscopes.

Flux meter, constructional details, comparison with ballistic galvanometer, extension of flux meter, determination of B-H curve method of reversals, step by step method.

Concepts of: LVDT, RVDT, Q-meter, transducers, thermocouple, strain gauges, digital voltmeter.

TEXT BOOKS:

1. A.K.Sawhney, *A Course in Electrical and Electronic Measurements and Instrumentation,* Danpat Rai Publishers, 2010.
2. Golding & F.C.Widdis, *Electrical Measurements and Measuring Instruments*, 5th edition, Wheeler Publishers, 1997.

REFERENCE BOOKS:

1. R. K. Rajput, *Electrical & Electronic Measurement & Instrumen tation,* 2nd Edition, S. Chand & Co.
2. Reissland, *Electrical Measurements: Fundamentals, Concepts and Applications,* New Age International Publishers, 2006.
3. Forest K. Harris, *Electrical Measurements,* Wiley, John & Sons, 1984.
4. J.B. Gupta, *Electrical Measurements,* S.K.Kataria publishers, 2004.
5. H. S. Kalsi, *Electronic Instrumentation*, 3rd Edition, Tata McGraw-Hill, 1996.

II B.Tech., II-Semester, EEE

10BT40205: TRANSFORMERS AND INDUCTION MACHINES	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Electrical Circuits and DC Machines of II B.Tech, I-Semester

COURSE DESCRIPTION:

Operation and performance of single phase and three phase transformers; Construction of various types of induction motor; Predetermination of performance and speed control of induction motor.

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge on
   - construction and working principle of Transformers, Auto transformers and Induction machines.
   - testing of Transformers and Induction machines.
   - speed control of Induction machines.
   - parallel operation of Transformers.
2. analyze the behavior of Transformer and Induction machines for various operating conditions.
3. design suitable accessories/techniques for the starting & speed control of Induction machine.
4. demonstrate skills in investigating the performance of Transformers and Induction machines.
5. identify the suitable Transformer and Induction machines for domestic, agriculture and industrial applications.

DETAILED SYLLABUS:

UNIT-I : CONSTRUCTION AND OPERATION OF SINGLE PHASE TRANSFORMERS

Single phase transformers-types , constructional details, minimization of hystersis and eddy current losses, emf equation, operation on no load and on load - phasor diagrams.

UNIT-II : PERFORMANCE OF SINGLE PHASE TRANSFORMERS

Equivalent circuit, losses and efficiency, regulation - All day efficiency, effect of variations of frequency and supply voltage on iron losses.

UNIT-III : TESTING OF SINGLE PHASE TRANSFORMER AND AUTOTRANSFORMER

OC and SC tests, Polarity test, Sumpner's test, predetermination of efficiency and regulation, separation of losses test, parallel operation with equal and unequal voltage ratios, auto transformers, equivalent circuit, comparison with two winding transformers.

UNIT-IV : THREE PHASE TRANSFORMERS

Three phase transformers - three phase connections - star/star, delta/star, delta/delta, star/delta and open delta , third harmonic in phase voltages, three winding transformers-tertiary windings, determination of Z_p, Z_s and Z_t, off load and on load tap changing, Scott connection - Problems.

UNIT-V : THREE PHASE INDUCTION MOTORS

Three phase induction motors, construction details of cage and wound rotor machines, production of rotating magnetic field, principle of operation, rotor emf and rotor frequency, rotor reactance, rotor current and power factor at standstill and during operation - problems.

UNIT-VI : INDUCTION MOTOR CHARACTERISTICS

Rotor power input, rotor copper loss and mechanical power developed and their inter relation, torque equation,deduction from torque equation, expressions for maximum torque and starting torque,torque slip characteristic, double cage and deep bar rotors,equivalent circuit, phasor diagram, crawling and cogging.

UNIT-VII : CONSTRUCTION OF CIRCLE DIAGRAM

Circle diagram, no-load and blocked rotor tests, stator resistance test,predetermination of performance, methods of starting and starting current and torque calculations.

UNIT-VIII : INDUCTION MOTOR SPEED CONTROL METHODS

Speed control:change of frequency, change of poles and methods of consequent poles, cascade connection, injection of an emf into rotor circuit (qualitative treatment only), induction generator - principle of operation - problems.

TEXT BOOKS:

1. JB Gupta, *Theory and performance of Electrical Machines (DC machines, Poly phase circuits & AC machines) in SI Units*, S.K. KATARIA & Sons,Delhi 2009.
2. P.S. Bimbhra, *Electrical Machinery,* 7th edition, Khanna Publishers, Delhi, 2005.

REFERENCE BOOKS:

1. A.E. Fitzgerald, C.Kingsley and S.Umans, *Electric Machinery*, 6th edition, Mc Graw-Hill Companies, New Delhi, 2008.
2. I.J. Nagrath & D.P.Kothari, *Electric Machinery,* 7thedition, Tata McGraw-Hill, 2005.
3. MG.Say, *Performance and Design of AC Machines,* BPB Publishers.
4. Langsdorf, *Theory of Alternating Current Machinery,* 2nd edition, Tata McGraw-Hill Companies.
5. B.L. Theraja and A.K. Theraja, *A. text book of Electrical Technology in SI units,* S.Chand, Vol: 2, 2010.

II B.Tech., II-Semester, EEE

10BT30411: SEMICONDUCTOR DEVICES AND CIRCUITS LAB	**L**	**T**	**P**	**C**
	-	**-**	**3**	**2**

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITES: Semiconductor Devices and Circuits of II B.Tech., I-Semester

COURSE DESCRIPTION:

Identification and testing of active and passive components; RPS, DMM, Function Generator, CRO; Diode characteristics; Rectifiers; Transistor and FET characteristics; UJT and SCR characteristics; BJT and FET amplifiers.

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. Analyze the characteristics of different electronic devices, like
    - Diode
    - Zener Diode
    - Transistor
    - FET and
    - UJT
2. Design and analyze the electronic circuits like transistor and FET amplifiers
3. Solve engineering problems and arrive at solutions pertaining to electronics.

DETAILED SYLLABUS:

PART A: (Only for viva voce Examination)

ELECTRONIC WORKSHOP PRACTICE (in 3 lab sessions):

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCBs

2. Identification, Specifications and Testing of Active Devices, Diodes: BJTs, Low-power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, Optoelectronic Devices, SCR, UJT, DIACs, TRIACs, Linear and Digital ICs

3. Study and operation of
    - Multimeters (Analog and Digital)
    - Function Generator
    - Regulated Power Supplies
    - CRO

PART B: (Minimum of 10 experiments to be conducted)

1. Forward and Reverse bias characteristics of PN Junction diode
2. Zener diode characteristics and Zener as Voltage Regulator
3. Input and Output characteristics of Transistor in CB Configuration
4. Input and Output characteristics of Transistor in CE Configuration
5. Halfwave Rectifier with and without filters
6. Fullwave Rectifier with and without filters
7. FET characteristics
8. Measurement of h parameters of transistor in CE configurations
9. Frequency response of CE Amplifier
10. Frequency response of CC Amplifier
11. Frequency response of Common Source FET Amplifier
12. SCR Characteristics
13. UJT Characteristics

II B.Tech., II-Semester, EEE

10BT40211: ELECTRICAL CIRCUITS AND SIMULATION LAB	**L**	**T**	**P**	**C**
	-	**-**	**3**	**2**

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITES: Electrical Circuits of II B.Tech., I-Semester and Network Analysis and Synthesis of II B.Tech., II-Semester

COURSE DESCRIPTION:

Verification of network theorems; Determination of Two port network parameters; analysis of AC and DC circuits using PSPICE; determination of resonant frequency in series and parallel RLC circuits

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge on
   - identification of various circuit elements and their values.
   - concepts of electrical circuits.
2. analyze and relate physical observations and measurements involving electrical circuits to theoretical principles and theorems.
3. design electrical circuits
4. demonstrate skills in
   - obtaining the current locus diagrams.
   - determining the two-port network parameters.
   - measuring of active and reactive powers.
5. apply PSPICE simulation tool to analyze the electrical circuits.
6. function effectively as individual and as member in a team.
7. Communicate effectively both oral and written.

DETAILED SYLLABUS:

Any EIGHT experiments to be conducted from part A

PART A : ELECTRICAL CIRCUITS

1. Verification of Superposition and Reciprocity theorems
2. Verification of Thevenin's and Norton's theorems
3. Verification of Maximum power transfer theorems for DC & AC excitations
4. Verification of Milliman's and Compensation theorems
5. Series and parallel resonance
6. Determination of self and mutual inductance and coefficient of coupling
7. Current locus diagrams of RL & RC series circuits
8. Z & Y parameters
9. Transmission and Hybrid parameters
10. Measurement of three phase active power and reactive power for balanced loads

Any FOUR experiments to be conducted from part B

PART B : PSPICE SIMULATION

1. Simulation of DC circuits
2. DC transient response
3. Mesh analysis
4. Nodal analysis
5. Simulation of AC circuits
6. AC transient response

II B.Tech., II-Semester, EEE

10BT4HS02: ADVANCED ENGLISH COMMUNICATION SKILLS (AUDIT COURSE)	**L**	**T**	**P**	**C**
	-	3	-	-

PREREQUISITE: Technical English and English Language and Communication Skills Lab of I B.Tech.,

COURSE DESCRIPTION:

Vocabulary Building; Reading Comprehension; Academic Essay; Technical Report; Career Skills; Resume Writing; Group Discussion; Interview Skills.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Acquire knowledge in.
   - Vocabulary
   - Etymology
   - Idioms and Phrases
2. Analyse the functional knowledge of writing, styles and techniques for academic and professional requirements.
3. Interpret and synthesize the language functions through:
   - Role Plays
   - Group Discussions
   - Mock Interviews
4. Use and create techniques and language lab software for enhancing the language skills.
5. Communicate effectively with engineering community and society in formal and informal situations.
6. Inculcate attitude to upgrade communicative competence for meeting global challenges.

DETAILED SYLLABUS:

UNIT-I : VOCABULARY BUILDING

Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases.

Functional English: starting conversation, responding appropriately and relevantly, using the right body language, role play in different situations.

UNIT-II : READING COMPREHENSION

Reading for facts, guessing meanings from context, scanning, skimming, inferring meaning and critical reading.

UNIT-III : ACADEMIC ESSAY WRITING

Accuracy, brevity, clarity, brainstorm, list your ideas, sub-headings, revising content and organisation.

UNIT-IV : TECHNICAL REPORT WRITING

Types of formats and styles, subject-matter, subject-organization, clarity, coherence and style, planning, data-collection, tools, analysis.

UNIT-V : CAREER SKILLS

Career direction, exploring your talents, personality inventories, write a "Who I Am" statement, thinking further, perform career research, How do I get hired, creating job satisfaction, identify your satisfaction triggers, positive attitude, maintain a balanced lifestyle, analyze your job in terms of your interests, set goals to bring your interests and responsibilities in line, personal SWOT analysis, making the most of your talents and opportunities, shaping your job to fit you better, future proof your career, managing your emotions at work, get the recognition you deserve.

UNIT-VI : RESUME WRITING

Structure and presentation, planning, defining the career objective, projecting ones strengths and skill-sets, summary, formats and styles, cover letter.

UNIT-VII : GROUP DISCUSSION

Dynamics of group discussion, intervention, summarizing, modulation of voice, fluency and coherence, participation, relevance, assertiveness, eye contact and body language.

UNIT-VIII : INTERVIEW SKILLS

Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.

REFERENCE BOOKS:

1. M. Ashraf Rizvi, *Effective Technical Communication Skills*, (2005), Tata McGraw-Hill, New Delhi.
2. Meenakshi Raman and Sangetha Sharma, *Technical Communi cation, Principles and Practice*", (2010) Oxford University Press, New Delhi.
3. Santha Kumar R, *Secrets of Success in Interviews*, (2007), Crucial Books, Secunderabad.
4. M. Ashraf Rizvi, *Resumes and Interviews - The Art of Wining*, (2008), Tata McGraw-Hill, New Delhi.
5. Gopala Swamy Ramesh and Mahadevan Ramesh,*The Ace of Soft Skills:Attitude, Communication and Etiquette for Success*, (2009), Pearson Education, New Delhi.

SUGGESTED SOFTWARE:

1. TOEFL, GRE and IELTS (Kaplan, Aarco and Barrons, Cliffs)
2. Softwares from 'train2success.com'
3. Resume Preparation, K-Van Solutions.
4. Facing Interviews, K-Van Solutions.
5. Study Skills Success, (Essay, Vocabulary strategies, IELTS), Young India Films.
6. Vocabulary Builder, Young India Films.
7. E-correspondence, Young India Films.
8. Group Discussions, (Ease - 2), Young India Films.
9. Report Writer, Young India Films.

III B. Tech., I-Semester, EEE

10BT3BS02: ENVIRONMENTAL SCIENCES	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: —

COURSE DESCRIPTION:

Introduction to environment, Need for public awareness; Natural resources, conservation and management; Ecology and ecosystems; Biodiversity, conservation and management; Environment pollution and Control; Social issues and environment; Human population and environment; Field study and analysis

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. Demonstrate knowledge in
    - Different components of environment and natural resources.
    - Green technology
    - Ecology and Ecosystems
    - Biodiversity and its conservation
    - Population and Human health
2. Identify sources of pollution and provide suggestions for protection of natural resources.
3. Follow environmental ethics to protect the diversified ecosystems and make environment sustainable.

DETAILED SYLLABUS:

UNIT-I : INTRODUCTION TO ENVIRONMENTAL SCIENCES

Definition and concept of the term environment, various components of environment, abiotic and biotic, atmosphere, hydrosphere, lithosphere, biosphere, inter relationships, need for public awareness, role of important national and international individuals and organizations in promoting environmentalism.

UNIT-II : NATURAL RESOURCES, CONSERVATION AND MANAGEMENT

Renewable and Non renewable resources and associated problems, Forests: Deforestation, causes, effects and remedies, effects of mining, dams and river valley projects - case studies, Water resources: Water use and over exploitation, conflicts over water, large dams, benefits and problems. Food resources : World food problems, adverse effects of modern agriculture, fertilizer and pesticide problems. Land resources: Land degradation, land slides, soil erosion, desertification, water logging, salinity, causes, effects and remedies. Mineral resources: Mining, adverse effects. Energy resources: Growing needs, renewable and non renewable resources, Alternate resources: Coal, wind, oil, tidal wave, natural gas, biomass and biogas, nuclear energy, hydrogen fuel and solar energy, impact on environment, sustainable life styles.

UNIT-III : ECOLOGY AND ECOSYSTEMS

Definitions and concepts, characteristics of ecosystem, structural and functional features, producers, consumers and decomposers and food webs, types of ecosystems, forests grassland, desert, crop land, pond, lake, river and marine ecosystems, energy flow in the ecosystem , ecological pyramids, ecological successions.

UNIT-IV : BIO DIVERSITY, CONSERVATION AND MANAGEMENT

Introduction - Definition and concept of biodiversity, value of biodiversity, role of biodiversity in addressing new millennium challenges, global, national biodiversity, hot spots of biodiversity, threats to biodiversity, man and wild life conflicts, remedial measures, endemic, endangered and extinct species, in-situ and ex-situ conservation of biodiversity.

UNIT-V : ENVIRONMENTAL POLLUTION AND CONTROL

Definition, causes, adverse effects and control measures of air pollution, indoor pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear pollution, solid waste management, causes, effects, control and disposal methods, role of individuals in the prevention of pollution, hazards and disaster management, floods, earthquakes, tsunamis, cyclones,land slides - case studies.

UNIT-VI : SOCIAL ISSUES AND THE ENVIRONMENT

Concept of sustainable development, methods of rainwater harvesting, watershed management, waste land reclamation, green cover, green power, green technology, resettlement and rehabilitation of people and related problems - Case studies, issues and possible solutions, greenhouse effect and global warming, carbon credits, acid rains, ozone layer depletion, causes, effects and remedies, consumerism and waste production, environment protection acts, air act, water act,forest conservation act, wild life protection act, issues involved in the enforcement.

UNIT-VII : HUMAN POPULATION AND ENVIRONMENT

Population growth and its impact on environment, environmental ethics, family welfare programmes, human health: T.B., Cancer, HIV/AIDS - Causes, effects and remedies, occupational health hazards, human rights, important international protocols and conventions on environment.

UNIT-VIII : FIELD WORK/ENVIRONMENTALIST'S DIARY/ ASSIGNMENTS/SEMINARS

TEXT BOOKS:

1. Erach Barucha, *Environmental Studies*, 1st edition, Universities Press, Hyderabad, 2010.
2. A. Kaushik and Kaushik, *Environmental Studies*, 3rd Edition, New Age International Publishers, 2011.

REFERENCE BOOKS:

1. Desh wal, *Environmental Studies*, 2nd Edition, Khanna Publications, New Delhi, 2010.
2. Rajagopalan, *Environmental Studies,* 1st edition, Oxford Univer sity Press, 2009.
3. Joseph Benny, *Environmental Studies*, 2nd Edition, Tata McGraw-Hill, New Delhi, 2010.

III B. Tech., I-Semester, EEE

10BT40501: COMPUTER ARCHITECTURE AND ORGANIZATION	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PRE-REQUISITES: Problem Solving and Computer Programming and Computer Programming Lab of I B.Tech., Switching Theory and Logic Design of II B.Tech., I-Semester

COURSE DESCRIPTION: Structure of Computers; Register Transfer and Micro-Operations; Micro-programmed Control; Pipeline and Vector Processing; the Memory System, Input-Output Organization; Multi-Processors and Case studies.

COURSE OUTCOMES: At the end of the course student will be able to:

1. Gain knowledge in register transfer logic, computer instructions, design of ALU, Memory and control list and I/O system functioning.
2. Analyze performance of processors using pipelining, vector processing and multiprocessing, CISC architecture in Pentium – IV and RISC architecture in Power PC.
3. Develop skills in using communication protocols such as RS 232C, USB and IEEE 1394.

DETAILED SYLLABUS:

UNIT-I : STRUCTURE OF COMPUTERS

Computer types, functional units, basic operational concepts, von-Neumann architecture, bus structures, software, performance, multiprocessors and multicomputers.

Computer Arithmetic: Review of representation of information, addition and subtraction, multiplication and division algorithms, Floating- point arithmetic operation, decimal arithmetic unit, decimal arithmetic operations.

UNIT-II : REGISTER TRANSFER AND MICRO-OPERATIONS

Register transfer language, register transfer, bus and memory transfers, arithmetic micro-operations, logic micro-operations, shift micro-operations, arithmetic logic shift unit, instruction codes, computer registers, computer instructions, instruction cycle, timing and control, memory- reference instructions, input-output and interrupt.

Central Processing Unit: Stack organization, instruction formats, addressing modes, data transfer and manipulation, program control, Reduced Instruction Set Computer (RISC), comparison of RISC and CISC.

UNIT-III : MICROPROGRAMMED CONTROL

Control memory, address sequencing, micro-program example, design of control unit, hardwired control, micro-programmed control, nanoprogramming.

UNIT-IV: PIPELINE AND VECTOR PROCESSING

Parallel processing, pipelining, arithmetic pipeline, instruction pipeline, RISC pipeline, data hazards, instruction hazards, influence on instruction sets, data path and control consideration, superscalar operations, vector processing, array processors.

UNIT-V: THE MEMORY SYSTEM

Basic concepts, semiconductor RAM, types of Read-Only Memory (ROM), cache memory, performance considerations, virtual memory, secondary storage, and introduction to Redundant Array of Inexpensive Disks (RAID).

Input-Output Organization: Peripheral devices, input-output interface, asynchronous data transfer, modes of transfer, priority interrupt, Direct Memory Access (DMA).

UNIT-VI : INPUT-OUTPUT ORGANIZATION (ADVANCED)

Input-Output Processor (IOP), Serial communication, Introduction to peripheral component Interconnect (PCI) bus, Introduction to Standard Serial Communication Protocols Like RS232, USB, and IEEE1394.

UNIT-VII : MULTIPROCESSORS

Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration, Interprocessor Communication and Synchronization, Cache Coherance, Shared Memory Multiprocessors.

UNIT-VIII : CASE STUDIES

CISC Architecture-Pentium IV, RISC Architecture-PowerPC.

TEXT BOOKS :

1. M. Moris Mano, *Computer System Architecture*, 3rd edition, Pearson/ Prentice Hall India, 2008.
2. William Stallings, *Computer Organization and Architecture*, 6th edition, Pearson/PHI.

REFERENCE BOOKS:

1. Carl Hamacher, Zvonks Vranesic, SafeaZaky, *Computer Organ zation*, 5th edition, McGraw-Hill, 2002.
2. Andrew S. Tanenbaum, *Structured Computer Organization,* 4th edition, Prentice Hall India/Pearson
3. Sivarama P. Dandamudi, *Fundamentals of Computer Organiza tion and Design,* Springer Int. ddition, 2003.
4. John P. Hayes, *Computer Architecture and Organization,* 3rd edition, Tata McGraw-Hill, 1998.

III B. Tech., I-Semester, EEE

10BT41301: CONTROL SYSTEMS	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Electrical Circuits of II B.Tech., I-Semester

COURSE DESCRIPTION:

Concepts of control system; transfer function of various physical systems; time response analysis; frequency response analysis; stability analysis; design of compensators; state space analysis

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge in
   - · representation of physical systems
   - · time and frequency domain specifications for stability analysis.
   - · methods of determining the stability of the system
   - · concept of controllability and observability.
2. analyze the stability of the system in time and frequency domains.
3. design compensators to meet the desired specifications.
4. demonstrate problem solving skills in
   - · deducing the transfer function using block diagram reduction technique and signal flow graph.
   - · evaluating the system stability in time and frequency domains.
   - · solving the state equations of a system.
   - · evaluating controllability and observability of a system.

DETAILED SYLLABUS:

UNIT-I : INTRODUCTION
Concepts of Control Systems, Open Loop and closed loop control systems, Feed-Back Characteristics, Effects of feedback, Block diagram representation of physical systems, Mathematical models-differential Equations.

UNIT-II : TRANSFER FUNCTION REPRESENTATION
Analogous systems, electrical analogy of physical systems, Derivation of transfer function, Transfer function of DC Servomotor, Synchro transmitter and receiver, Block diagram algebra, Signal Flow graph and Mason's gain formula.

UNIT-III : TIME RESPONSE ANALYSIS
Types of test signals, Response of first and second order system, Time domain specifications, type and order of systems, steady state error, static error constants, generalized error co-efficients. Effect of P, PI, PID on time response.

UNIT-IV : STABILITY ANALYSIS IN S-DOMAIN
Concepts of stability: Characteristic equation, location of roots in s-plane for stability, asymptotic stability and relative stability, Routh-Hurwitz stability criterion.
Root Locus Technique: Root locus concept, construction of root loci, effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT-V : FREQUENCY RESPONSE ANALYSIS
Introduction, Frequency domain specifications, Bode diagrams, Determination of Frequency domain specifications and transfer function from the Bode Diagram, Phase margin and Gain margin, Stability Analysis from Bode Plots.

UNIT-VI : STABILITY ANALYSIS IN FREQUENCY DOMAIN
Polar Plots, Nyquist plots, stability in frequency domain using Nyquist stability criterion, simple problems.

UNIT-VII : DESIGN AND COMPENSATION OF CONTROL SYSTEMS
Introduction to Compensation networks, Lag, Lead, lead-lag compensation, Compensation using Bode plots.

UNIT-VIII : STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS

Concepts of state, state variables and state model, derivation of state model for physical systems Diagonalization, State Transition Matrix and its Properties, Solution of linear state equation, Concepts of Controllability and Observability, Kalman's test only.

TEXT BOOKS:

1. I. J. Nagrath and M. Gopal, *Control Systems Engineering,* 2nd edition New Age International (P) Limited.
2. Katsuhiko Ogata, *Modern Control Engineering,* 3rd edition, Prentice Hall of India Pvt. Ltd.

REFERENCE BOOKS:

1. B.C.Kuo, *Automatic Control Systems*, Weilly Eastern, 2004.
2. John wiley, *Control Systems Engineering*, 3rd Edition, NISE.
3. Richard C. Dorf, Robert H. Bishop, *Modern Control Systems,* 11th edition, Pearson Education, 2007.
4. Graham Goodwin, Stefan Graebe and Mario Salgado, *Control System Design,* Prentice Hall.

III B. Tech., I-Semester, EEE

10BT50201: POWER ELECTRONICS	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Semiconductor Devices & Circuits of II B.Tech I –Semester and Semiconductor Devices & Circuits Lab of II B.Tech., II-Semester

COURSE DESCRIPTION:

Power semiconductor devices; commutation circuits; design of snubber circuit; Single phase and three phase controlled converters; AC voltage controllers, Cycloconverters; choppers and inverters

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge in
   - The characteristics of various power semiconductor devices, their ratings and protection.
   - Various triggering methods and commutation techniques
   - Operation of Line commutated and Force commutated converters
2. analyze the performance of different power converters subjected to various loads
3. design
   - Static and dynamic equalizing circuits
   - Device Protection circuits
   - Circuits to meet the desired specifications.
4. demonstrate problem solving skills in evaluating electrical parameters and different variables of various power electronic circuits.

DETAILED SYLLABUS:

UNIT-I : POWER SEMICONDUCTOR DEVICES

Thyristors, Silicon Controlled Rectifiers (SCR's), BJT, power MOSFET, power IGBT and their characteristics, basic theory and operation of SCR, static characteristics of SCR, dynamic characteristics of SCR, turn on methods for SCR.

UNIT-II : DEVICES AND COMMUTATION CIRCUITS

Two transistor analogy, SCR, R and RC triggering, UJT firing circuit, series and parallel connections of SCR's - Numerical problems, specifications and ratings of SCR's, turn off (commutation) methods for SCR.

UNIT-III : PROTECTION CIRCUITS

Protection against dv/dt and overvoltages, snubber circuit, design of snubber circuit, numerical problems, metal oxide varistors, improving dv/dt rating with the help of cathode short di/dt protection with the help of inductor, overcurrent protection, semiconductor fuses, cooling of semiconductor devices- types.

UNIT-IV : SINGLE PHASE HALF AND FULLY CONTROLLED CONVERTERS

Phase control technique, single phase line commutated converters, mid-point and bridge connections - Half and Fully controlled converters with R, RL loads and RLE load - derivation of average load voltage and current, active and reactive power inputs to the converters, effect of free wheeling diode - numerical problems.

UNIT-V : THREE PHASE LINE COMMUTATED CONVERTERS

Three phase converters - three pulse and six pulse converters - Mid point and bridge connections average load voltage with R and RL loads, effect of source inductance, dual converters (both single phase and three phase), waveforms - numerical problems.

UNIT-VI : AC VOLTAGE CONTROLLERS AND CYCLOCONVERTERS

AC voltage controllers, single phase two SCRs in anti parallel - with R and RL loads, modes of operation of Triac - Triac with R and RL loads - Derivation of RMS load voltage, current and power factor - numerical problems, cycloconverters: single phase mid point cyclo converters with resistive and inductive load (principle of operation only), bridge configuration of single phase cycloconverter (principle of operation only) - waveforms.

UNIT-VII : CHOPPERS

Choppers, time ratio control and current limit control strategies, step down choppers - derivation of load voltage and currents with R, RL and RLE loads, step up chopper - load voltage expression, Morgan's chopper, Jone's chopper, AC chopper - waveforms.

UNIT-VIII : INVERTERS

Inverters - single phase inverter, basic series inverter, basic parallel inverter, Voltage Source Inverter and Current Source Inverter, McMurray and McMurray-Bedford inverters, voltage control techniques for inverters, pulse width modulation techniques.

TEXT BOOKS:

1. M. D. Singh & K. B. Kanchandhani, *Power Electronics*, Tata Mc Graw-Hill Publishing Company, 1998.
2. P.C. Sen, *Power Electronics*, Tata McGraw-Hill Publishing Com pany, 2009.

REFERENCE BOOKS:

1. Vedam Subramanyam, *Power Electronics*, 3rd Edition, New Age International (P) Limited, 2008.
2. M. H. Rashid, *Power Electronics: Circuits, Devices and Applica tions*, 2nd edition, Prentice Hall of India, 1998.
3. G. K. Dubey, S. R. Doradla, A. Joshi and R. M. K. Sinha, *Thyristorised Power Controllers*, New Age International (P) Limited Publishers, 1996.
4. John G. Kassakian, Martin F. Schlecht and George C. Verghese, *Principles of Power Electronics*, Pearson, 2009.

III B. Tech., I-Semester, EEE

	L	T	P	C
10BT50202: AC MACHINES	**4**	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Transformers & Induction Machines of II B. Tech., I-Semester

COURSE DESCRIPTION:

Construction, operation, characteristics, regulation and parallel operation of Synchronous generator; Operation and circle diagram of Synchronous motor; Single phase induction motors, AC series motor, Universal motor; operation of special machines

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge in:
   - construction details, working principle, characteristics and performance of a synchronous machine, single phase motors and special machines.
   - armature reaction, regulation and synchronization of alternator.
   - methods of Starting of synchronous motor and its performance evaluation using circle diagrams.
   - Parallel operation of alternators.
2. analyze the operation of synchronous and single phase machines for various operating conditions.
3. evaluate the performance and various parameters of synchronous machine.
4. identify a suitable machine for domestic and industrial applications.

DETAILED SYLLABUS:

UNIT-I : CONSTRUCTIONAL DETAILS AND PRINCIPLE OF OPERATION OF SYNCHRONOUS GENERATOR

Constructional features of round rotor and salient pole machines, armature windings, integral slot and fractional slot windings, distributed and concentrated windings, distribution, pitch and winding factors, EMF equation - problems.

UNIT-II : CHARACTERISTICS OF SYNCHRONOUS GENERATOR

Harmonics in generated EMF, suppression of harmonics, armature reaction, leakage reactance, synchronous reactance and impedance, experimental determination, phasor diagram, load characteristics.

UNIT-III : REGULATION OF SYNCHRONOUS GENERATOR

Regulation by synchronous impedance method, MMF method, ZPF method and ASA method, salient pole alternators, two reaction analysis, experimental determination of X_d and X_q (Slip test), phasor diagrams, regulation of salient pole alternators.

UNIT-IV : PARALLEL OPERATION OF SYNCHRONOUS GENERATOR

Synchronizing alternators with infinite bus bars, synchronizing power and torque, parallel operation and load sharing, effect of change of excitation and mechanical power input, analysis of short circuit current wave form, determination of sub-transient, transient and steady state reactances.

UNIT-V : SYNCHRONOUS MOTORS - PRINCIPLE OF OPERATION AND CIRCLE DIAGRAM

Theory of operation, phasor diagram, variation of current and power factor with excitation, synchronous condenser, mathematical analysis for power developed, circle diagram, excitation and power circles, hunting and its suppression, methods of starting, synchronous induction motor.

UNIT-VI : SINGLE PHASE INDUCTION MOTORS

Single phase induction motor, constructional features,double revolving field theory, elementary idea of cross field theory, split phase motors, shaded pole motor.

UNIT-VII : SINGLE PHASE MOTORS

Principle & performance of AC series motor, universal motor, principle of permanent magnet and reluctance motors.

UNIT-VIII : SPECIAL MACHINES

Stepper motor - types, synchros - types, servo motors - DC and AC servo motors.

TEXT BOOKS:

1. J.B. Gupta, *Theory and Performance of Electrical Machines (DC Machines, Polyphase Circuits & AC Machines) in SI Units,* 14th edition, S.K. Kataria & Sons, New Delhi, 2006.
2. P.S. Bimbhra, *Electrical Machinery*, 7th edition, Khanna Publishers, Delhi, 2005.

REFERENCE BOOKS:

1. M.G. Say, *The Performance and Design of Alternating Current Machines,* CBS Publishers and Distributors Pvt., Ltd., 3rd Edition, New Delhi, 2002.
2. A.E. Fitzgerald, C. Kingsley and S. Umans, *Electric Machinery*, McGraw-Hill Companies, 2nd Edition, New Delhi, 2008.
3. Langsdorf, *Theory of Alternating Current Machinery*, 2nd edition, Tata Mc Graw-Hill, New Delhi, 2005.
4. I.J.Nagrath & D.P.Kothari, *Electric Machines,* 7th Edition, Tata McGraw-Hill Publishers, 2005.

III B. Tech., I-Semester, EEE

10BT50203: ELECTRICAL POWER TRANSMISSION	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Generation of Electrical Power of II B.Tech., II-Semester

COURSE DESCRIPTION:

Calculation of Transmission line parameters; classification and performance of transmission lines, corona; travelling wave phenomenon; Symmetrical component theory; Types of insulators; sag and tension calculations; underground cables

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge on
   - transmission line configurations and their performance.
   - transients in transmission lines
   - insulation system for transmission system
   - concepts of corona, per unit system, symmetrical component theory
   - cables and their performance
2. analyze
   - the electrical and mechanical aspects of transmission lines.
   - the capacitance of cable for different configurations.
   - phasors using symmetrical component theory.
3. design of electrical, mechanical systems and insulators to improve the overall performance of transmission lines and cables.
4. demonstrate skills in
   - evaluating the parameters and performance of transmission lines and cables.
   - evaluating the electrical and mechanical aspects of transmission lines, cables and insulators.

DETAILED SYLLABUS:

UNIT-I : TRANSMISSION LINE PARAMETERS

Types of conductors, calculation of resistance for solid conductors, calculation of inductance for single phase and three phase, single and double circuit lines, concept of GMR and GMD, symmetrical and asymmetrical conductor configuration with and without transposition, numerical problems.

Calculation of capacitance for 2 wire and 3 wire systems, effect of ground on capacitance, capacitance calculations for symmetrical and asymmetrical single and double circuit lines, numerical problems.

UNIT-II : PERFORMANCE OF SHORT AND MEDIUM TRANSMISSION LINES

Classification of transmission lines- short, medium and long lines and their model representations-nominal-T, nominal-$\prod$ and A, B, C, D constants for symmetrical and asymmetrical networks, numerical problems. Mathematical solutions to estimate regulation and efficiency of all types of lines- numerical problems.

UNIT-III : PERFORMANCE OF LONG TRANSMISSION LINES AND CORONA

Rigorous solution for long transmission lines- surge impedance and surge impedance loading of long lines, wave length and velocity of propagation of waves-numerical problems.

Skin, Proximity and Ferranti effects-Corona- description of the phenomenon, factors affecting corona, critical voltages and power loss, radio interference- numerical problems.

UNIT-IV : POWER SYSTEM TRANSIENTS

Types of transients- traveling or propagation of surges- attenuation, distortion, reflection and refraction coefficients- termination of lines with different types of conditions- open circuited line, short circuited line, T-junction, lumped reactive junctions- Beweley's Lattice diagram for all the cases mentioned above-numerical problems

UNIT-V : SYMMETRICAL COMPONENT THEORY

Per unit system representation, per unit equivalent reactance network of a three phase power system, numerical problems, symmetrical component theory: voltages, currents and impedances. symmetrical component transformation, sequence networks: positive, negative and zero sequence networks, numerical problems.

UNIT-VI : OVERHEAD LINE INSULATORS

Line supports, different types, wooden, RCC poles and steel towers, types of insulators, string efficiency and methods for improvement, numerical problems, voltage distribution, calculation of string efficiency, capacitance grading and static shielding - numerical problems.

UNIT-VII : SAG AND TENSION CALCULATIONS

Sag and tension calculations with equal and unequal heights of towers, effect of wind and ice on weight of conductor, numerical problems, stringing chart and sag template and their applications, vibrations and dampers.

UNIT-VIII : UNDER GROUND CABLES

Types of cables, construction, types of insulating materials, calculations of insulation resistance and stress in insulation, numerical problems.

Capacitance of single and 3-core belted cables, numerical problems, grading of cables, capacitance grading, numerical problems, description of inter sheath grading.

TEXTBOOKS:

1. M.L.Soni, P.V.Gupta, V.S. Bhatnagar, A.Chakravarthy, *A Text Book on Power System Engineering,* Dhanpat Rai and Co Private Ltd., 2007.
2. C.L.Wadhwa, *Electrical Power Systems*, 3rd edition, New Age International(P)Limited, publishers, 2005.

REFERENCE BOOKS:

1. John J Grainger William D Stevenson, *Power System Analysis,* 4th Edition, *TMC Companies*, 2003.
2. B.R.Gupta, *Power System Analysis and Design*, 3rd edition, Wheeler Publishers, 1999.
3. Hadi Saadat, *Power System Analysis*, 6th reprint, Tata McGraw-Hill Edition, 2005.
4. I.J.Nagrath and D.P.Kothari, *Modern Power System Analysis*, 3rd edition, Tata McGraw-Hill, 2003.

III B. Tech., I-Semester, EEE

10BT50211: TRANSFORMERS AND AC MACHINES LAB	**L**	**T**	**P**	**C**
	-	**-**	**3**	**2**

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITES: Transformers and Induction Machines of II B.Tech., II-Semester

COURSE DESCRIPTION:

Determination of Performance of Transformers and Induction motors; Regulation of alternator; V and Inverted V curves, calculation of Xd and Xq of a salient pole synchronous machine

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge on identification of parts of Transformers and AC machines
2. analyze the performance of Transformers and AC machines
3. design the circuit based on loading and rating of the Transformers and Induction machines.
4. demonstrate skills in
   - obtaining the various characteristics of Transformers and AC machines.
   - determining the performance characteristics of Transformers and AC machines.
   - determining and separating losses in Transformers and AC machines.
5. function effectively as individual and as member in a team
6. Communicate effectively both oral and written

DETAILED SYLLABUS:

The following experiments are required to be conducted as compulsory experiments:

1. OC and SC tests on single phase transformer
2. Sumpner's test on a pair of single phase transformers
3. Scott connection of transformers
4. No-load & blocked rotor tests on three phase induction motor
5. Regulation of a three-phase alternator by EMF and MMF methods
6. V and inverted V curves of a three-phase synchronous motor
7. Equivalent circuit of a single phase induction motor
8. Determination of X_d and X_q of a salient pole synchronous machine

In addition to the above eight experiments, atleast any FOUR of the following experiments are required to be conducted from the following list:

1. Parallel operation of single phase transformers
2. Separation of core losses of a single phase transformer
3. Brake test on three phase induction motor
4. Separation of no-load losses of three phase induction motor
5. Brake test on single phase induction motor
6. Regulation of three phase alternator by ZPF and ASA methods
7. Efficiency of a three phase alternator
8. Heat run test on a bank of three single phase delta connected transformers
9. Measurement of sequence impedance of a three phase alternator
10. Performance characteristics of a Schrage motor

III B. Tech., I-Semester, EEE

10BT50212: MEASUREMENTS AND TESTING LAB	**L**	**T**	**P**	**C**
	-	**-**	**3**	**2**

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITES: Electrical Measurements of II B.Tech., II-Semester

COURSE DESCRIPTION:

Measurement of Resistance, Inductance, Capacitance, Power and power factor; Testing of single phase energy meter, reverse power relay and Transformer oil

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. Demonstrate knowledge on measurement of electrical parameters
2. Identify various bridges for measuring Low, medium and high values of resistance, inductance and capacitance
3. Develop skills and methods in measurement of power and energy.
4. Application of different measuring instruments in the field of electrical engineering
5. function effectively as individual and as member in a team
6. Present a cohesive and detailed laboratory report

DETAILED SYLLABUS:

The following experiments are required to be conducted as compulsory experiments:

1. Calibration and testing of single phase energy meter
2. Calibration of dynamometer type power factor meter
3. Crompton DC potentiometer - calibration of PMMC ammeter and PMMC voltmeter
4. Kelvin's double bridge and Wheatstone bridge - measurement of resistance - determination of tolerance
5. Measurement of % ratio error and phase angle of given CT by Silsbee's method
6. Schering bridge & Anderson bridge
7. Measurement of three phase reactive power with single phase wattmeter
8. Measurement of parameters of a choke coil using three voltmeter and three ammeter methods

In addition to the above eight experiments, at least any FOUR of the experiments from the following list are required to be conducted:

1. Measurement of earth resistance using earth meggar
2. Calibration of LPF wattmeter by Phantom loading
3. Measurement of three phase active and reactive power with two wattmeter by unbalanced load
4. Dielectric oil testing using HT testing kit
5. LVDT and capacitance pickup - characteristics and calibration
6. Resistance strain gauge - strain measurements and calibration
7. Transformer turns ratio measurement using AC bridge
8. AC Potentiometer - calibration of AC voltmeter, parameters of choke
9. Testing of reverse power relay
10. Measurement of three phase power using one wattmeter with two number of CTs

III B. Tech., II-Semester, EEE **L T P C**

10BT4HS01: MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTANCY **4 1 - 4**

(Common to EEE, EIE & EConE)

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: —

COURSE DESCRIPTION:

Managerial Economics; Demand and Elasticity of Demand; Production Functions; Markets and Pricing Policies; Formation of different types of Business Organizations; Principles of Accounting; Final Accounts; Capital Budgeting and its Techniques; and Computerized Accounting with Tally software.

COURSE OUTCOMES: After completion of the course, a successful student will be able to

1. Acquire Knowledge in
    - Tools and concepts of Micro Economics.
    - Basic Principles and concepts of Accountancy.
    - Provides life skills for effective utilization of scarce resources.
    - Financial Accounting.
    - Using advanced tools like tally and SAP.
    - Significance of Economics and Accountancy
2. Develop skills in providing solutions for
    - Managerial decisions of an organization.
    - Demand & Supply, Production & Cost and Markets & Price through Economic theories.
    - Financial data in decision making.
3. Develop effective communication in Business and Accounting transactions.
4. Ascertain the profitability and soundness of the organization.

DETAILED SYLLABUS:

UNIT-I : INTRODUCTION TO MANAGERIAL ECONOMICS AND DEMAND ANALYSIS

Definition, nature and scope of managerial economics, **demand Analysis:** Determinants of demand– demand function - law of demand and its exceptions, elasticity of demand, types, measurement and significance of elasticity of demand, demand forecasting and methods of demand forecasting.

UNIT-II : THEORY OF PRODUCTION AND COST ANALYSIS

Production Function: isoquants and isocosts, input – output relationship, law of returns, internal and external economies of scale, **Cost concepts:** opportunity Vs out lay costs, fixed Vs variable costs, explicit Vs implicit costs, out of pocket Vs inputted costs, Break Even Analysis (BEA), determination of break even point (simple problems).

UNIT-III : INTRODUCTION TO MARKETS AND PRICING

Market Structure: Types of markets, features of perfect competition, monopoly and monopolistic competition, price and output determination in perfect competition and monopoly, **Pricing:** Objectives and policies of pricing – sealed bid pricing, marginal cost pricing, cost plus pricing, going rate pricing, limit pricing, market penetration, market skimming, block pricing, bundling, peak load pricing, cross subsidization, duel pricing, administrated pricing.

UNIT-IV : BUSINESS AND NEW ECONOMIC ENVIRONMENT

Characteristic features of business, features and evolution of sole proprietorship, partnership, joint stock company, new economic policy 1991.

UNIT-V : INTRODUCTION AND PRINCIPLES OF ACCOUNTING

Accountancy: Introduction – concepts – conventions – accounting principles - double entry book keeping, journal, ledger, trail balance (simple problems).

UNIT–VI : FINAL ACCOUNTS

Introduction to final accounts, trading account, profit and loss account and balance sheet with simple adjustments (simple problems).

UNIT–VII : CAPITAL AND CAPITAL BUDGETING

Capital: Significance, types of capital, **capital budgeting:** nature and scope of capital budgeting, features and methods of capital budgeting, pay back period method, accounting rate of return method, internal rate of return method, net present value method and profitability index (simple problems).

UNIT–VIII : COMPUTERIZATION OF ACCOUNTANCY SYSTEM

Manual accounting Vs computerized accounting – advantages and disadvantages of computerized accounting – using accounting software. **Tally:**Tally features – company creation – account groups – group creation – ledger creation**.**

TEXT BOOKS:

1. A.R. Aryasri, *Managerial Economics and Financial Analysis*, 3rd edition, Tata McGraw-Hill, New Delhi, 2007.
2. R.Cauvery, U.K.Sudhanayak, M.Girija and R. Meenakshi, *Managerial Economics,* 1st edition, S. Chand and company, New Delhi, 1997.

REFERENCE BOOKS:

1. Ms. Samba Lalita, *Computer Accounting Lab Work*, 1st edition, Kalyani Publishers, Ludhiana, 2009.
2. Vershaney and Maheswari, *Managerial Economics,* 19th edition Sultan Chand and Sons, New Delhi, 2005.
3. H.Craig Petersen and W.Cris Levis, *Managerial Economics*, 4th edition, Pearson, 2009.
4. Lipsy and Chrystel, *Economics,* 4th edition,Oxford University Press, New Delhi, 2008.
5. S.N.Maheswari and S.K.Maheswari, *Financial Accounting,* 4th edition, Vikas Publishing House, 2005.
6. S.P. Jain and K.L. Narang, *Financial Accounting,* 5th edition, Kalyani Publishers, Ludhiana, 2000.

III B. Tech., II-Semester, EEE

10BT60401: DIGITAL SIGNAL PROCESSING	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Network Analysis and Synthesis of II B.Tech., II-Semester

COURSE DESCRIPTION:

Introduction to Discrete-time signals and sequences; Discrete Fourier Series; Fast Fourier transforms; Z-transforms; IIR and FIR filters; Multirate Digital signal processing; applications of Digital signal processing

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge in
   - Digital signals, sequences and systems.
   - DFT and FFT transforms.
   - Analog & Digital filter design.
   - Digital Filter Realization.
   - Multirate systems.
2. analyze the real time situations and requirements to design an appropriate digital filer for processing the signals.
3. design and develop digital filters and multirate system to optimize system performance.
4. solve problems in processing of signals through digital systems using frequency domain, digital filters and multirate systems.
5. apply appropriate techniques to engineering activities in processing signals through digital systems

DETAILED SYLLABUS:

UNIT-I : INTRODUCTION TO DIGITAL SIGNAL PROCESSING
Discrete-time signals and sequences, Linear shift invariant systems, Stability and Causality, Linear constant coefficient difference equations. Frequency domain representation of discrete-time signals and systems.

UNIT-II : DISCRETE FOURIER SERIES
DFS representation of periodic sequences, properties of Discrete Fourier Series. Discrete Fourier Transforms: properties of DFT, Linear convolution of sequences using DFT, Computation of DFT. Relation between Z-Transforms and DFS.

UNIT-III : FAST FOURIER TRANSFORMS
Fast Fourier transforms (FFT): Radix-2 Decimation in time (DIT) and Decimation in frequency (DIF), FFT algorithms, Inverse FFT and FFT for composite N.

UNIT-IV : REALIZATION OF DIGITAL FILTERS
Review of Z-transforms, Applications of Z-Transforms, Solution for difference equations of digital filters, Block diagram representation of linear constant-coefficient difference equations. Basic structures of IIR systems, Transposed forms. Basic structures of FIR systems, System function.

UNIT-V : IIR DIGITAL FILTERS
Introduction to analog and digital filters, Analog filter approximations-Butterworth and chebyshev, Design of IIR digital filters from analog filters, Design examples: analog-digital transformations.

UNIT-VI : FIR DIGITAL FILTERS
Characteristics of FIR digital filters, Frequency response. Design of FIR digital filters using windowing techniques, Frequency sampling technique, Comparison of IIR and FIR filters.

UNIT-VII : MULTIRATE DIGITAL SIGNAL PROCESSING FUNDAMENTALS

Basic sample rate alteration devices, decimation, interpolation, sampling rate conversion, implementation of sampling rate conversion, multistage design of decimator and interpolator.

UNIT-VIII : APPLICATIONS OF DIGITAL SIGNAL PROCESSING

Spectral analysis of nonstationary signals, musical sound processing, signal compression, transmultiplexers, discrete multitone transmission of digital data.

TEXT BOOKS:

1. John G. Proakis, Dimitris G. Manolakis, *Digital signal processing, principles, Algorithms and applications,* 4th Edition, Pearson Education/PHI, 2007.
2. A.V. Oppenheim and R.W. Schaffer, *Discrete Time Signal Processing,* 2nd Edition, PHI, 2006.
3. Sanjit K Mitra, *Digital signal processing, A computer base approach,* 3rd Edition, Tata Mcgraw Hill, 2009.

REFERENCE BOOKS:

1. S Salivahana, A Vallavaraj, C Gnanapriya, *Digital Signal Processing,* Tata McGraw-Hill, 2005.
2. Andreas Antoniou, *Digital signal processing,* Tata McGraw-Hill, 2006.

III B. Tech., II-Semester, EEE

10BT50422: LINEAR AND DIGITAL IC APPLICATIONS	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Analog Electronic Circuits of II B.Tech., II-Semester

COURSE DESCRIPTION:

Types and Characteristics of Operational Amplifiers; Applications of Op-Amp; 555 timer and phase locked loops, application of PLL; CMOS logic families; Bipolar logic and interfacing; VHD Language; combinational and sequential logic design

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge on:
   - Op-amp operation and applications.
   - Timer circuits and applications.
   - CMOS logic and its interfacing.
   - VHDL design and programming.
2. analyze
   - Op-amp based circuits.
   - Timers for various circuits.
   - Different logic families.
3. demonstrate skill in designing
   - circuits using Op-amps.
   - Logic gates using CMOS.
   - combinational and sequential circuits.
4. demonstrate skills in
   - evaluating parameters of Op-amp based circuits.
   - programming skills for various combinational and sequential circuits.

DETAILED SYLLABUS:

UNIT-I

Differential amplifier- characteristics of OP-Amps, integrated circuits-types, classification, package types and temperature ranges, power supplies, Op-amp block diagram, ideal and practical Op-amp specifications, DC and AC characteristics, 741 op-amp & its features, FET input. Op-Amps, Op-Amp parameters and measurement, input and output Offset voltages and currents, slew rates, CMRR, PSRR, drift, frequency compensation technique.

UNIT-II : LINEAR & NON-LINEAR APPLICATIONS OF OP- AMPS

Inverting and Non-inverting amplifier, integrator and differentiator, difference amplifier, instrumentation amplifier, AC amplifier, V to I, I to V converters, buffers. Non- linear function generation, comparators, multivibrators, triangular and square wave generators, log and antilog amplifiers, precision rectifiers.

UNIT-III : TIMERS AND PHASE LOCKED LOOPS

Introduction to 555 timer, functional diagram, monostable and astable operations and applications, Schmitt trigger. PLL - introduction, block schematic, principles and description of individual blocks, 565 PLL, applications of PLL – frequency multiplication, frequency translation, AM, FM & FSK.

UNIT-IV : CMOS LOGIC

Introduction to logic families, CMOS logic, CMOS steady state electrical behavior, CMOS dynamic electrical behavior, CMOS logic families.

UNIT-V : BIPOLAR LOGIC AND INTERFACING

Bipolar logic, transistor logic, TTL families, CMOS/TTL interfacing, low voltage CMOS logic and interfacing, emitter coupled logic, comparison of logic families, familiarity with standard 74XX and CMOS 40XX series-ICs – specifications.

UNIT-VI : THE VHDL HARDWARE DESCRIPTION LANGUAGE

Design flow, program structure, types and constants, functions and procedures, libraries and packages. Structural design elements, data flow design elements, behavioral design elements, time dimension and simulation synthesis.

UNIT-VI : THE VHDL HARDWARE DESCRIPTION LANGUAGE

Design flow, program structure, types and constants, functions and procedures, libraries and packages. Structural design elements, data flow design elements, behavioral design elements, time dimension and simulation synthesis.

UNIT-VII : COMBINATIONAL LOGIC DESIGN

Decoders, encoders, three state devices, multiplexers and demultiplexers, code converters, EX-OR gates and parity circuits, comparators, adders & subtractors, ALUs, combinational multipliers. VHDL modes for the above ICs.

UNIT-VIII : SEQUENTIAL LOGIC DESIGN

Latches and flip-flops, PLDs, counters, shift register, and their VHDL models, synchronous design methodology, impediments to synchronous design.

TEXT BOOKS:

1. Ramakanth A. Gayakwad, *Op-Amps & Linear ICs,* Prentice Hall India, 1987.
2. John F. Wakerly, *Digital Design Principles & Practices,* 3rd edition, PHI/ Pearson Education Asia, 2005.
3. Charles H. Roth Jr., *Digital System Design Using VHDL,* 1st edition, Cengage Publications.

REFERENCE BOOKS:

1. James M.Fiore, *Op amps & Linear Integrated Circuits Concepts & Applications,* Cengage 2009.
2. D. Roy Chowdhury, *Linear Integrated Circuits,* 2nd Edition, New Age International (p) Ltd, 2003.
3. J. Bhasker, *VHDL Primer*, 3rd Edition, Pearson Education/ PHI.

III B. Tech., II-Semester, EEE

10BT60404: MICROPROCESSORS AND MICROCONTROLLERS	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Computer Architecture & Organisation of III B.Tech., I-Semester

COURSE DESCRIPTION:

Architecture of 8085, 8086; instruction set of 8086 and assembler directives; Programmable peripheral interface (8255A); types of serial communication standards; interfacing with 8086, 8257 and 8259; Architecture, interrupts, communication and applications of 8051 Microcontroller

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate potential knowledge in
   - internal hardware details of Intel 8085, 8086, 8051 and programmable devices like 8255, 8251, 8259.
   - interfacing various peripherals to build stand alone systems.
2. critically analyze the requirements to meet the specifications.
3. design suitable interfaces for real time applications.
4. exhibit programming skills, choose suitable hardware and program the devices to solve engineering problems.

DETAILED SYLLABUS:

UNIT-I : 8085 ARCHITECTURE

Microprocessor evolution and types, introduction to 8085 architecture, register organization, pin description, instruction set (briefly), simple programs, interrupts of 8085, interfacing I/O devices using memory mapped I/O and I/O mapped I/O.

UNIT-II : 8086 ARCHITECTURE

Architecture of 8086 microprocessor, register organization, special functions of general purpose registers, memory segmentation, pin description, minimum and maximum mode operation of 8086, timing diagram.

UNIT-III : 8086 INSTRUCTION SET AND ASSEMBLER DIRECTIVES

Machine language instruction formats, addressing modes, instruction set of 8086, assembler directives, simple programs - procedures and macros.

UNIT-IV : PROGRAMMABLE INTERFACING DEVICES

Types of data communication, serial and parallel, methods of parallel data transfer, 8255A (programmable peripheral interface) internal block diagram, operational modes and initialization, interface of I/O devices: A/D, D/A, key board, stepper motor.

UNIT-V : SERIAL DATA COMMUNICATION

Types of serial data transmission, synchronous and asynchronous, 8251 (USART), simple programs for sending and receiving characters with an 8251 (polling & interrupt basis), serial communication standard, RS232C, RS232C to TTL and TTL to RS232C conversion, USB.

UNIT-VI : INTERFACING WITH ADVANCED DEVICES

Memory (static RAM and EPROM) and I/O interfacing with 8086, 8257 (DMA controller), interrupt structure, interrupt vector table, 8259 Programmable Interrupt Controller (PIC), importance of cascading of PICs.

UNIT-VII : 8051 MICROCONTROLLER

Architecture of 8051 microcontroller, internal and external memories, addressing modes and instruction set of 8051, simple programs using 8051.

UNIT-VIII : 8051 INTERRUPTS, COMMUNICATION AND APPLICATIONS

Interrupts, timers/counters and serial communication, programming of interrupts, timers/counters and serial communication interrupts. Interfacing LEDs, seven segment display.

TEXT BOOKS:

1. Douglas V.Hall, *Microprocessors and Interfacing: Programming and Hardware,* revised 2nd edition, Tata McGraw-Hill.
2. Mazidi and Mazidi, *The 8051 Microcontroller and Embedded Sys tems*, Prentice Hall of India, 2000.

REFERENCE BOOKS:

1. Ramesh S. Goankar, *Microprocessor- Architecture, Programming and Applications with the 8085*, 5th edition, Penram International publishing private limited.
2. A.K. Ray & K.M.Bhurchandi, A*dvanced Microprocessors and Periph erals- Architecture, Programming and Interfacing,* Tata McGraw-Hill, 2002 reprint.
3. Yu-cheng Liu, Glenn A. Gibson, *Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design,* Prentice Hall of India 2006.

III B. Tech., II-Semester, EEE

10BT60201: UTILIZATION OF ELECTRICAL ENERGY	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: AC Machines and Transformers & AC Machines Lab of III B.Tech., I-Semester

COURSE DESCRIPTION:

Types and characteristics of electric drives; types of electric heating and welding; Fundamentals and various methods of Illumination; electric traction; significance of energy auditing and BEE standards

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge in
   - Different types of electric drives.
   - Methods of electric heating, welding and illumination.
   - control of traction motors
   - mechanics of traction system
   - concepts of energy auditing.
2. analyze
   - appropriate drive for the industrial purpose.
   - proper illumination strategy for good lighting system.
   - the traction system for better performance.
3. design illumination system for proper lighting
4. demonstrate skills in evaluating the illumination levels, performance of various electrical drives and traction effort.
5. apply suitable drive, heating, welding and illumination techniques for various societal needs .
6. Infer knowledge of BEE standards for utilization of electric power in compliance with environment and ethical code.

DETAILED SYLLABUS:

UNIT-I : ELECTRIC DRIVES

Type of electric drives, choice of motor, starting and running characteristics, speed control, temperature rise, applications of electric drives, types of industrial loads, continuous, intermittent and variable loads, load equalization.

UNIT-II : ELECTRIC HEATING

Advantages and methods of electric heating, resistance heating, induction heating and dielectric heating.

UNIT-III : ELECTRIC WELDING

Electric welding, resistance and arc welding, electric welding equipment, comparison between AC and DC welding.

UNIT-IV : ILLUMINATION FUNDAMENTALS

Introduction, terms used in illumination - laws of illumination, polar curves, photometry, integrating sphere, sources of light.

UNIT-V : VARIOUS ILLUMINATION METHODS

Discharge lamps, mercury vapor and sodium vapor lamps, comparison between tungsten filament lamps and fluorescent tubes, compact fluorescent lamp, basic principles of light control, types and design of good lighting system and practice, flood lighting.

UNIT-VI : ELECTRIC TRACTION - I

System of electric traction and track electrification, review of existing electric traction systems in India, special features of traction motor, methods of electric braking, plugging, rheostatic braking, regenerative braking.

UNIT-VII : ELECTRIC TRACTION - II

Mechanics of train movement, speed-time curves for different services, trapezoidal and quadrilateral speed-time curves, calculations of tractive effort, power, specific energy consumption for given run-effect of varying acceleration and braking retardation, adhesive weight and braking retardation, coefficient of adhesion.

UNIT-VIII : ENERGY AUDITING

Cost benefit analysis, energy auditing, public supply for reduction of energy costs, bureau of energy efficiency (BEE) standards for electrical appliances, electronic chokes, smart meters, energy efficient motors: factors affecting efficiency, loss distribution, constructional details and characteristics.

TEXT BOOKS:

1. J.B.Gupta, *Utilization of Electrical Power and Electric Traction*, S.K.Kataria and Sons, 2002.
2. B.R. Gupta , *Generation of Electrical Energy*, Eurasia publishing House (P) Ltd, New Delhi, 2003.

REFERENCE BOOKS AND WEBSITES:

1. N.V.Suryanarayana, *Utilization of Electrical Power including Electric drives and Electric traction*, New Age International (P) Limited, Publishers, 1996.
2. C.L.Wadhwa, *Generation, Distribution utilization of Electrical Energy*, New Age International Pvt. Ltd, 2003.
3. E. Openshaw Taylor, *Utilisation of Electric Energy,* Orient Longman, 1971.
4. John Andreas, *Energy - Efficient Electric Motors*, Marcel Dekker, INC, New York.
5. http://www.bee-india.nic.in
6. http://www.meteringindia.com

III B. Tech., II-Semester, EEE

10BT60202: POWER SEMICONDUCTOR DRIVES	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Power Electronics and AC Machines of III B.Tech., I-Semester

COURSE DESCRIPTION:

Single phase and three phase controlled rectifier fed drives; four quadrant operation of DC motors; chopper fed drives; Induction motor control from stator side and rotor side; synchronous motor control by VSI and CSI Cycloconverters; control of special motor drives

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge on the
   - process of controlling DC & AC motor drives in various quadrant operations using Power modulators.
   - driver circuits for the control and operation of special machines, solar and battery powered drives.
2. analyze the speed–Torque characteristics of DC & AC motor drives using conventional and static methods.
3. design controllers for various quadrant operations using Power modulators.
4. demonstrate skills in evaluating control parameters of motor drives to meet the desired specifications.
5. apply suitable power modulator for control of DC and AC motor and other special motor drives.

DETAILED SYLLABUS:

UNIT-I : CONTROL OF DC MOTORS BY SINGLE PHASE CONVERTERS

Introduction to thyristor controlled drives, single phase semi and fully controlled converters connected to DC separately excited and DC series motors, continuous current operation, output voltage and current waveforms, speed and torque expressions, speed - torque characteristics - problems on converter fed DC motors.

UNIT-II : CONTROL OF DC MOTORS BY THREE PHASE CONVERTERS

Three phase semi and fully controlled converters connected to DC separately excited and DC series motors, output voltage and current waveforms, speed and torque expressions, speed - torque characteristics - problems.

UNIT-III : FOUR QUADRANT OPERATION OF DC DRIVES

Introduction to four quadrant operation, motoring operations, electric braking, plugging, dynamic and regenerative braking operations, four quadrant operation of DC motors by dual converters, closed loop operation of DC motor (block diagram only).

UNIT-IV : CONTROL OF DC MOTORS BY CHOPPERS

Single quadrant, two-quadrant and four quadrant chopper fed DC separately excited and series excited motors, continuous current operation, output voltage and current wave forms, speed-torque expressions, speed-torque characteristics, problems on chopper fed DC motors, closed loop operation (block diagram only).

UNIT-V : CONTROL OF INDUCTION MOTOR THROUGH STATOR VOLTAGE AND STATOR FREQUENCY

Variable voltage characteristics, control of induction motor by AC voltage controllers, variable frequency characteristics, variable frequency control of induction motor by voltage source and current source inverter and cycloconverters, PWM control, speed-torque characteristics, numerical problems on induction motor drives.

UNIT-VI : CONTROL OF INDUCTION MOTOR FROM ROTOR SIDE

Static rotor resistance control, slip power recovery, static Scherbius drive, static Kramer drive, their performance and speed-torque characteristics, advantages, applications - problems, closed loop operation of induction motor drives (block diagram only).

UNIT-VII : CONTROL OF SYNCHRONOUS MOTORS

Separate control and self control of synchronous motors, operation of self controlled synchronous motors by VSI and CSI cycloconverters, load commutated CSI fed synchronous motor, operation, waveforms, speed-torque characteristics, numerical problems, closed loop control operation of synchronous motor drives (block diagram only).

UNIT-VIII : CONTROL OF SPECIAL MOTOR DRIVES

Stepper motors, drive circuits for stepper motors, switched reluctance motor - operation and control requirements, converter circuits, modes of operation, solar and battery powered drives, solar panels, motors suitable for pump drives.

TEXT BOOKS:

1. G K Dubey, *Fundamentals of Electric Drives,* 2nd edition, Narosa Publications, 2009.
2. M.H. Rashid, *Power Electronic Circuits, Devices and Applications,* Prentice Hall of India.

REFERENCE BOOKS:

1. Dr. S. Sivanagaraju, M. Balasubba Reddy & A. Mallikarjuna Prasad, *Power Semiconductor Drives*, Prentice Hall of India, 2009.
2. B.K. Bose, *Modern Power Electronics and AC Drives*, Prentice Hall of India, 2006.
3. Vedam Subramanyam, *Thyristor Control of Electric Drives,*Tata McGraw-Hill Publilcations.
4. MD Singh and K B Khanchandani, *Power Electronics,* Tata McGraw-Hill Publishing Company, 1998.

III B. Tech., II-Semester, EEE

	L	T	P	C
10BT60211: CONTROL SYSTEMS AND SIMULATION LAB	-	-	3	2

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITES: Control Systems of III B.Tech., I-Semester

COURSE DESCRIPTION:

Time response of second order system, application of PLC's, study the effect of feedback; effect of PID controller on second order system; compensator design and characteristics of Synchros, magnetic amplifiers and AC servo motor; Simulation of Physical systems using PSPICE, stability analysis, determination of state space model and time domain specifications of a given transfer function using MATLAB

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. Demonstrate Knowledge on
   - the effect of feedback and different controllers.
   - Conversion of transfer function into state model
2. Analyze the characteristics of synchros, servo motors and magnetic amplifiers.
3. Design a ladder network for a PLC to verify Boolean expressions
4. Evaluate the effect of controllers and determine time domain and frequency domain specifications of second order system.
5. Apply MATLAB to determine stability and time domain specifications of second order system
6. Apply control engineering concepts in DC position control and temperature control systems.
7. function effectively as individual and as member in a team
8. Present a cohesive and detailed laboratory report

DETAILED SYLLABUS:

Any EIGHT of the following experiments are to be conducted from part A

PART A :

1. Time response of second order system
2. Characteristics of synchros
3. Programmable logic controller - study and verification of truth tables of logic gates, simple boolean expressions and application of speed control of motor
4. Effect of feedback on DC servo motor
5. Transfer function of DC machine
6. Effect of P, PD, PI and PID controllers on a second order systems
7. Lag and lead compensation - magnitude and phase plots
8. Temperature control using PID controller
9. Characteristics of magnetic amplifiers
10. Characteristics of AC servo motor

Any FOUR of the following experiments are to be conducted from part B

PART B:

1. PSPICE simulation of Op-amp based integrator and differentiator circuits
2. Linear system analysis (time domain analysis, error analysis) using MATLAB
3. Stability analysis (Bode, Root Locus and Nyquist) of linear time invariant system using MATLAB
4. State space model for classical transfer function using MATLAB - verification
5. Unit step response of given second order transfer function using MATLAB. Determination of peak overshoot, peak time, rise time and delay time

III B. Tech., II-Semester, EEE

10BT60212: POWER ELECTRONICS AND SIMULATION LAB	**L**	**T**	**P**	**C**
	-	**-**	**3**	**2**

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITES: Power Electronics of III B.Tech., I-Semester and Electrical Circuits and Simulation Lab of II B.Tech., II-Semester

COURSE DESCRIPTION:

Characteristics of power semiconductor devices, different firing schemes, operation and control of converters with R, RL and motor loads; operation of chopper, Inverter, Cycloconverter; Four quadrant operation of DC motor using Microprocessor; Simulation of Power electronic circuits using PSPICE

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. Demonstrate practical knowledge in:
   - Operation of power semi conductor devices such as SCR, BJT, MOSFET and IGBT.
   - Understanding gate firing circuits for SCR.
2. Analyze and relate physical observations and measurements of various power converters with theoretical principles
3. Design the power electronic circuit and validate using PSPICE
4. Select and apply a suitable commutation circuit for various power electronic converters
5. Build and test various converter circuits using PSPICE
6. apply power converters for speed control of DC motor
7. function effectively as individual and as member in a team
8. Prepare laboratory reports that clearly communicate experimental information

DETAILED SYLLABUS:

Any TEN experiments to be conducted from part A

PART A:

1. Characteristics of SCR, MOSFET and IGBT
2. Gate firing circuits for SCR's (R, RC triggering,Half bridge and Full bridge converter)
3. Single phase Half-wave controlled converter with R and RL loads
4. Single phase Half-controlled bridge converter with R and RL loads
5. Single phase Fully-controlled bridge converter with R and RL loads
6. Speed control of DC motor using single phase Half-controlled bridge converter
7. Speed control of DC motor using single phase Fully-controlled bridge converter
8. Single phase AC voltage controller with R and RL loads
9. Forced commutation circuits (Class A, Class B, Class C & Class D)
10. DC Jones chopper with R and RL loads
11. Single phase parallel inverter with R and RL loads
12. Single phase cycloconverter with R and RL loads
13. Single phase series inverter with R and RL loads
14. Single phase dual converter with R and RL loads
15. Single phase input IGBT based four-quadrant chopper using microprocessor

Any TWO experiments to be conducted from part B

PART B:

1. Analysis of three phase circuit using PSPICE
2. Simulation of single phase Full-converter for RLE load using PSPICE
3. Simulation of resonant pulse commutation circuit and Buck chopper using PSPICE
4. Simulation of single phase inverter with PWM control using PSPICE

III B. Tech., II-Semester, EEE

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-	-	-	2

10BT60211: SEMINAR

ASSESSMENT:

INTERNAL EVALUATION	EXTERNAL EVALUATION	TOTAL
75 MARKS	-	75 MARKS

PREREQUISITES: All the courses of the program up to III B. Tech. – I Semester.

COURSE DESCRIPTION:

Identification of topic for the seminar; Literature survey; Performing critical study and analysis of the topic identified; Preparation of report and presentation

COURSE OUTCOMES: On completion of seminar work the student will be able to

1. demonstrate in-depth knowledge on a specialized topic by reviewing relevant literature.
2. Analyze and synthesize information on the selected topic.
3. Apply skills to explore applications in emerging areas.
4. Emphasize the importance of engineering on society and habituate professional ethics.
5. Develop independent learning for proper execution.
6. Develop the art of report writing and presenting the seminar topic.

IV B. Tech., I-Semester, EEE

	L	T	P	C
10BT6HS01: MANAGEMENT SCIENCE	**4**	**-**	**-**	**4**

(Common to EEE, EIE & EConE)

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: —

COURSE DESCRIPTION:

Management science approaches in organizations, including modelling and rational approaches to decision-making process; Historic development of management thought: decision making; the management functions of planning, organizing, leading and controlling. Case analysis; materials management; business simulations and real-time projects; analysis and communication, using real world applications and cases; decision analysis as applied to tactical and strategic business decisions.

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. Understand fundamental needs of a small business enterprise and identify the avenues for improvement.
2. Analyze lacunae in management practices in an organization and provide qualitative assessment of the possible remedies to address the lacunae.
3. Design administrative system and process flow for small enterprises for maximizing efficiency.
4. Apply problem-structuring methods used within Management Science.
5. Exercise discernment in implementing managerial decisions for ethical, safe, and sustainable operations of the business operations.

DETAILED SYLLABUS:

UNIT-I : INTRODUCTION TO MANAGEMENT

Concepts of management and organization, nature and importance of management, evolution of management thought, functions of management, contributions of F.W. Taylor and Henri Fayol to the management, systems approach to management, managerial skills, elements of corporate planning process, environmental scanning, SWOT analysis, social responsibilities of management.

UNIT-II : DESIGNING ORGANIZATIONAL STRUCTURES

Basic concepts related to organization, departmentation and decentralization, types of organizations, merits, demerits and adoptability to modern firms.

UNIT-III : OPERATIONS MANAGEMENT

Principles and types of plant layout, methods of production, forecasting, forecasting methods, work study, basic procedure involved in method study and work measurement, statistical quality control: Factors affecting quality, quality control using control charts (simple problems), acceptance sampling.

UNIT-IV : MATERIALS MANAGEMENT

Materials management objectives, inventory, types of inventory, safety stock, classical EOQ model, need for inventory control, EOQ simple problems, ABC analysis, purchase procedure, stores management.

Marketing: Functions of marketing, marketing mix, channels of distribution.

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UNIT-V : HUMAN RESOURCES MANAGEMENT (HRM)

Nature and scope of HRM, HRD and personnel management and industrial relations, functions of HRM, role of HR Manager in an organization, performance appraisal, job evaluation and merit rating, motivation, importance of motivation, maslow's theory of human needs, McGregor's theory X and theory Y, Herzberg's two factor theory.

UNIT-VI : PROJECT MANAGEMENT (PERT/CPM)

Network analysis, Program Eevaluation and Review Technique (PERT), Critical Path Method (CPM), identifying critical path, probability of completing the project within given time, project cost analysis, project crashing (simple problems).

UNIT-VII : ENTREPRENEURSHIP

Introduction to entrepreneurship, definition of an entrepreneur, entrepreneurial traits, entrepreneur vs. manager, entrepreneurial decision process, role of entrepreneurship in economic development, social responsibilities of entrepreneurs, opportunities for entrepreneurs in India and abroad, women as an entrepreneur.

UNIT-VIII : CONTEMPORARY MANAGEMENT PRACTICES

Basic concepts of Just-In-Time (JIT) system, Total Quality Management (TQM) , value chain analysis, Enterprise Resource Planning (ERP), Business Process Outsourcing (BPO), gobalization, management challenges, intellectual property rights, supply chain management, role of information technology in managerial decision making.

TEXT BOOKS:

1. O.P. Khanna, *Industrial Engineering and Management*, Dhanpat Rai and Sons, 2010.
2. Stoner, Freeman and Gilbert, *Management*, 6th Edition, Pearson Education, New Delhi, 2005.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane, *Marketing Mangement*, 12th Edition, PHI, New Delhi, 2007.
2. Koontz and Weihrich, *Essentials of Management,* 6th edition, Tata McGraw-Hill, New Delhi, 2007.
3. N.D. Vohra, *Quantitative Techniques in Management,* 2nd edition, Tata McGraw-Hill, New Delhi.
4. Heinz Weihrich and Harold Koontz, *Management- A Global Perspective*,10th Edition, McGraw-Hill International.

IV B. Tech., I-Semester, EEE

10BT70201: SWITCHGEAR AND PROTECTION	**L**	**T**	**P**	**C**
	4	**-**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Electrical Power Transmission and Transformers and AC Machines Lab of III B.Tech., I-Semester

COURSE DESCRIPTION:

Symmetrical fault analysis; types of fuses, circuit breakers and relays; static and microprocessor based relays; protection of generators, transformers, feeders and busbars; Insulation Coordination-Basic Impulse Level; protection against over voltages; methods of neutral grounding

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. demonstrate knowledge in
   - short circuit studies.
   - operation of various protective devices.
   - protection principles for power system components.
2. analyze
   - fault level for different faults
   - operating aspects of protective devices
   - different grounding methods for protection
3. design of proper protection schemes for different power system components.
4. demonstrate skills to evaluate
   - operating parameters of various protecting devices
   - settings of protection devices in different protection schemes.

DETAILED SYLLABUS

UNIT-I : SHORT CIRCUIT ANALYSIS

Symmetrical fault analysis: short circuit current and MVA calculations, fault levels - problems, Unsymmetrical fault analysis: LG, LL and LLG faults with and without fault impedance - problems.

UNIT-II : FUSES AND CIRCUIT BREAKERS

Fuses-types, ratings, isolators, circuit breakers: elementary principles of arc interruption, recovery, restriking voltage, restriking phenomenon average and maximum rate of rise of restriking voltage, current chopping and resistance switching, construction and principle of minimum oil circuit breaker, air blast circuit breaker, vacuum circuit breaker and SF_6 circuit breaker, circuit breaker ratings and specifications, auto reclosures.

UNIT-III : ELECTROMAGNETIC RELAYS

Basic requirements of relays, types of relays based on applications, constructional details of attracted armature, balanced beam, induction type relays, differential relays and biased differential relays, universal torque equation, characteristics of over current, directional and distance relays (R-X diagram).

UNIT-IV : STATIC AND MICROPROCESSOR BASED RELAYS

Static relays, advantages and disadvantages, basic requirements of static relays,definite time, inverse and IDMT static relays, comparators, amplitude and phase comparators, microprocessor based relays, advantages and disadvantages, block diagram for over current (definite, inverse and IDMT) and distance relays and their flow charts.

UNIT-V : PROTECTION OF GENERATORS AND TRANSFORMERS

Protection of generators: differential protection, restricted earth fault protection and inter-turn fault protection, rotor fault protection, problems on percentage winding unprotected.

Transformer protection: differential protection, percentage differential protection, Buchholtz relay protection, problems on design of CT's ratio.

UNIT-VI : PROTECTION OF FEEDERS AND TRANSMISSION LINES

Protection of feeder (radial and ring main) using over current relays, protection of transmission line, 3-Zone protection using distance relays, carrier current protection, protection of bus bars.

UNIT-VII : NEUTRAL GROUNDING

Grounded and ungrounded systems, effects of ungrounded neutral on system performance, methods of neutral grounding, solid, resistance, reactance and peterson coil grounding, arcing grounds and grounding practices, applications of reactors - problems.

UNIT-VIII : PROTECTION AGAINST OVER VOLTAGES

Generation of over voltages in power systems, protection against lightning over voltages, valve type and Zinc-Oxide lighting arresters, insulation co-ordination, basic impulse level.

TEXT BOOKS:

1. Sunil S Rao, *Switchgear and Protection,* 11th edition, Khanna Publishers, 2005.
2. Badri Ram, D.N.Viswakarma, *Power System Protection and Switchgear,* 18th reprint, Tata McGraw-Hill Publications, 2005.

REFERENCE BOOKS:

1. C.L.Wadhwa, *Electrical Power Systems,* 3rd edition, New Age International (P) Limited, Publishers, 2005.
2. B.L.Soni, Gupta, Bhatnagar, Chakrabarthy, *A Text Book on Power System Engineering,* Dhanpat Rai & Co, 2007.
3. B.Ravindranath, M.Chander, *Power System Protection and Switchgear,* 1st edition, New Age International (P) Limited, Publishers, 2007.
4. T.S.Madhava Rao, *Power System Protection: Static Relays,* 2nd edition, Tata McGraw-Hill inc., US 2004.

IV B. Tech., I-Semester, EEE

10BT70202: POWER SYSTEM OPERATION AND CONTROL	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Special Functions and Complex Analysis of II B.Tech., I-Semester, Generation of Electrical Power of II B.Tech., II-Semester and Control Systems of III B.Tech., I-Semester

COURSE DESCRIPTION:
Optimal operation of Generators in Thermal Power Stations; Optimum generation allocation; Optimal Scheduling of Hydrothermal System; modelling of turbine, generator and governor; single and two area frequency control; reactive power control; restructuring of power systems

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. Gain knowledge in:
   - Characteristics of Thermal and Hydro units for their optimal operation.
   - Modelling of generator, turbine and speed governors in power systems.
   - Load frequency control of single area and two area systems.
   - Significance of reactive power and its compensation in transmission lines.
   - Identifying key issues in deregulation of power system restructuring.
2. Analyze
   - the economic operation criteria for thermal and hydro-thermal units with and without losses.
   - a suitable controller for improving LFC dynamics in single and two area power system.
   - a suitable compensating strategy for reactive power management in transmission lines.
3. Design suitable controllers for LFC in 1-area and 2-area systems.
4. Acquire skills in
   - Scheduling of Thermal and Hydro-thermal units for optimal operation.
   - Evaluating the steady state frequency deviations for a load disturbance in single and two area power system.
   - Evaluating the proper ratings and settings of compensating devices.

DETAILED SYLLABUS:

UNIT-I : ECONOMIC OPERATION OF POWER SYSTEMS-I

Optimal operation of generators in thermal power stations, characteristics of thermal plants - heat rate curve, incremental fuel and production costs, input-output characteristics, optimum allocation with line losses neglected.

UNIT-II : ECONOMIC OPERATION OF POWER SYSTEMS-II

Optimum generation allocation including the effect of transmission losses-loss coefficients, general transmission line loss formula.

UNIT-III : HYDROTHERMAL SCHEDULING

Optimal scheduling of hydrothermal system: hydroelectric power plant models, scheduling problems, short term hydrothermal scheduling problem.

UNIT-IV : MODELING OF TURBINE,GENERATOR AND GOVERNOR

Modeling of turbine: first order turbine model, block diagram representation of steam turbines and approximate linear models, modeling of generator(steady state and transient models): description of simplified network model of a synchronous machine (classical model), description of swing equation (no derivation) and state space II-order mathematical model of synchronous machine,
Modeling of governor: Mathematical modeling of speed governing system, derivation of small signal transfer function, block diagram.

UNIT-V : SINGLE AREA LOAD FREQUENCY CONTROL

Necessity of keeping frequency constant, definition of control area, block diagram representation of an isolated power system, steady state response (controlled and uncontrolled case), dynamic response(uncontrolled case), Proportional plus integral control of single area and its block diagram representation of single area system, steady state response-load frequency control and economic dispatch control.

UNIT-VI : TWO AREA LOAD FREQUENCY CONTROL

Load frequency control of two area system, uncontrolled and controlled case, tie-line bias control.

UNIT-VII : REACTIVE POWER-VOLTAGE CONTROL

Overview of reactive power control, typical excitation scheme, generation and absorption of reactive power, relation between voltage and reactive power, methods of voltage control in transmission system, advantages and disadvantages of different types of compensating equipment for transmission systems.

UNIT-VIII : POWER SYSTEM RESTRUCTURING

Introduction, need for deregulation, motivation for power system restructuring, key issues in deregulation.

TEXT BOOKS

1. C.L.Wadhwa, *Electrical Power Systems*, 3rd edition, New Age International, 2005.
2. I.J. Nagrath & D.P. Kothari, *Modern Power System Analysis*, 3rd edition, Tata McGraw-Hill, 2003.

REFERENCE BOOKS:

1. S.N. Singh, *Electric Power Generation, Transmission and Distribu tion*, 2nd edition, Prentice Hall India.
2. A. Chakravarthi and S. Halder, *Power System Analysis Operation and Control,* 3rd edition, Prentice Hall India.
3. Hadi Saadat, *Power System Analysis*, Tata McGraw-Hill edition, 2004.

IV B. Tech., I-Semester, EEE

10BT70203: POWER SYSTEM ANALYSIS	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Special Functions and Complex Analysis of II B.Tech., I-Semester and Switchgear and Protection of IV B.Tech., I-Semester

COURSE DESCRIPTION:

Representation of power system elements; Graph theory; formation of Y bus and Z bus of a Power System; power flow studies by various methods; three phase balance and unbalanced network elements; fault analysis; steady state and transient stability analysis of a power system.

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. demonstrate knowledge in:
   - the formation of various network matrices for a power system network.
   - load flow studies.
   - concepts of power system stability.
2. analyze
   - the power flows and losses in the power system network using load flow analysis for different conditions.
   - the stability of the system for different loading and faulted conditions.
   - fault level for various faults.
3. demonstrate skills in evaluating
   - various network matrices.
   - the load flow solution for a power system network for different conditions.
   - the various stability limits for different conditions.

DETAILED SYLLABUS:

UNIT-I : POWER SYSTEM NETWORK MATRICES-I
Representation of power system elements, essential characteristics of a good algorithm, steps involved in solving a problem using digital computer, Graph Theory: definitions, bus incidence matrix, Y_{Bus} formation by direct and singular transformation methods - problems.

UNIT-II : POWER SYSTEM NETWORK MATRICES-II
Formation of Z_{Bus}: partial network, algorithm for the modification of Z_{Bus} matrix for addition element for the following cases: addition of element from a new bus to reference, addition of element from a new bus to an old bus, addition of element between an old bus to reference and addition of element between two old busses (derivations and numerical problems), modification of Z_{Bus} for the changes in network.

UNIT-III : POWER FLOW STUDIES-I
Necessity of power flow studies, data for power flow studies - derivation of static load flow equations - load flow solutions using Gauss Seidel method: acceleration factor, load flow solution with and without PV buses, algorithm and flowchart, numerical load flow solution for simple power systems (max. 3-Buses): determination of bus voltages, injected active and reactive powers (sample one iteration only) and finding line flows/losses for the given bus voltages.

UNIT-IV : POWER FLOW STUDIES-II
Newton Raphson method in rectangular and polar co-ordinates form: load flow solution with or without PV buses, derivation of Jacobian elements, algorithm and flowchart, decoupled and fast decoupled methods, comparison of different methods, DC load flow.

UNIT-V : THREE PHASE NETWORK MODEL
Three phase elements, rotating, stationary elements, three phase balanced network elements, symmetrical components transformation matrices, three phase unbalanced network elements.

UNIT-VI : FAULT ANALYSIS USING Z_{BUS}
Symmetrical and unsymmetrical fault analysis using Z_{Bus} and problems.

UNIT-VII : POWER SYSTEM STEADY STATE STABILITY ANALYSIS

Elementary concepts of steady state, dynamic and transient stabilities, description of steady state stability power limit, transfer reactance, synchronizing power coefficient, power angle curve and determination of steady state stability and methods to improve steady state stability.

UNIT-VIII : POWER SYSTEM TRANSIENT STATE STABILITY ANALYSIS

Derivation of swing equation, determination of transient stability by equal area criterion, application of equal area criterion, critical clearing angle calculation, solution of swing equation by point by point method, methods to improve transient stability, application of auto reclosing and fast operating circuit breakers.

TEXT BOOKS:

1. Stagg El - Abiad & Stags, *Computer Methods in Power Systems*, McGraw-Hill edition.
2. I.J.Nagrath & D.P.Kothari, *Modern Power system Analysis*, 2nd edition, Tata McGraw-Hill Publishing Company.
3. B.R. Gupta,*Power System Analysis and Design*, 6th revised edition, S.Chand & Co, 2010.

REFERENCE BOOKS:

1. Grainger and Stevenson, *Power System Analysis*, Tata McGraw-Hill, 2003.
2. M.A. Pai, *Computer Techniques in Power System Analysis*, 2nd edition, Tata McGraw-Hill, 1994.
3. S. Sivanagaraju, B. V. Rami Reddy, *Electrical Power System Analysis*, revised edition, Laxmi Publications, 2011.
4. Glovar and Sarma, *Power System Analysis*, Thomson Publishers, 2008.
5. Hadi Saadath, *Power System Analysis*, Tata McGraw-Hill, 2004.

IV B. Tech., I-Semester, EEE

10BT71302: PROGRAMMABLE LOGIC CONTROLLERS (ELECTIVE-I)	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Switching Theory and Logic Design of II B.Tech., I-Semester and Microprocessors and Microcontrollers of III B.Tech., II-Semester

COURSE DESCRIPTION:

Introduction to PLC; PLC ladder diagrams; programming PLC; timers, counters and sequences used in PLC; data handling functions; Bit Patterns; advanced PLC functions

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. demonstrate knowledge on:
   - programmable logic controllers.
   - various functions of PLCs.
2. analyze the process of automation using PLCs
3. demonstrate design skills in automating a process control.
4. demonstrate skills in programming PLCs for different applications.
5. apply the suitable PLC in industry and domestic applications.

DETAILED SYLLABUS:

UNIT-I : PLC BASICS

Introduction, PLC advantages, disadvantages, PLC system, CPU, I/O modules and interfacing, power supplies, Programming equipment, Programming formats, Construction of PLC ladder diagrams, Devices connected to I/O modules.

UNIT-II : PLC PROGRAMMING

Input instructions, Outputs, Operational procedures, Programming examples using contacts and coils, Fail-Safe Circuits, Drill press operation.

UNIT-III : DIGITAL LOGIC GATES AND LADDER DIAGRAMS

Digital logic gates, Boolean algebra PLC programming, Conversion examples.

Ladder Diagrams for process control: Ladder diagrams & sequence listings, ladder diagram construction and flowchart for spray process system.

UNIT-IV : REGISTERS AND TIMER FUNCTIONS

Characteristics of Registers, module addressing, holding registers, Input Registers, Output Registers. Timer function & Industrial applications, Counter function & industrial applications.

UNIT-V : INTERMEDIATE FUNCTIONS

Intermediate functions: Arithmetic functions, Number comparison functions, Number conversion functions

UNIT-VI : DATA HANDLING FUNCTIONS

Skip, Master control relay, Jump functions. PLC data move systems: Move function, FIFO, FAL, ONS, CLR & Sweep functions and their applications

UNIT-VII : PLC FUNCTIONS WORKING WITH BITS

Bit Pattern, Changing a register bit status, Shift register functions and applications, Sequencer functions and applications, Controlling of two-axis & three axis Robots with PLC, Matrix functions.

UNIT-VIII : ADVANCED PLC FUNCTIONS

Analog modules & systems, Analog signal processing, Multi-bit Data Processing, Analog output application examples, PID principle, position indicator with PID control, PID Modules, PID tuning, PID functions, Networking of PLCs, Alternative Programming languages, PLC auxiliary commands and functions.

TEXT BOOK:

1. John W. Webb & Ronald A. Reiss, *Programmable Logic Controllers Principles and Applications,* 5th Edition, PHI.

REFERENCE BOOK:

1. M.Chidambaram, *Computer control of process*, Narosa 2003.

IV B. Tech., I-Semester, EEE

10BT50423: PRINCIPLES OF COMMUNICATIONS (ELECTIVE-I)	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: —

COURSE DESCRIPTION:

Types and block diagram of communication systems; types of amplitude modulation; frequency and phase modulations; sampling theorem; block diagram of PCM; digital modulation techniques; error detection and correction codes.

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. demonstrate knowledge on: elements of communication system, various analog and digital modulation techniques, digitization techniques, pulse modulation techniques, Time & Frequency Division Multiplexing, different types of noises, data transmission and detection of digital signals and coding techniques.
2. analyze complex engineering problems critically in the domain of analog & digital communication systems
3. design and develop digital communication system.
4. solve engineering problems for feasible and optimal solutions in the core area of digital Communications and systems.

DETAILED SYLLABUS:

UNIT-I : INTRODUCTION

Block diagram of electrical communication system, radio communication: Types of communications, analog, pulse and digital types of signals, fourier transform for various signals, fourier spectrum, power spectral density, autocorrelation, cross correlation, convolution.

UNIT-II : AMPLITUDE MODULATION

Need for modulation, types of amplitude modulation, AM, DSBSC, SSBSC, power and BW requirements, generation of AM, DSBSC, SSBSC, demodulation of AM: Diode detector, product demodulation for DSBSC & SSBSC.

UNIT-III : ANGLE MODULATION

Frequency and phase modulations, advantages of FM over AM, bandwidth consideration, narrowband and wideband FM, generation and demodulation of FM, comparison of FM and PM.

UNIT-IV : PULSE MODULATIONS

Sampling, nyquist rate of sampling, sampling theorem for band limited signals, PAM, regeneration of base band signal, PWM and PPM, time division multiplexing, frequency division multiplexing, asynchronous multiplexing.

UNIT-V : PCM SCHEMES

Advantages, block diagram of PCM, quantization, effect of quantization, quantization error, base band digital signal, DM, ADM, ADPCM and comparison.

UNIT-VI : DIGITAL MODULATION

ASK, FSK, PSK, QPSK, DPSK, QAM, modulation and demodulation-coherent and incoherent, modems.

UNIT-VII : INFORMATION THEORY

Concept of information, rate of information and entropy, source coding for optimum rate of information, coding efficiency, Shanon-Fano and huffman coding.

UNIT-VIII : ERROR CONTROL CODING

ntroduction, error detection and correction codes, block codes, convolutional codes.

TEXT BOOKS:

1. Simon Haykin, *Communication Systems,* 2nd edition, John Wiley Publishers, 2008.
2. R.P. Singh and S D Sapre, *Communication Systems Analog and Digital,* 3rd edition, Tata McGraw-Hill, 2006.
3. H. Taub and D. Schilling, *Principles of Communication Systems,* 2nd edition, Tata McGraw-Hill, 2003.

REFERENCE BOOKS:

1. Kennedy and Davis, *Electronic Communication Systems,* 4th edition, Tata McGraw-Hill, 2004.
2. John. G. Proakis and Masoud Salehi, *Communication Systems Engineering,* 2nd edition, Prentice Hall India, 2004.

IV B. Tech., I-Semester, EEE 10BT60405: VLSI DESIGN (ELECTIVE-I)	L	T	P	C
	4	1	-	4

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Linear and Digital IC Applications of III B.Tech., II-Semester.

COURSE DESCRIPTION: Introduction to the design and implementation of VLSI circuits for complex digital systems; CMOS technology; submicron design; clocking; subsystem design; CAD tools and algorithms; simulation; verification; testing and design methodology.

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. demonstarte knowledge in
   - Understanding the Fabrication of MOS Transistors.
   - Electrical properties of CMOS and BiCMOS Circuits
   - Designing Static Combinational and Sequential logic at transistor level, including Mask layout.
   - Estimating and optimizing combinational RC Circuit delay using RC delay models and logical effort.
   - Design methodology and tools.
   - Testing the chip at various abstraction levels
2. Perform analysis of Circuit Characterization and Performance Estimation of CMOS device and Create models of moderately sized CMOS circuits that realize specified digital functions
3. Formulate and solve technology specific problems in developing an IC circuit using EDA tools
4. Use modern design tools to IC devices to create system- on - chip (SOC) designs in FPGAs

DETAILED SYLLABUS:

UNIT-I : INTRODUCTION

Introduction to IC Technology – MOS, PMOS, NMOS, CMOS & BiCMOS technologies- Oxidation, Lithography, Diffusion, Ion implantation, Metallisation, Encapsulation, Probe testing, Integrated Resistors and Capacitors.

UNIT-II : BASIC ELECTRICAL PROPERTIES

Basic Electrical Properties of MOS and BiCMOS Circuits: Ids-Vds relationships, MOS transistor threshold Voltage, gm, gds, figure of merit; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT-III : VLSI CIRCUIT DESIGN PROCESSES

VLSI design flow, MOS layers, Stick diagrams, Design rules and Layout, 2 μ m CMOS design rules for Wires, Contacts and Transistors, Layout diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

UNIT-IV : GATE LEVEL DESIGN

Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Basic circuit concepts, Sheet Resistance RS and its concept to MOS, Area Capacitance Units, Calculations - Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers

UNIT-V : SUBSYSTEM DESIGN

Adders – Transmission based Adder, Carry Bypass Adder, Carry Skip Adder, Carry Select Adder, Shifters- Barrel Shifter, Logarithmic Shifter, Multipliers – Definitions, Array Multiplier, Carry Save multiplier, Booth Multiplier, ALUs, Parity generators, Comparators, Zero/One Detectors, Counters- Synchronous & Asynchronous Counter, High Density Memory Elements.

UNIT-VI : SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN

PLAs, FPGAs, CPLDs, PALs, Cell based Design Methodology, Design Approach.

UNIT-VII : VHDL SYNTHESIS

VHDL synthesis, circuit design flow, circuit synthesis, types of simulation, layout synthesis, design capture tools, design verification tools.

UNIT-VIII : CMOS TESTING

CMOS testing, need for testing, test principles, design strategies for test, chip level test techniques, system-level test techniques, layout design for improved testability.

TEXT BOOKS:

1. Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, *Essentials of VLSI Circuits and Systems,* Prentice Hall India, 2005 edition.
2. Weste and EShraghian, *Principles of CMOS VLSI Design,* Pearson Education, 1999.

REFERENCE BOOKS:

1. John M. Rabaey, *Digital Integrated Circuits: A Design Perspective,* 2nd edition, Prentice Hall India, EEE, 1997.
2. Wayne wolf, *Modern VLSI Design,* 3rd edition, Pearson Education, 1997.
3. Charles H. Roth, *Fundamentals of Logic Design,* 5th edition, Thomson Publications, 2004.

IV B. Tech., I-Semester, EEE

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10BT70421: ADVANCED MICROPROCESSORS AND MICROCONTROLLERS (ELECTIVE-I)

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Microprocessors and Microcontrollers of III B.Tech., II-Semester

COURSE DESCRIPTION:

Architecture, Programming and Interfacing of 80286, 80386, 80486, Pentium, Pentiumpro, Pentium IV and dual core Microprocessors; Architecture, Programming, Interfacing and applications of 8051 Microcontroller; 16/32 bit Microcontrollers

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. demonstrate in-depth knowledge on
   - architecture, memory management of Intel X86, Pentium, Pentium PRO, Pentium-IV and dual core processors.
   - architecture, instruction set of 8051 microcontroller family and their applications in real time.
   - 16/32 bit microcontrollers such as 80196 family and ARM microcontrollers.
2. write programs for a particular task/application.

DETAILED SYLLABUS:

UNIT-I : THE 80286 MICROPROCESSORS

Architecture, Register Organization, Addressing Modes and over view on instruction set of 80286.

UNIT-II : THE 80386 AND 80486 MICROPROCESSORS

Architectural features, Register Organization, Memory management, Virtual 8086 mode, The Memory Paging Mechanism.

UNIT-III : THE PENTIUM AND PENTIUMPRO PROCESSORS

The Memory System, Input/output system, Branch Prediction Logic, Cache Structure, Pentium Registers, Serial Pentium pro features.

UNIT-IV : THE PENTIUM IV AND DUALCORE MICROPROCESSORS

Architecture, Special Registers and Pin Structures (brief treatment only)

UNIT-V : OVERVIEW OF ARCHITECTURE AND MICROCONTROLLER RESOURCES

Architecture of a typical micro controller – Microcontroller resources – Resources in advanced and next generation microcontrollers. 8051 microcontroller – Internal and External memories – Counters and Timers – Synchronous serial-cum asynchronous serial communication - Interrupts.

UNIT-VI : 8051 FAMILY MICROCONTROLLERS INSTRUCTION SET

Basic assembly language programming – Data transfer instructions – Data and Bit-manipulation instructions – Arithmetic instructions – Instructions for Logical operations on the test among the Registers, Internal RAM, and SFRs– Program flow control instructions – Interrupt control flow.

UNIT-VII : REAL TIME CONTROL

INTERRUPTS: Interrupt handling structure of an MCU – Interrupt Latency and Interrupt deadline – Multiple sources of the interrupts – Non-mask able interrupt sources – Enabling or disabling of the sources – Polling to determine the interrupt source and assignment of the priorities among them – Interrupt structure in Intel 8051.

TIMERS: Programmable Timers in the MCU's – Free running counter and real time control – Interrupt interval and density constraints.

UNIT-VIII : 16/32 BIT MICROCONTROLLERS

16 bit Microcontrollers: Hardware – Memory map in Intel 80196 family MCU system – IO ports – Programmable Timers and High-speed outputs and input captures – Interrupts

ARM 32 Bit Microcontrollers: Introduction to 16/32 Bit processors – ARM architecture and organization – ARM / Thumb programming model – ARM / Thumb instruction set

TEXT BOOKS:

1. Barry B. Brey, *The Intel Microprocessors,* 8th edition, Pearson Education, 2009.
2. A.K.Ray and K.M.Bhurchandi, *Advanced Microprocessor and Peripherals,* Tata McGraw-Hill, 2000.
3. Raj Kamal, *Microcontrollers Architecture, Programming, Interfacing and System Design,* Pearson Education, 2005.
4. Mazidi and Mazidi, *The 8051 Microcontroller and Embedded Systems,* Prentice Hall India, 2000.

REFERENCE BOOKS:

1. YU-Chang, Glenn A. Gibson, *Micro Computer Systems: The 8086/8088 Family Architecture, Programming and Design,* 2nd edition, Pearson Education, 2007.
2. Douglas V. Hall, *Microprocessors and Interfacing,* Special Indian Edition, 2006.
3. A.V. Deshmuk, *Microcontrollers (Theory & Applications),* WTMH, 2005.
4. John B. Peatman, *Design with PIC Microcontrollers,* Pearson Education, 2005.

IV B. Tech., I-Semester, EEE

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10BT51301: ADVANCED CONTROL SYSTEMS (ELECTIVE-II)	**4**	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Control Systems of III B.Tech., I-Semester

COURSE DESCRIPTION:

State space representation: solution of state equation, canonical forms; controllability and observability; nonlinear system analysis using describing function and phase-plane methods; lyapunov stability; pole placement technique, design of observers; formulation of various optimal control problems; minimization of functionals

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. demonstrate knowledge on:
   - concepts of state space representation and controllability & observability for different systems.
   - stability analysis of different systems.
   - concepts of modal and optimal control.
   - calculus of variations.
2. analyze
   - controllability& observability using different concepts.
   - Effect of various non-linearities on the system.
   - Stability of a non-linear system using different approaches.
   - constrained and unconstrained systems using different approaches.
3. demonstrate skill in designing a controller, compensator, observer and regulator to meet the required specifications.
4. demonstrate skills in
   - solving state equation and state models.
   - evaluating stability using describing functions.
   - Evaluating parameters for modal and optimal control.

DETAILED SYLLABUS:

UNIT-I : STATE SPACE ANALYSIS

State Space Representation using phase variables, Solution of State Equation, State Transition Matrix, Diagonalization, Canonical Forms, Controllable Canonical Form, Observable Canonical Form, Jordan Canonical Form.

UNIT-II : CONTROLLABILITY AND OBSERVABILITY

Tests for controllability and observability for continuous time systems, Necessary and sufficient conditions for controllability and observability, Principle of Duality, Controllability and observability form Jordan canonical form and other canonical forms.

UNIT-III : DESCRIBING FUNCTION ANALYSIS

Introduction to nonlinear systems, Different physical nonlinearities, describing functions, describing function analysis of nonlinear control systems.

UNIT-IV : PHASE-PLANE ANALYSIS

Introduction to phase-plane analysis, Method of Isoclines for Constructing Trajectories, singular points, phase-plane analysis of nonlinear control systems, Delta method.

UNIT-V : STABILITY ANALYSIS

Stability in the sense of Lyapunov, Lyapunov's stability and Lypanov's instability theorems, Graphical representation, Sylvester principle, Definiteness, Direct method of Lypanov for the Linear and Nonlinear continuous time autonomous systems.

UNIT-VI : MODAL CONTROL

Effect of state feedback on controllability and observability, Design of State Feedback Control through Pole placement. Full order observer and reduced order observer.

UNIT-VII : OPTIMAL CONTROL

Formulation of optimal control problem. Minimum time, Minimum energy, minimum fuel problems, State regulator problem, Output regulator problem, Tracking problem, Continuous-Time Linear Regulators.

UNIT-VIII : CALCULUS OF VARIATIONS

Minimization of functionals of single function, Euler Lagrange Equation, Constrained minimization, Minimum principle, Control variable inequality constraints, Control and state variable inequality constraints.

TEXT BOOKS:

1. M. Gopal, *Modern Control System Theory*, 2nd edition, New Age International Publishers, 1996.
2. A.Nagoor kani, *Advanced control Theory*, 2nd Edition, RBA Publications, 2009.

REFERENCE BOOKS:

1. K. Ogata, *Modern Control Engineering*, 3rd edition, Prentice Hall of India, 1998.
2. I.J. Nagarath and M.Gopal, *Control Systems Engineering,* New Age International (P) Ltd.
3. A. Ananda Kumar, *Control Systems,* PHI, 2007.

IV B. Tech., I-Semester, EEE

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10BT70204: FLEXIBLE AC TRANSMISSION (ELECTIVE-II)

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Power Electronics and AC Machines of III B.Tech., I-Semester and Power System Analysis of IV B.Tech., I-Semester

COURSE DESCRIPTION:

Electrical transmission networks: Conventional control methods; Principle of Reactive-Power Control; FACTS controllers and their advantages; transformer connections for various pulse operations: VSI and CSI; objective of shunt compensation; application of shunt compensators; need for series compensation; application of TCSC

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. demonstrate knowledge on:
   - · different conventional and modern methods for real and reactive power control in transmission system.
   - · importance and operation of various FACTS controllers in transmission system.
   - · various transformer and converter configurations used for FACTS controllers.
2. Analyze different compensators for improving overall performance of the transmission system.
3. Extend the applications of FACTS devices to improve the overall performance of the transmission system.

DETAILED SYLLABUS:

UNIT-I : INTRODUCTION TO TRANSMISSION NETWORKS

Electrical transmission networks, conventional control methods, Automatic Generation Control(AGC), excitation control, transformer tap changer control, phase shifting transformer, problems of AC transmission systems, power flow in parallel paths and meshed system, factors limiting loading capability, stability consideration.

UNIT-II : REACTIVE POWER CONTROL

Reactive power control in electrical power transmission - principles of conventional reactive power compensators, Flexible AC Transmission Systems (FACTS) concepts, importance of controllable parameters, basic types of FACTS controllers, advantages of FACTS technology.

UNIT-III : VOLTAGE AND CURRENT SOURCE CONVERTERS

Voltage source converters: conversion principles, transformer connections for 3, 6, 12, 24 and 48 pulse operation, pulse width modulation converter, current source converters.

UNIT-IV : STATIC SHUNT COMPENSATORS

Static shunt compensation: objectives of shunt compensation, mid point voltage regulation, voltage instability prevention, improvement of transient stability, power oscillation damping.

UNIT-V : STATIC VAR COMPENSATORS

Methods of controllable VAR generation, variable impedance type static VAR generators, switching converter type VAR generators, hybrid VAR generators.

UNIT-VI : SVC AND STATCOM APPLICATIONS

Voltage control by SVC, influence of SVC on system voltage, design of SVC voltage regulator, modeling of SVC for power flow and transient stability, principle of operation of STATCOM, V-I characteristics.

Applications: enhancement of transient stability, steady state power transfer, prevention of voltage instability.

UNIT-VII : STATIC SERIES COMPENSATOR

Static series compensators: concept of series capacitive compensation, improvement of transient stability, power oscillation damping.

UNIT-VIII : TCSC APPLICATIONS

Operation of TCSC, different modes of operation, modeling of TCSC - variable reactance model, modeling of power flow and stability studies.

Applications: improvement of system stability limit, enhancement of system damping.

TEXT BOOKS:

1. Narain G.Hingorani, Laszi Gyugyi, *Understanding FACTS: Concepts and Technology of Flexible AC Transmission Systems*, Wiley-IEEE Press, 1999.
2. R.Mohan Mathur and Rajiv K.Varma, *Thyristor Based FACTS Controllers for Electrical Transmission Systems*, Wiley-IEEE Press, 2002.

REFERENCE BOOKS:

1. Xiao-Ping, Rehtanz, Christian, Pal, Bikash, *Flexible AC Transmission Systems: Modeling and Control , Springer Power Systems Series*, 2006.
2. P. S. Kundur, *Power System Stability and Control,* McGraw-Hill Professional, 1994.
3. R. Padiyar, *Power System Dynamics: Stability and Contro*l, John Wiley, 1996.

IV B. Tech., I-Semester, EEE

10BT70205: HIGH VOLTAGE DC TRANSMISSION (ELECTIVE-II)	**L**	**T**	**P**	**C**
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ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Power Electronics of III B.Tech., I-Semester and Power System Analysis of IV B.Tech., I-Semester

COURSE DESCRIPTION:

Need for HVDC Transmission: planning and modern trends; Analysis and Control of Power Converters; Harmonics: characteristics and design of Filters; sources of reactive power and control strategies; solution of AC-DC power flow; faults and protection of converters used in HVDC Transmission

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. demonstrate knowledge on:
   - different types of HVDC systems, various converter configurations and their control.
   - Effects of harmonics, faults and their control methods.
   - active and reactive power flow and their control.
2. analyze
   - different converter configurations.
   - Different control and protection strategies in HVDC system.
   - Power flow in HVDC system
3. demonstrate skill in designing filter circuits for minimizing harmonics.
4. demonstrate skills in evaluating parameters in HVDC system.

DETAILED SYLLABUS:

UNIT-I : INTRODUCTION TO HVDC TRANSMISSION

HVDC transmission: need for HVDC transmission, apparatus required for HVDC transmission system, types of DC links, comparison of AC and DC transmission systems, applications of AC and DC transmission systems, planning and modern trends in HVDC transmission system.

UNIT-II : STATIC POWER CONVERTER ANALYSIS

Static power converters: analysis of Graetz circuit, characteristics of 6 pulse & 12 pulse converters, communication process, rectifier and inverter operation, equivalent circuit for converter, special features of converter transformers.

UNIT-III : HARMONICS

Generation of harmonics, characteristic harmonics, calculation of AC harmonics, non-characteristic harmonics, effects of harmonics, calculation of voltage and current harmonics, effect of pulse number on harmonics.

UNIT-IV : FILTERS

Types of AC filters, filter characterstics, design of single tuned filters, design of high pass filters, DC filters.

UNIT-V : CONTROL OF HVDC CONVERTER AND SYSTEMS

Principle of DC link control, constant current, constant extinction angle and constant ignition angle control, individual phase control and equidistant firing angle control.

UNIT-VI : REACTIVE POWER CONTROL IN HVDC

Reactive power requirements in steady state, conventional control strategies, alternate control strategies, sources of reactive power, AC filters, shunt capacitors, synchronous condensers, static VAR systems.

UNIT-VII : POWER FLOW ANALYSIS IN AC/DC SYSTEMS

Modeling of DC links, DC networks, DC power flow control, pu system for DC quantities, solution of AC-DC power flow, simultaneous method, sequential method.

UNIT-VIII : CONVERTER FAULTS AND PROTECTION

Converter faults, over voltages in converter station, protection against over current and over voltage in converter station, surge arresters, protection of DC line, DC breakers.

TEXT BOOKS:

1. K.R.Padiyar, *High Voltage Direct Current Transmission,* New Age International (P) Ltd., New Delhi.
2. Sunil S Rao, EHVAC, *HVDC Transmission and Distribution Engi neering*, Khanna Publishers, 2001.

REFERENCE BOOKS:

1. E.Uhlman, *Power Transmission by Direct Current,* Springer Verlag, Berrlin.
2. J. Arillaga, *H.V.D.C.Tranmission*, Peter Peregrilnus Ltd., London, UK, 1983.
3. E. W. Kimbark, *Direct current Transmission,* John Wiely & Sons, New York.

IV B. Tech., I-Semester, EEE

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10BT70206: RENEWABLE ENERGY SOURCES (ELECTIVE-II)

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Generation of Electric Power of II B.Tech., II-Semester

COURSE DESCRIPTION:

Concept of solar radiation: Environmental impact of solar power; classification of solar energy collectors; different methods of solar energy storage and applications; wind energy, bio-mass energy, geo thermal and ocean energy; need for direct energy conversion

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. demonstrate knowledge on
   - generation of electrical energy from renewable energy sources and direct energy conversion
   - different conversion, energy storage methods and applications.
   - laws and effects in energy conversion.
2. analyze
   - various solar energy collectors
   - horizontal and vertical axis windmills
   - various bio mass digesters.
   - potential and conversion techniques for renewable energy sources.
3. demonstrate skills in evaluating Solar radiation and wind power
4. Industrial and residential application of renewable energy sources.
5. environmental impact of solar, wind, geothermal and ocean power

DETAILED SYLLABUS:

UNIT-I : PRINCIPLES OF SOLAR RADIATION

Role and potential of new and renewable source, the solar energy option, environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II : SOLAR ENERGY COLLECTION

Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT-III : SOLAR ENERGY STORAGE AND APPLICATIONS

Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT-IV : WIND ENERGY

Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria.

UNIT-V : BIO-MASS

Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, IC engine operation and economic aspects.

UNIT-VI : GEOTHERMAL ENERGY

Resources, types of wells, methods of harnessing the energy, potential in India.

UNIT-VII : OCEAN ENERGY

OTEC: principle of utilization, setting of OTEC plants, thermodynamic cycles, tidal and wave energy: potential and conversion techniques, mini-hydel power plants and their economics.

UNIT-VIII : DIRECT ENERGY CONVERSION

Need for DEC, Carnot cycle, limitations, principles of DEC, thermo-electric generators, Seebeck, Peltier, Joul and Thomson effects, MHD generators - principle, fuel cells - principle, Faraday's laws, thermo-dynamic aspects, selection of fuel and operation conditions.

TEXT BOOKS:

1. G.D. Rai, *Non-Conventional Energy Sources*, Khanna Publishers, Delhi, 2007.
2. G.N. Tiwari and M.K. Ghosal, *Fundamentals of Renewable Energy Resources,* Narosa Publishing House, New Delhi, 2007.

REFERENCE BOOKS:

1. Twidell & Wier, *Renewable Energy Resources*, CRC Press(Taylor & Francis), 2006.
2. Ramesh & Kumar, *Renewable Energy Technologies*, Narosa Publishing House, New Delhi, 2003
3. K Mittal, *Non-Conventional Energy Systems*, Wheeler Publishing, New Delhi, 2003.
4. D.P. Kothari,K.C.Singhal, *Renewable Energy Sources and Emerg ing Technologies,* Prentice Hall Iindia.
5. G.D. Rai, *Solar Energy Utilization*, Khanna Publishers, Delhi, 2001.

IV B. Tech., I-Semester, EEE

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10BT60411: MICROPROCESSORS AND MICROCONTROLLERS LAB

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITES: Microprocessors and Microcontrollers of III B.Tech., II-Semester

COURSE DESCRIPTION:

Arithmetic and logical operations using 8085 and 8086 microprocessors; interfacing programs with 8086; programs using 8051

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. Demonstrate knowledge on assemblers, macros, instruction set of 8085, 8086, 8051
2. Analyze the requirements critically and write programs occupying less space in memory and executes faster.
3. design suitable interfaces for real time applications
4. exhibit skills to test and debug programs in the laboratory and choose suitable hardware and program the devices to solve engineering problems
5. function effectively as individual and as member in a team
6. Prepare laboratory reports that clearly communicate experimental information

DETAILED SYLLABUS:

Any TWELVE experiments to be conducted

I Programs using 8085

1. Arithmetic operations
2. Logical operations

II Programs using 8086

1. Introduction to MASM/TASM
2. Arithmetic operations
3. Logic operations
4. String operations
5. Modular program: use procedure

III Interfacing Programs with 8086

1. Stepper motor
2. Logic controllers
3. A/D and D/A converter
4. Seven segment display
5. Keyboard interfacing

IV Programs using 8051

1. Arithmetic operations
2. Addition operation using external memory
3. Programs using special instructions like SWAP, bit/byte, set/reset etc.

IV B. Tech., I-Semester, EEE

	L	T	P	C
10BT70211: POWER SYSTEMS AND SIMULATION LAB	-	-	3	2

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITES: Power System Operation and Control and Power System Analysis of IV B.Tech., I-Semester

COURSE DESCRIPTION:

Determination of sub-transient reactance, sequence impedances, sequence components and power angle characteristics of synchronous machine; determination of load flows using MATLAB software; simulation of synchronous machine and load frequency problem

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. Demonstrate knowledge on the usage of MATLAB and SIMULINK
2. Analyze
   - faults on synchronous generator
   - the power flow in power system network using various Load flow methods
3. Apply Skills to
   - obtain over current relay characteristics
   - determine sequence components of salient pole synchronous machine
4. Apply MATLAB
   - to determine Y-bus, Z-bus and power flow in power system network
   - to investigate load frequency problem using SIMULINK
5. function effectively as individual and as member in a team
6. Communicate effectively both oral and written

DETAILED SYLLABUS:

The following experiments are required to be conducted as compulsory experiments

PART A: POWER SYSTEMS EXPERIMENTS

1. Determination of sub-transient reactance of salient pole synchronous machine
2. Determination of sequence impedances of cylindrical rotor synchronous machine
3. LG & LL fault analysis of synchronous generator
4. Power angle characteristics of salient pole synchronous machine
5. Determination of sequence components of salient pole synchro nous Machine
6. Characteristics of over current relay

PART B: SIMULATION EXPERIMENTS

1. Formation of Y_{BUS} using MATLAB programme
2. Formation of Z_{BUS} using MATLAB programme
3. Gauss-Seidel method load flow analysis using MATLAB programme
4. Newton-Raphson method load flow analysis using MATLAB programme
5. Development of MATLAB simulink model for a synchronous machine with and without AVR
6. Development of MATLAB Simulink model for a single area and two area load frequency problem

IV B. Tech., I-Semester, EEE	L	T	P	C
10BT7HS01: PROFESSIONAL ETHICS (AUDIT COURSE)	-	2	-	-

PREREQUISITES: —

COURSE DESCRIPTION:

Introduction to engineering ethics; Professional characteristics; Role of engineering in social experimentation; Rights and responsibilities of engineers; Global issues in ethics; Ethics for engineers in various roles.

COURSE OUTCOMES:

On successful completion of the course the students will be able to

1. Demonstrate knowledge in engineering ethics.
2. Analyze ethical issues for corrective action.
3. Develop ethical environment in public and business environment.
4. Investigate and synthesize available information to provide valid conclusions in public and business environment.
5. Apply ethical issues in day-to-day life in harmonious with the society.
6. Follow environmental ethics while conducting business.
7. Apply ethical principles and commit to professional ethics, norms and responsibilities and norms of the engineering practice.

DETAILED SYLLABUS:

UNIT-I : ENGINEERING ETHICS

Scope and aims of engineering ethics-Senses of Engineering Ethics-Variety of Moral Issues-Types of Inquiry- Moral Dilemmas,- Moral Autonomy- Kohlberg's Theory, Gilligan's theory, Consensus and Controversy.

UNIT-II : PROFESSIONAL IDEALS AND VIRTUES

Theories about virtues, professional responsibility, integrity, self-respect, sense of "responsibility". Self-Interest, Customs and Religion- Self-interest and ethical egoism, customs and ethical relativism, religion and divine command ethics. Use of ethical theories- resolving moral dilemmas and Moral leadership

UNIT-III : ENGINEERING AS SOCIAL EXPERIMENTATION

Engineering as experimentation- similarities to standard experiments, learning from the past and knowledge gained. Engineering as Responsible experiments-Conscientiousness. Moral autonomy and accountability, the challenger case.

UNIT-IV : RESPONSIBILITIES AND RIGHTS

Collegiality and Loyalty, Respect for authority, collective bargaining, confidentiality, conflict of interests, occupational crime. Rights of Engineers- Professional rights, whistle-blowing, The bart case, employee rights and discrimination.

UNIT-V : GLOBAL ISSUES

Multinational corporations-Professional ethics, environmental ethics, computer ethics, Engineers as Managers, Consultants and Leaders. Engineers as managers - Managerial ethics applied to engineering profession.

TEXT BOOKS:

1. Mike W. Martin, Roland Schinzinger, *Ethics in Engineering,* Tata McGraw-Hill, 3rd Edition, 1996, 14th Reprint, 2007.
2. Govindarajan M, Nata Govindarajan.M, Natarajan.S, Senthilkumar. V.S, *Engineering Ethics*, Prentice Hall of India, 2004.

REFERENCE BOOKS:

1. Dr. S. Kannan, K. Srilakshmi, *Human Values and Professional Ethics*, Taxmann Allied Services pvt ltd., 2009.
2. Edmund G seebauer and Robert L Barry, *Fundamental of Ethics for scientists and Engineers*, Oxford University Press, Oxford, 2001.
3. Charles F Fledderman, *Engineering Ethics*, Pearson education/ Prentice Hall, NewJercy, 2004, (Indian reprint).

IV B. Tech., I-Semester, EEE

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10BT70212: MINI-PROJECT

ASSESSMENT:

INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
25 MARKS	50 MARKS	75 MARKS

PREREQUISITES: All courses of the program up to III B. Tech. – II Semester.

COURSE DESCRIPTION:

Identification of topic for the mini-project; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

COURSE OUTCOMES: On completion of project work the student will be able to

1. Acquire in-depth knowledge in the areas of interest of mini-project topic.
2. Analyze critically chosen mini-project topic for substantiated conclusions.
3. Design solutions for the mini-project topic chosen.
4. Undertake investigation of mini-project results providing valid conclusions.
5. Use the appropriate techniques, resources and modern engineering tools necessary for mini-project work.
6. Apply mini-project results for sustainable development of the society.
7. Understand the impact of mini-project results in the context of environmental sustainability.
8. Understand professional and ethical responsibilities for sustainable development of society in the chosen field of mini-project.
9. Function effectively as individual and a member in the mini-project team.
10. Develop communication skills, both oral and written for preparing and presenting mini-project reports.
11. Demonstrate knowledge and understanding of cost and time analysis required for carrying out the mini-project.
12. Engage in lifelong learning to improve knowledge and competence in the chosen field of mini-project.

IV B. Tech., I-Semester, EEE

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10BT7HS01: PROFESSIONAL ETHICS (AUDIT COURSE)

PREREQUISITES: —

COURSE DESCRIPTION:
Introduction to engineering ethics; Professional characteristics; Role of engineering in social experimentation; Rights and responsibilities of engineers; Global issues in ethics; Ethics for engineers in various roles.

COURSE OUTCOMES:
On successful completion of the course the students will be able to

1. Demonstrate knowledge in engineering ethics.
2. Analyze ethical issues for corrective action.
3. Develop ethical environment in public and business environment.
4. Investigate and synthesize available information to provide valid conclusions in public and business environment.
5. Apply ethical issues in day-to-day life in harmonious with the society.
6. Follow environmental ethics while conducting business.
7. Apply ethical principles and commit to professional ethics, norms and responsibilities and norms of the engineering practice.

DETAILED SYLLABUS:

UNIT-I: ENGINEERING ETHICS
Scope and aims of engineering ethics - Senses of Engineering Ethics – Variety of Moral issues – Types of Inquiry – Moral dilemmas, – Moral Dilemmas – Moral autonomy – Kohlberg's theory, – Gilligan's theory – Consensus and controversy.

UNIT-II: PROFESSIONAL IDEALS AND VIRTUES
Theories about virtues, Professional responsibility, – Integrity, – Self respect, sense of "responsibility". – Self interest, Customs and Religion - Self-interest and ethical egoism, customs and ethical relativism, religion and divine command ethics. Use of ethical theories – resolving moral dilemmas and Moral leadership.

UNIT-III: ENGINEERING AS SOCIAL EXPERIMENTATION

Engineering as experimentation – similarities to standard experiments, learning from the past and knowledge gained. Engineering as Responsible experimenters – Conscientiousness. Moral autonomy and accountability, the challenger case.

UNIT-IV: RESPONSIBILITIES AND RIGHTS

Collegiality and Loyalty, Respect for authority, collective bargaining, confidentiality, Conflict of interests, Occupational crime. - Rights of Engineers – Professional rights whistle-blowing, The bart case, employee rights and discrimination.

UNIT-V: GLOBAL ISSUES

Multinational corporations – Professional ethics, environmental ethics, Computer ethics, Engineers as Managers, Consultants and Leaders. Engineers as Managers – Managerial ethics applied to engineering profession.

TEXT BOOKS

1. Mike Martin and Ronald Schinzinger, Ethics in Engineering, McGraw-Hill, 3rd Edition, 1996, 14th Reprint, 2007.
2. Govindarajan M, Nata Govindarajan. M, Natarajan S, Senthilkumar V. S., Engineering Ethics, Prentice Hall of India, New Delhi, 2004.

REFERENCE BOOKS

1. Dr. S. Kannan, K. Srilakshmi, Human Values and professional Ethics, Taxmann Allied Services pvt. Ltd., 2009.
2. Edmund G Seebauer and Robert L Barry, Fundamental of Ethics for scientists and Engineers, Oxford University Press, Oxford, 2001.
3. Charles F Fledderman, Engineering Ethics, Pearson education/prentice Hall, New Jercy, 2004, (Indian reprint).

IV B. Tech., II-Semester, EEE

10BT70405: EMBEDDED AND REAL TIME SYSTEMS	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Advanced Microprocessors and Microcontrollers of IV B.Tech., I-Semester

COURSE DESCRIPTION:

Overview of embedded system and classification; basic architecture, operation and pipelining of processors; introduction to concurrent process models; need for communication and various types; concepts of embedded/RTOS; debugging techniques and ARM controllers; introduction to automation and synthesis.

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. demonstrate fundamental knowledge on
   - Communication Interfacing Models
   - Kernal Objects
   - ARM and SHARC Controllers
2. Analyze Various problems in
   - Processor Technology
   - State Machines
   - Concurrent Process Models
   - Design Technology
3. Design and develop Embedded system to suit a particular application.
4. Choose suitable Hardware and software components of a system that work together to solve engineering problems to exhibit a specific behavior.

DETAILED SYLLABUS:

UNIT-I : INTRODUCTION

Embedded systems overview, classification, applications, design challenge, processor technology, IC technology, Design Technology, Trade-offs. Single purpose processors RT-level combinational logic, sequential logic (RT-level), custom single purpose processor design (RT-level), optimizing custom single purpose processors.

UNIT-II : GENERAL PURPOSE PROCESSORS

Basic architecture, operation, Pipelining, Programmer's view, development environment, Application Specific Instruction-Set Processors (ASIPs) – Microcontrollers and Digital Signal Processors.

UNIT-III : STATE MACHINE AND CONCURRENT PROCESS MODELS

Introduction, models versus languages, finite state machines with data path model (FSMD), using state machines, program state machine model (PSM), concurrent process model, concurrent processes, communication among processes, synchronization among processes, implementation, data flow model, real-time systems.

UNIT-IV : COMMUNICATION INTERFACE

Need for communication interfaces, RS232 / UART, RS422 / RS485, USB, Infrared, IEEE 1394 Firewire, Ethernet, I^2C bus and CAN

UNIT-V : EMBEDDED/RTOS CONCEPTS–I

Architecture of the Kernel, Tasks and Task scheduler, Types of real-time tasks, Task periodicity, Task scheduling, Classification of scheduling algorithms, Clock driven Scheduling, Event driven Scheduling, resource sharing, Commercial RTOs.

UNIT-VI : EMBEDDED/RTOS CONCEPTS–II

Interrupt service routines, Semaphores, Mutex, Mailboxes, Message Queues, Event Registers, Pipes, Signals, Timers, Memory Management, Priority inversion problem.

UNIT-VII : TARGET ARCHITECUTERS

Host and target machines, linkers, loading software into target machine, debugging techniques, ARM microcontroller, ARM pipeline, Instruction set architecture, THUMB instructions, Exceptions in ARM, salient features of SHARC microcontroller and comparison with ARM microcontroller.

UNIT-VIII : DESIGN TECHNOLOGY

Introduction, Automation, Synthesis, Parallel evolution of compilation and synthesis, Logic Synthesis, RT synthesis, Behavioral Synthesis, Systems Synthesis and Hardware/ Software Co-Design, Verification, Hardware/Software co-simulation, Reuse of intellectual property codes.

TEXT BOOKS:

1. Frank Vahid, Tony D. Givargis, *Embedded System Design – A Unified Hardware/Software Introduction,* John Wiley, 2002.
2. KVKK Prasad, *Embedded/Real Time Systems,* Dreamtech Press, 2005.
3. Santanu Chattopadyay, *Embedded System Design,* Prentice Hall India, 2010.

REFERENCE BOOKS:

1. Jonathan W. Valvano, Brooks/Cole, *Embedded Microcomputer Systems,* Thompson Learning, 2002.
2. David E. Simon, *An Embedded Software Primer,* Pearson Education, 2005.
3. Sri Ram VIyer, Pankaj Gupta, *Embedded Real Time Systems Programming,* Tata McGraw-Hill, 2004.

IV B. Tech., II-Semester, EEE

	L	T	P	C
10BT50503: DATABASE MANAGEMENT SYSTEMS (ELECTIVE-III)	**4**	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PRE-REQUISITES: —

COURSE DESCRIPTION: Introduction to Database Systems; Database Design; Relational Model; SQL Queries, Constraints and Triggers; Schema Refinement and Normal Forms; Transaction Management; Concurrency Control and Recovery System; Overview of Storage and Indexing.

COURSE OUTCOMES: At the end of the course student will be able to:

1. Gain knowledge on:
   - Fundamentals of DBMS
   - Database design
   - Normal forms
   - Storage and Indexing
2. Apply Structured Query Language (SQL) and PL-SQL in retrieval and management of data in real time applications.
3. Develop skills in designing, managing databases and its security.

DETAILED SYLLABUS:

UNIT–I : INTRODUCTION

History of Database Systems, Introduction to DBMS, Database System Applications, Database Systems Versus File Systems, View of Data, Data Models, Database Languages- DDL & DML Commands and Examples of Basic SQL Queries, Database Users and Administrators, Transaction Management, Database System Structure, Application Architectures.

UNIT–II : DATABASE DESIGN

Introduction to Database Design, E-R Diagrams, Entities, Attributes and Entity Sets, Relationships and Relationship Sets, Additional Features of the E-R Model, Conceptual Design with the E-R Model, Conceptual Design for Large Enterprises, ERD Case Studies.

UNIT–III : RELATIONAL MODEL

Introduction to the Relational Model, Integrity Constraints over relations, Enforcing Integrity Constraints, Querying Relational Data, Logical Database Design: ER to Relational, Introduction to Views, Destroying/Altering Tables and Views.

Relational Algebra and Calculus: Preliminaries, Relational Algebra Operators, Relational Calculus - Tuple and Domain Relational Calculus, Expressive Power of Algebra and Calculus.

UNIT–IV : SQL QUERIES, CONSTRAINTS AND TRIGGERS

Overview, The form of a Basic SQL Query, Union, Intersect and Except operators, Nested Queries, Aggregate Operators, Null values, Complex Integrity Constraints in SQL, Triggers and Active Databases, Designing Active Databases.

UNIT–V : SCHEMA REFINEMENT AND NORMAL FORMS

Introduction to Schema Refinement, Functional Dependencies, Reasoning about FDs, Normal Forms - 1NF, 2NF, 3NF, BCNF, Properties of Decompositions, Normalization, Schema Refinement in Database Design, Other Kinds of Dependencies - 4NF, 5NF, DKNF, Case Studies.

UNIT–VI : TRANSACTION MANAGEMENT

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Transaction Definition in SQL, Testing for Serializability.

UNIT –VII : CONCURRENCY CONTROL AND RECOVERY SYSTEM

Concurrency Control: Lock Based protocols, Time-Stamp Based Protocols, Validation based Protocols, Multiple Granularity, and Deadlock Handling.

Recovery System: Failure Classification, Storage Structure, Recovery and Atomicity, Log-Based Recovery, Shadow Paging, Recovery with Concurrent Transactions, Buffer Management, Failure with Loss of Non-volatile Storage, Advanced Recovery Techniques, Remote Backup Systems.

UNIT –VIII : OVERVIEW OF STORAGE AND INDEXING

Data on External Storage, File Organizations and Indexing, Index Data Structures, Comparison of File Organizations, Indexes and Performance Tuning.

Tree-Structured Indexing: Intuition for Tree Indexes, Indexed Sequential Access Method (ISAM), B+ Trees: A Dynamic Tree Structure.

TEXTBOOK:

1. Raghurama Krishnan, Johannes Gehrke, *Database Management Systems,* 3rd edition, Tata McGrawHill, 2007.

REFERENCE BOOKS:

1. Elmasri Navate, *Fundamentals of Database Systems,* Pearson Education,1994.
2. Abraham Silberschatz, Henry F.Korth, S.Sudarshan, *Database System Concepts,* 5th edition, McGraw-Hill, 2005.
3. Peter Rob and Carlos Coronel, *Database Systems Design, Implementation, and Management,* 7th edition, 2009.
4. Pranab Kumar Das Gupta, *Database Management System Oracle SQL and PL/SQL,* PHI Learning Private Limited, 2009.

IV B. Tech., II-Semester, EEE

L	T	P	C
4	1	-	4

10BT70521: OPERATING SYSTEM PRINCIPLES (ELECTIVE-III)

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Computer Architecture and Organisation of III B.Tech., I-Semester and Advanced Microprocessors and Microcontrollers of IV B.Tech., I-Semester

COURSE DESCRIPTION:

Operating Systems Overview; Process management; Concurrency and Synchronization; Deadlocks; Memory Management; File System; I/ O System; Protection and Security

COURSE OUTCOMES: on successful completion of the course a student will be able to

1. Gain knowledge on: Operating system functions and services, file system, memory management, security and protection.
2. Analyses skills on
   - CPU scheduling algorithms – FCFS, SJF, Priority and Round Robin
   - Disk Scheduling algorithms – FCFS, SSTF, Scan, CScan, Look, Clock
   - Memory Allocation algorithms – MFT, MVT
   - Page replacement algorithms – FIFO, Optimal, LFU, LRU
   - File and Directory maintenance.
3. Apply appropriate process synchronization techniques to real time problems.

DETAILED SYLLABUS:

UNIT-I : OPERATING SYSTEMS OVERVIEW

What operating systems do, operating systems operations, process management, memory management, storage management, protection and security, distributed systems, special purpose systems, operating systems structures: operating system services and systems calls.

UNIT-II : PROCESS MANAGEMENT

Process concepts and scheduling operations on processes, threads and inter process communication, scheduling criteria, scheduling algorithms.

UNIT-III : CONCURRENCY AND SYNCHRONIZATION

Process synchronization, critical-section problem, Peterson's solution, synchronization hardware, semaphores, classic problems of synchronization, monitors.

UNIT-IV : DEADLOCKS

System model, deadlock characterization, methods for handling deadlock, deadlock prevention, detection and avoidance, recovery form deadlock, Bankers algorithm.

UNIT-V : MEMORY MANAGEMENT

Logical versus physical address space, swapping, contiguous memory allocation, paging, segmentation, demand paging, performance of demand paging, page-replacement algorithms, thrashing.

UNIT-VI : FILE SYSTEM

File System interface: Concept of a file, access methods, directory structure, file system mounting, file sharing, protection.

File system implementation: File system structure, file system implementation, directory implementation, allocation methods, free-space management.

UNIT-VII : I/O SYSTEM

Mass-storage structure: Overview of mass-storage structure, disk structure, disk attachment, disk scheduling algorithms, swap-space management, RAID structure, stable-storage implementation, tertiary storage structure.

UNIT-VIII : SECURITY

The security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, firewalling to protect systems and networks.

TEXT BOOK:

1. Peter Baer Galvin Abraham Silberchatz, Greg Gagne, *Operating System Principles*, 7th edition, John Wiley.

REFERENCE BOOKS:

1. Stallings, *Operating Systems: Internals and Design Principles*, 5th edition, Pearson Education, 2008.
2. Andrew S. Tanenbaum, *Modern Operating Systems,* 2nd edition, Prentice Hall India.
3. Crowley, *Operating System A Design Approach,* 2nd edition, Tata McGraw-Hill.
4. Dhamdhere, *Operating Systems,* Tata McGraw-Hill, 2006.

IV B. Tech., II-Semester, EEE

10BT71301: NEURAL NETWORKS AND FUZZY SYSTEMS (ELECTIVE-III)	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: —

COURSE DESCRIPTION:

Introduction to biological neuron; characteristics of ANN; perceptron models and learning rules; feedback and counter propagation networks; General Concepts of Associative Memory; Introduction to classical sets and Fuzzy sets; Properties of Membership Functions- Fuzzification and defuzzification; fuzzy rule base systems; applications of neural networks and fuzzy systems.

COURSE OUTCOMES: on successful completion of the course a student will be able to

1. demonstrate knowledge in:
   - various Artificial Neural Network configurations.
   - concepts of various associative memories and their training algorithms.
   - concepts of crisp and fuzzy sets.
   - membership functions, development of rule base and decision making systems.
2. analyze various algorithms to obtain the optimal solution.
3. design fuzzy logic controllers.
4. skills to
   - Identify and select suitable algorithms, neural networks for optimization of an objective function.
   - Formulate rule base to develop a fuzzy logic controller.
5. apply different neural networks and fuzzy logic for real time applications

DETAILED SYLLABUS:

UNIT-I : INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS

Introduction, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Characteristics of ANN, McCulloch-Pitts Model, Types of Neuron Activation Function, ANN Architectures, Supervised, Unsupervised, Reinforced Learning, Potential applications to ANN.

UNIT-II : FEED FORWARD NETWORKS

Perceptron Models, Learning Rules, Hebbian Learning Rule, Perceptron Learning Rule, Delta Learning Rule, Back propagation, Architecture, Calculation of error, Training algorithm, Applications, Kohenen Self organizing Feature map, Architecture, Training, Learning Vector Quantizer (LVQ).

UNIT-III : FEEDBACK AND COUNTER PROPAGATION NETWORKS

Hopfield network, Architecture, Training algorithm, Application. Full Counter Propagation Network (Full CPN), Architecture, Training Phases of Full CPN, Training Algorithm, Application.

UNIT-IV : ASSOCIATIVE MEMORIES

General Concepts of Associative Memory, Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms, Basic architecture BAM Energy Function, Adaptive resonant Theory, ART1, ART2, Architecture, Algorithm, Applications.

UNIT-V : CLASSICAL AND FUZZY SETS

Introduction to classical sets, properties, Fuzzy sets, Membership functions, Classical Relations and Fuzzy Relations, Composition.

UNIT-VI : FUZZY LOGIC SYSTEM COMPONENTS

Properties of Membership Functions, Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification, methods, α-cuts for Fuzzy Relations, Extension principle.

UNIT-VII : FUZZY SYSTEMS

Natural Language, Linguistic Hedges, Fuzzy (Rule-Based) Systems, Graphical Techniques of Inference, Fuzzy Control Systems, Control System Design Problem, Simple Fuzzy Logic Controllers-Examples.

UNIT-VIII : NEURAL NETWORK AND FUZZY APPLICATIONS

Neural network applications: Load forecasting, Process identification, control and fault diagnosis (Image Processing).
Fuzzy logic applications: Temperature control, Cruise control application, Air conditioner control, DC motor speed control.

TEXT BOOKS:

1. S. Rajasekharan and G. A. Vijayalakshmi Pai, *Neural Networks, Fuzzy Logic, Genetic Algorithms: Synthesis and Applications*, PHI Publication, 2004.
2. Timothy J. Ross, *Fuzzy Logic with Engineering Applications*, McGraw-Hill Inc. 1997

REFERENCE BOOKS:

1. Simon Haykin, *Neural Networks- A Comprehensive Foundation,* Pearson Education, 2001.
2. S.N.Sivanandam, S.Sumathi,S. N. Deepa, *Introduction to Neural Networks using MATLAB 6.0,* TMH, 2006.
3. Philip D.Wasserman, *Neural Computing*, Wiley Publications.

IV B. Tech., II-Semester, EEE

	L	T	P	C
10BT4EC01: OPTIMIZATION TECHNIQUES (ELECTIVE-III)	**4**	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Engineering Mathematics of I B.Tech.,

COURSE DESCRIPTION:

Introduction to Optimization Techniques; single variable optimization: solution by method of lagrange multipliers; Standard form of a linear programming problem; Transportation Problem and Convex Programming; classification of One–dimensional minimization methods; Unconstrained Optimization Techniques; introduction to dynamic programming.

COURSE OUTCOMES: on successful completion of the course a student will be able to

1. demonstrate knowledge on:
   - linear programming problem
   - classical optimization techniques
   - transportation and assignment techniques
   - non-linear programming techniques for constrained and un-constrained problems
   - dynamic programming problems
2. analyze
   - optimal criteria for equality and inequality constraints for LP problems.
   - Optimal criteria for multi decision process
3. demonstrate skill in designing Kuhn-tucker optimal conditions, principle of optimality for multi decision process.
4. demonstrate skills in evaluating LP problems using graphical, simplex, transportation, branch & bound technique, Fibonacci method, steepest descent methods and dynamic programming methods.

DETAILED SYLLABUS:

UNIT-I : INTRODUCTION TO OPTIMIZATION TECHNIQUES

Statement of an optimization problem, design vector, design constraints, constraint surface, objective function, objective function surfaces, classification of optimization problems.

UNIT-II : CLASSICAL OPTIMIZATION TECHNIQUES

Single variable optimization, multi variable 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 constraints, Kuhn - Tucker conditions.

UNIT-III : INTRODUCTION TO LINEAR PROGRAMMING

Standard form of a linear programming problem, geometry of linear programming problems, definitions and theorems, solution of a system of linear simultaneous equations, pivotal reduction of a general system of equations, motivation to the simplex method, simplex algorithm, big M-method, dual simplex algorithm.

UNIT-IV : TRANSPORTATION PROBLEM AND CONVEX PROGRAMMING

Finding initial basic feasible solution by North-West corner rule, least cost method and Vogel's approximation method, Assignment problems, variants, Integer Programming, Branch and bound technique, Convex programming.

UNIT-V : UNCONSTRAINED NONLINEAR PROGRAMMING:

One-dimensional minimization methods: Classification, Fibonacci method, Problems and Quadratic interpolation method, Problems.

UNIT-VI : UNCONSTRAINED OPTIMIZATION TECHNIQUES

Univariate method, Problems, Powell's Method, Conjugate directions, Algorithms, Problems, Steepest Descent (Cauchy) Method, Problems.

UNIT-VII : CONSTRAINED NONLINEAR PROGRAMMING

Characteristics of a constrained problem, classification, basic approach of penalty function method; basic approaches of interior and exterior penalty function methods.

UNIT-VIII : DYNAMIC PROGRAMMING

Dynamic programming, multistage decision processes, types, concept of sub optimization and the principle of optimality, computational procedure in dynamic programming, examples illustrating the calculus method of solution, examples illustrating the tabular method of solution.

TEXT BOOKS:

1. S. S. Rao, Engineering optimization: Theory and practice, 3rd edi tion, New Age International (P) Limited, 1998.
2. S.D. Sharma, Operations Research, Kedarnath Ram Nath and Co. Publications, Meerut, 2003.

REFERENCE BOOKS:

1. H.A. Taha, Operations Research: An Introduction, 6th edition, Prentice Hall India Pvt. Ltd.
2. Kanthi Swaroop, Gupta and Mohan, Introduction to Operations Research, 2006.

IV B. Tech., II-Semester, EEE	L	T	P	C
10BT80201: EHVAC TRANSMISSION (ELECTIVE-IV)	**4**	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Electromagnetic Fields of II B.Tech., II-Semester and Electrical Power Transmission of III B.Tech., I-Semester

COURSE DESCRIPTION:

Advantages and problems associated with EHVAC transmission; line inductance and capacitance calculations; introduction to electrostatics; corona effects: power loss, audible noise and radio interference; calculation of electrostatic field of EHVAC lines; shunt and series compensation; Design of EHV lines based on steady state and transient limits.

COURSE OUTCOMES: on successful completion of the course a student will be able to

1. demonstrate knowledge on:
   - EHVAC conductor parameters, configurations, electrical and mechanical aspects for design and analysis.
   - Corona inference, effects and relevant parameters in EHVAC systems.
   - Electrostatic field interference and effects.
   - Voltage control methods in EHVAC system.
2. analyze
   - various electrical parameters of different conductor configurations.
   - various parameters of corona phenomenon in EHVAC system.
3. demonstrate skill in design of EHV lines and cables based on steady state and transient limits.
4. demonstrate skills in evaluating various electrical and relevant parameters of different conductor configurations in EHVAC system.

DETAILED SYLLABUS:

UNIT-I : PRELIMINARIES

Necessity of EHVAC transmission advantages and problems, power handling capacity and line losses, mechanical considerations, resistance of conductors, properties of bundled conductors, bundle spacing and bundle radius, examples.

UNIT-II : LINE AND GROUND REACTIVE PARAMETERS

Line inductance and capacitance, sequence inductances and capacitances, modes of propagation, ground return, examples.

UNIT-III : VOLTAGE GRADIENTS OF CONDUCTORS

Electrostatics, field of sphere gap, field of line charges and properties, charge, potential relations for multi-conductors, surface voltage gradient on conductors, distribution of voltage gradient on sub-conductors of bundle, examples.

UNIT-IV : CORONA EFFECTS - I

Power loss and Audible Noise (AN), corona loss formulae, charge voltage diagram, generation, characteristics, limits and measurements of AN, relation between 1-phase and 3-phase AN levels, examples.

UNIT-V : CORONA EFFECTS - II

Radio Interference (RI), corona pulses generation, properties, limits, frequency spectrum, modes of propagation, excitation function, measurement of RI, RIV and excitation functions, examples.

UNIT-VI : ELECTROSTATIC FIELD

Calculation of electrostatic field of EHVAC lines, effect on humans, animals and plants, electrostatic induction in unenergised circuit of double circuit line, electromagnetic interference, examples.

UNIT-VII : POWER FREQUENCY VOLTAGE CONTROL AND OVER VOLTAGES IN EHV LINES

No load voltage, charging currents at power frequency, voltage control, shunt and series compensation, static VAR compensation.

UNIT-VIII : DESIGN OF EHV LINES AND EHV CABLES

Design of EHV lines based on steady state and transient limits, EHV cables and their characteristics.

TEXT BOOK:

1. Rakosh Das Begamudre, *Extra High Voltage AC Transmission Engineering*, 3rd Edition, New Age International Pvt. Ltd, 2006.

REFERENCE BOOKS:

1. Edison Electric Institution (GEC), *EHV Transmission Line Refer ence Book*, Edison House, 1986.
2. S. Rao, *EHVAC, HVDC Transmission and Distribution Engineering*, Khanna Publishers, 2001.

IV B. Tech., II-Semester, EEE

10BT80202: DISTRIBUTION OF ELECTRICAL POWER (ELECTIVE-IV)	**L**	**T**	**P**	**C**
	4	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Electrical Power Transmission of III B.Tech., I-Semester

COURSE DESCRIPTION:

Introduction to distribution systems; Design Considerations of Distribution Feeders; Voltage drop and power-loss calculations; protection of distribution systems; Different types of power capacitors and their effects; Quality of Service and Voltage Standards; Distribution System Planning-load forecasting; Distribution System Automation

COURSE OUTCOMES: on successful completion of the course a student will be able to

1. demonstrate knowledge on:
   - different types of loads and distribution feeders.
   - different parameters and protection schemes for distribution feeders
   - planning, operation and automation of distribution system.
2. analyze
   - different feeder configurations.
   - optimal capacitor placement.
   - voltage control in different feeder system.
   - techniques in planning and load forecasting.
3. demonstrate skill in
   - evaluating load parameters of different types of loads.
   - evaluating voltage drop, losses and fault levels in distribution system.
   - evaluating optimal capacitor size and location in distribution system.

DETAILED SYLLABUS:

UNIT-I : GENERAL CONCEPTS

Introduction to distribution systems, load modeling and characteristics, coincidence factor, contribution factor, loss factor, relationship between the load factor and loss factor, classification of loads (residential, commercial, agricultural and industrial) and their characteristics.

UNIT-II : DISTRIBUTION FEEDERS

Design considerations of distribution feeders, radial and loop types of primary feeders, voltage levels, feeder loading - basic design practice of the secondary distribution system.

UNIT- III : SYSTEM ANALYSIS

Voltage drop and power loss calculations, derivation for voltage drop and power loss in lines, manual methods of solution for radial networks, three phase balanced primary lines, non three phase primary lines and load flow analysis of systems.

UNIT-IV : DISTRIBUTION SYSTEM PROTECTION

Types of common faults and procedure for fault calculation, objectives of distribution system protection, principle of operation of fuses, circuit reclosers, line sectionalizer and circuit breakers, coordination of protective devices.

UNIT-V : APPLICATION OF CAPACITORS IN DISTRIBUTION SYSTEM

Different types of power capacitors, shunt and series capacitors, effect of shunt capacitors (fixed and switched) for power factor correction, economic justification for capacitors, procedure to determine the optimum capacitor allocation.

UNIT-VI : VOLTAGE CONTROL

Quality of service and voltage standards, voltage fluctuations, voltage control, feeder voltage regulators, effect of series capacitors, effect of AVB/AVR, line drop compensation.

UNIT-VII : DISTRIBUTION SYSTEM PLANNING

Factors affecting system planning, load forecasting, classification of load forecasting, substation expansion, distribution system planning models, present distribution system planning techniques.

UNIT-VIII : AUTOMATION AND REAL TIME MANAGEMENT

Need for distribution automation, distribution system automation, distribution automation and control functions, communication in distribution system, distribution management, functions of DMS, distribution automation and management functionalities.

TEXT BOOKS:

1. Turan Gonen, *Electric Power Distribution System Engineering*, McGraw-Hill Book Company, 1986.
2. S. Sivanagaraju, V.Sankar, *Electrical Power Distribution and Automation*, Dhanpat Rai & Co, 2006.

REFERENCE BOOKS:

1. A.S. Pabla, *Electric Power Distribution,* 4th edition, Tata McGraw-Hill Publishing Company, 1997.
2. V. Kamaraju, *Electrical Power Distribution Systems,* Right Publishers, 2001.

IV B. Tech., II-Semester, EEE

	L	T	P	C
10BT80203: HIGH VOLTAGE ENGINEERING (ELECTIVE-IV)	**4**	**1**	**-**	**4**

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Electrical Measurements of II B.Tech., II-Semester and Switchgear and Protection of IV B.Tech., I-Semester

COURSE DESCRIPTION:

Types of insulators and their applications; breakdown process in solid, liquid and gaseous dielectrics; generation of high DC and AC voltages, impulse voltages and currents; measurement of high voltage, current, resistivity, dielectric constant and loss factor; testing of electrical apparatus.

COURSE OUTCOMES: on successful completion of the course a student will be able to

1. demonstrate knowledge on:
   - various types of insulation and their behavior under voltage stress.
   - Generation and measurement of High voltages and currents.
   - testing of different electrical materials and apparatus.
2. analyze
   - breakdown phenomenon in different insulation systems.
   - different circuits for generation of high voltage and currents.
   - different methods of measuring high voltage quantities.
3. demonstrate skill in designing a circuit for measuring instruments.
4. demonstrate skills in evaluating
   - different parameters of insulation systems.
   - different parameters in measuring electrical quantities.

DETAILED SYLLABUS:

UNIT-I : INTRODUCTION TO HIGH VOLTAGE TECHNOLOGY AND APPLICATIONS

Electric field stresses, gas/vaccum as insulator, liquid dielectrics, solids and composites, estimation and control of electric stress, applications of insulating materials in transformers, rotating machines, circuit breakers, cable power capacitors and bushings.

UNIT-II : BREAKDOWN IN GASEOUS AND LIQUID DIELECTRICS

Gases as insulating media, collision process, ionization process, Townsend's criteria of breakdown in gases, and pachen's law, liquid as insulator, pure and commercial liquids, breakdown in pure and commercial liquids.

UNIT-III : BREAKDOWN IN SOLID DIELECTRICS

Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, breakdown in composite dielectrics, solid dielectrics used in practice.

UNIT-IV : GENERATION OF HIGH DC AND AC VOLTAGES

Generation of high DC voltages - rectifiers, voltage doubler circuits, voltage multiplier circuits, voltage drop and regulation, vandegraaf generators, electrostatic generators, generation of high alternating voltages-cascade transformers, resonant transformers, tesla coil - problems.

UNIT-V : GENERATION OF IMPULSE VOLTAGES AND CURRENTS

Generation of impulse voltages-impulse wave shapes theoritical representation, wave shape control, Marx circuit, components of multistage impulse generator. Generation of impulse currents, impulse current generator, tripping and control of impulse generator - problems.

UNIT-VI : MEASUREMENT OF HIGH VOLTAGES AND CURRENTS

Measurement of high direct current voltages, measurement of high voltages alternating and impulse, measurement of high currents-direct, alternating and impulse, oscilloscope for impulse voltage and current measurements.

UNIT-VII : NON-DESTRUCTIVE TESTING OF MATERIAL AND ELECTRICAL APPARATUS

Measurement of dc resistivity, measurement of dielectric constant and loss factor, partial discharge measurements.

UNIT-VIII : HIGH VOLTAGE TESTING OF ELECTRICAL APPARATUS

Testing of insulators and bushings, testing of isolators and circuit breakers, testing of cables, testing of transformers, testing of surge arresters, radio interference measurements.

TEXT BOOKS:

1. M.S. Naidu and V.Kamaraju, *High Voltage Engineering,* 4th edition, Tata McGraw-Hill Publications, 2008.
2. Elsevier E.Kuffel,W.S.Zaengl, J.Kuffel, *High Voltage Engineering: Fundamentals,* 2nd edition, 2005.

REFERENCE BOOKS:

1. C.L.Wadhwa, *High Voltage Engineering,* 2nd edition, New Age International (P) Limited, 2007.
2. Ravindra Arora and Wolfgang Mosch, *High Voltage Insulation Engineering,* New Age International (P) Limited, 1995.

IV B. Tech., II-Semester, EEE

L T P C

10BT80204: RELIABILITY ENGINEERING AND APPLICATIONS TO POWER SYSTEMS (ELECTIVE-IV)

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ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Power System Analysis of IV B.Tech., I-Semester

Basic Probability Concept, Elements of probability theory; definition of reliability and component reliability, reliability functions; Reliability evaluation of Non - Series-Parallel Systems configurations; Introduction to Markov Process & Markov chain; Generation system model; Frequency and duration concepts; Basic indices - Customer oriented indices

COURSE OUTCOMES: on successful completion of the course a student will be able to

1. demonstrate knowledge on
   - elements of probability theory and probability distributions
   - types of failures, reliability block diagram reductions.
   - network reduction techniques and markov modelling
   - generation and load modelling
   - frequency and duration techniques
   - distribution system reliability indices
2. analyze
   - the various probability distributions and failure rates.
   - The network reduction techniques
   - LOLP, LOLE indices.
   - Methods for identifying critical components
   - cumulative probability cumulative frequencies
   - Customer, load and energy oriented indices
3. design
   - protection system for reliability enhancement
   - preventive and operational measures to improve system performance.
4. evaluate the power system networks using reliability concepts for adequacy and security
5. application of modern tools for power system reliability assessment.

DETAILED SYLLABUS:

UNIT-I : BASIC PROBABILITY THEORY

Probability concept, elements of probability theory, random variables (continuous, discrete variables), density function and distribution functions, mean, standard deviation, variance, probability distributions: Exponential distribution, Binomial distribution, Poisson distribution, Normal distribution, Weibull distribution, Log Normal distribution.

UNIT-II : RELIABILITY FUNCTIONS

Definition of reliability, component reliability, hazard rate, derivation of the reliability function in terms of the hazard rate, Bath tub curve, MTTF, MTTR, MTBF, types of failures (early failures, chance failures and wear-out failures), reliability block diagrams, series and parallel systems, series-parallel systems, parallel-series systems.

UNIT-III : NETWORK MODELING

Reliability evaluation of non series-parallel systems configurations, cut-set, basic cut-set, Tie-set, and basic Tie-set, minimal cut-set, minimal Tie-set and decomposition methods, deduction of the minimal cut-sets from the minimal paths, standby redundant systems, concept of redundancy, perfect switching, imperfect switching, event trees.

UNIT-IV : MARKOV MODELING

Introduction, Markov process and Markov chain, STPM, time dependant probability, functions, evaluating limiting state probabilities, Markov process, one component repairable model, two component repairable model, three component repairable model.

UNIT-V : GENERATION SYSTEM RELIABILITY ANALYSIS

Introduction, generation system model, identical units,determination of capacity outage probability table, determination of transitional rates, non-identical units, determination of capacity outage probability table, reducing the states by combining equal capacity states, determination of transitional rates, sequential addition method, recursive relation for unit addition, unit removal, LOLP , LOLE determination.

UNIT-VI : FREQUENCY AND DURATION TECHNIQUES

Frequency and duration concepts, two components repairable model (with identical components), evaluation of cumulative probability, cumulative frequency and equivalent transition rates.

UNIT-VII : COMPOSITE SYSTEM RELIABILITY ANALYSIS

Two level representation of daily load modeling, merging of generation and load models, evaluation of probabilities, transitional rates, decomposition method, weather effects on transmission lines-circuit breaker model.

UNIT-VIII : DISTRIBUTION SYSTEM AND RELIABILITY ANALYSIS

Basic indices, customer oriented indices, load and energy indices, radial networks - problems.

TEXT BOOKS:

1. Roy Billinton and Ronald N Allen, *Reliability Evaluation of Engineering Systems*, Plenum Press, New York and London (BS Publications, Revised edition), 2007.
2. Roy Billinton and Ronald N Allen, R*eliability Evaluation of Power Systems,* Plenum Press, New York and London 2nd edition (BS Publications, Revised edition), 2007.

REFERENCE BOOKS:

1. Charles E. Ebeling, *An Introduction to Reliability and Maintainability Engineering*, Tata McGraw-Hill edition, 2000.
2. LS Sainath, *Reliability Engineering*, 3rd edition, Affiliated East West Pvt. Ltd., 1991.
3. Balaguru Swamy, *Reliability Engineering*, Tata McGraw-Hill edition, 1984.

IV B. Tech., II-Semester, EEE

10BT80211: COMPREHENSIVE VIV-VOCE

L	T	P	C
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ASSESSMENT:

INTERNAL MARKS	EXTERNAL MARKS	TOTAL
100 Marks	-	100 MARKS

PREREQUISITES: All courses of the program.

COURSE DESCRIPTION: Assessment of student learning outcomes

COURSE OUTCOMES: Comprehensive Viva-Voce enables a successful student to

1. To assimilate the knowledge from various sources and present a unified stance.
2. To confidently present ideas in front of mixed audience
3. To exhibit awareness about ethics, group work and environmental care

IV B. Tech., II-Semester, EEE

10BT80212: PROJECT WORK

L	T	P	C
-	-	12	12

ASSESSMENT:

INTERNAL EVALUATION	EXTERNAL EVALUATION	TOTAL
75 MARKS	150 MARKS	225 MARKS

PREREQUISITES: All the courses of the program up to IV B. Tech. – I Semester.

COURSE DESCRIPTION:
Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

COURSE OUTCOMES: On completion of project work the student will be able to

1. Acquire in-depth knowledge in the areas of project topic.
2. Analyze critically chosen project topic for substantiated conclusions.
3. Design solutions for the project topic chosen.
4. Undertake investigation of project results providing valid conclusions.
5. Use the appropriate techniques, resources and modern engineering tools necessary for project work.
6. Apply project results for sustainable development of the society.
7. Understand the impact of project results in the context of environmental sustainability.
8. Understand professional and ethical responsibilities for sustainable development of society in chosen field of project.
9. Function effectively as individual and a member in the project team.
10. Develop communication skills, both oral and written for preparing and presenting project reports.
11. Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.
12. Engage in lifelong learning to improve knowledge and competence in the chosen field of project.

Rules of Disciplinary Action for Malpractice/Improper conduct in Examinations

S. No.	Nature of Malpractice / Improper Conduct	Rule No.	Punishment
1.	Possession of unauthorised material in printed or handwritten form or electronic devices	Rules 1(a), 1(b)	Expulsion from the examination hall and cancellation of examination in that subject. If any outside person involves and helps the candidate for malpractice, the outside person is handed over to the police and a case is registered.
2.	If the candidate copies evidently from various sources like, hand written material, typewritten or Photostat material, writing on body arms or clothes, writing with pen/pencil on calculators, scales, hall ticket, rubber etc.	Rule 2	Expulsion from the examination hall and cancellation of exam in that subject and all other subjects the candidate has appeared, including practical examinations and project work. He/she shall not be permitted to appear for the remaining examinations.
3.	If any person impersonates the other candidate in the examination.	Rule 3	If the person is a student of the College he shall be expelled from examination and debarred. He shall forfeit the seat. The performance of the original candidate is cancelled for that series of examination and debarred for two semesters. If the person is an outsider, he/she shall be handed over to the police and a case is registered.
4.	If the candidate attempts to steal/mutilate/damage (or) tries to send out the answer book (or) Takes out (or) arranges to send out the question paper during the examination.	Rule 4	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared, including practical examinations and project work. He/she shall not be permitted for the remaining examinations of the courses in that semester/year. The candidate is also debarred for two consecutive semesters. **This matter shall be reported to police and a case is registered**

5.	If the candidate uses objectionable, abusive or offensive language in the answer paper, or writes to the examiner requesting him to award pass marks.	Rule 5	Cancellation of the perfor-mance in that course.
6.	If the candidate refuses to obey the examination authorities (or) misbehaves (or) creates disturbance of any kind in and around the examina-tion hall (or) organizes a walk out, (or) threatens (or) assaults the invigilator and indulges in the act of misconduct, destruction of property on the campus.	Rule 6	In case of students of the college, they shall be expelled from examination and their examination performance stands cancelled. In case of outsiders, they will be handed over to the police and a case is registered against them.
7.	If the candidate possesses any lethal weapon or firearm in the examination hall.	Rule 7	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared, including practical examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. **This matter shall be reported to police and a case is registered**
8.	If a student of the College, who is not a candidate for the particular exam or any person not connected with the College indulges in any malpractice or improper conduct mentioned in clauses 6 and 7.	Rule 8	For student of the College expulsion from the examination hall and cancellation of the performance in that series of examination. The candidate is also debarred and forfeits the seat. For persons who do not belong to the college will be handed over to the police and a case is registered.

9.	If the candidate comes in an intoxicated/inebriated condition to the examination hall.	Rule 9	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared, including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year
10.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Rule 10	Cancellation of the performance in that subject and all other subjects the candidate has appeared, including practical examinations and project work of that semester/year examinations.
11.	If any malpractice is detected which is not covered in the clauses 1 to 10 above, shall be brought to the notice of the Chief Controller of Examinations.		

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

Sree Sainath Nagar, A.Rangampet, Near Tirupati - 517 102. A.P.

Salient Features of Prohibition of Ragging in Educational Institutions Act 26 of 1997

- Ragging within or outside the College is prohibited.
- Ragging means doing an act which causes or is likely to cause insult or annoyance or fear or apprehension or threat or intimidation or outrage of modesty or injury to a student

Nature of Ragging	Punishment
Teasing, Embarrassing and humiliating	Imprisonment up to 6 months or fine up to Rs. 1,000/- or Both
Assaulting or using criminal force or criminal intimidation	Imprisonment up to 1 year or fine up to Rs. 2,000/- or Both
Wrongfully restraining or confining or causing hurt	Imprisonment up to 2 years or fine up to Rs. 5,000/- or Both
Causing grievous hurt, Kidnapping or rape or committing unnatural offence	Imprisonment up to 5 years or fine up to Rs. 10,000/-
Causing death or abetting suicide	Imprisonment up to 10 years or fine up to Rs. 50,000/-

Note:

1. A student convicted of any of the above offences, will be expelled from the College.
2. A student imprisoned for more than six months for any of the above offences will not be admitted in any other College.
3. A student against whom there is prima facie evidence of ragging in any form will be suspended from the College immediately.
4. The full text of Act 26 of 1997 **and** UGC Regulations on Curbing the Menace of Ragging in Higher Educational Institutions, 2009 **(Dated 17th June, 2009) are placed in the College library for reference.**