RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

AUTONOMOUS

NANDYAL-518501, KURNOOL DIST., A.P., INDIA

ELECTRICAL AND ELECTRONICS ENGINEERING

ESTD: 1995

Applicable for students admitted into B.Tech (Regular) from 2010-11
&
B.Tech (Lateral Entry Scheme) from 2011-12

ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABUS

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGG & TECHNOLOGY, NANDYAL

AUTONOMOUS

ELECTRICAL AND ELECTRONICS ENGINEERING

NANDYAL-518501, KURNOOL DIST., A.P., INDIA

(Affiliated to J.N.T.U.A, Anantapur)

ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABUS

B.Tech (Regular) from 2010-11 and B.Tech (Lateral Entry Scheme) from 2011-12

For pursuing four year under graduate Bachelor Degree Programme of study in Engineering (B.Tech), Two year Master (post graduate) Degree of study in Engineering (M.Tech),Two year Master (post graduate) degree of study in Business Administration (MBA),Three year Master (post graduate) Degree of study in Computer Applications (MCA) offered by Rajeev Gandhi Memorial College of Engineering and Technology, Nandyal - 518501 under Autonomous status and herein referred to as RGMCET(Autonomous):

All the rules specified herein approved by the Academic Council will be in force and applicable to students admitted from the Academic Year 2010-11 onwards. Any reference to "Institute" or "College" in these rules and regulations stands for Rajeev Gandhi Memorial College of Engineering and Technology (Autonomous).

All the rules and regulations, specified here after shall be read as a whole for the purpose of interpretation as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, the Principal, Rajeev Gandhi Memorial College of Engineering and Technology shall be the Chairman, Academic Council.

The candidate seeking admission into the first year of study of four year B.Tech degree Programme should have

i) Passed either Intermediate Public Examination (IPE) conducted by the Board of Intermediate Education, Andhra Pradesh with Mathematics, Physics and Chemistry as optional subjects (or any equivalent examination certified by Board of Intermediate Examinations) or a Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Andhra Pradesh (or any equivalent certified by State Board of Technical Education) for admission.

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

Admission Procedure:

As per the norms of A.P. State Council of Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made to the first year of Four year B.Tech. Degree programme as follows:-

a) As per the norms of Government of Andhra Pradesh, A-Category (based on the rank obtained in EAMCET) seats will be filled by the Convener, EAMCET.

b) As per the norms of Government of Andhra Pradesh, B-Category seats will be filled by the management.

Admission to the Second year of Four year B.Tech Degree Programme in Engineering:

i) Candidates qualified in ECET and admitted by the Convener, ECET, in such cases for admission, when needed permission from the statutory bodies are to be obtained.

ii) 10% of the sanctioned strength in each programme of study (of RGMCET) shall be filled by the Convener, ECET as lateral entry.

List of Programmes offered

1) B.Tech – Regular (& Lateral Entry)
2) M.Tech – Regular
3) MBA – Regular
4) MCA – Regular

1. Academic Regulations for 2010 B.Tech (Regular)

(Effective for the students admitted into the I year from the Academic Year 2010-2011)

The B.Tech Degree will be conferred by the Jawaharlal Nehru Technological University, Anantapur, to students who are admitted to the program and fulfil all the requirements for the award of the Degree as specified below.

1.0 Award of B.Tech. Degree

The student will be declared eligible for the award of the B. Tech. degree if he fulfils the following academic regulations:

1.1) Pursued a course of study for not less than prescribed course work duration and not more than double the prescribed course work duration.

1.2) Registered for 240 credits and secured 232 credits with compulsory subjects as listed in Table-1 below.

Table 1: Compulsory Subjects

S.No	Subject Particulars
1.	All the first year subjects
2.	All practical subjects
3.	All audit courses/soft skills/open electives
4.	Mini project
5.	Seminar
6	Comprehensive viva voce
7.	Project work

2.0 Forfeit of seat

Students, who fail to fulfil all the academic requirements for the award of the degree within **eight academic years** from the year of their admission, shall forfeit their seat in B.Tech course.

3.0 Courses of study

The following courses of study are offered at present as specializations for the B.Tech. Course

1. Civil Engineering.
2. Computer Science and Engineering.
3. Electrical and Electronics Engineering.
4. Electronics and Communication Engineering.
5. Electronics and Instrumentation Engineering.
6. Information Technology.
7. Mechanical Engineering.

and any other course as approved by the authorities of the University from time to time.

Table 2: Credits

	I Year				Semester			
	Periods /Week	Credits	Internal Marks	External Marks	Periods /Week	Credits	Internal Marks	External Marks
Theory	02	04	30	70	04	04	30	70
	03	05	30	70				
	03+1*	05						
	03+1*	06						
Practical	03	03	25	50	03	02	25	50
Practical / Drawing	03+1*	02			06	04		
	06	06	30	70			30	70
Open Electives/Audit courses /Soft skills courses	03					02**	100	
Mini Project						02		50
Seminar						02	50	
Comprehensive Viva-voce						04		50
Project	-	-				12	50	100

[*Tutorial,

****Open Electives/Audit courses/Soft skills course credits will not be considered for the award of division. However all these courses have to be cleared through Internal evaluation by scoring minimum of 40%.The credits obtained in these courses will be taken in to account for award of degree.]**

4.0 Distribution and Weightage of Marks

4.1 The performance of the student in each semester / I year shall be evaluated subject – wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition, mini-project, comprehensive viva, seminar shall be evaluated for 50 marks each and the project work shall be evaluated for 150 marks.

4.2 For theory subjects the distribution shall be 30 marks for Internal Evaluation (25 marks for internal test and 05 marks for assignments) and 70 marks for the End-Examination.

4.3 For the semester system, during the semester there shall be 2 tests for theory subjects. In each Internal test there shall be one compulsory (short answers) question and 3 descriptive questions. The duration of internal test will be for 2 hrs. First test to be conducted in 1 – 3 units and second test to be conducted in 4 - 6 units of each subject. For awarding of 25 Internal marks the performance of the student in two Internal examinations conducted one in the middle of the semester and the other towards the end of the semester giving a weightage of 0.75 for the better score and 0.25 for the other score will be considered. There shall be two assignments (problem based) in each semester for award of 05 marks so that Internal component (marks) will be 30 marks (25 marks for Internal test+05 marks for assignments).

4.4 For the I year class which shall be on yearly basis, there shall be 3 tests. For awarding of 25 Internal marks the performance of the student in three Internal examinations conducted as per the schedule giving a weightage of 0.5 for the best score, 0.25 for better score and 0.25 for the other score will be considered. The distribution of syllabus for the conduct of Internal tests in the first year shall be as follows:

Table 3: Units for Internal Tests

I Year		Semester	
2 Units	**First Internal test.**	**3 Units**	**First Internal test.**
3 Units	**Second Internal test.**	**3 Units**	**Second Internal test.**
3 Units	**Third Internal test.**		

In a year there shall be at least three assignments and in each semester there shall be two assignments for the award of 5 marks.

4.5 In the case of open electives/Audit courses and soft skills subjects two Internal examinations shall be conducted one in the middle of the semester and the other at end of the semester for 70 marks and the marks scored by the student in these exams with a weightage of 0.75 for better score and 0.25 for the other score will be awarded as Internal marks for 70. The remaining 30 marks are based on the average marks scored in two assignments.

4.6 No makeup test for Internal examination or assignments will be conducted in any subject or practical. The student, who is absent for any test shall be deemed to have scored zero in that test.

5.0 Question Paper Pattern:

5.1 Each Internal Test question paper shall contain 5 questions, of which the First question is compulsory and three questions are to be answered from the remaining four. Compulsory question carries 10 marks (It contains 5 questions of two marks - no choice in first question). The remaining 3 questions carry 5 marks each.

5.2 The End Examination question paper will have 7 questions and students have to write 5 questions. However, the first question is compulsory and it consists of 7 short answer questions, each carrying 2 marks. The next 4 questions are to be answered from the remaining 6 questions and each carries 14 marks.

5.3 For practical subjects there shall be a continuous evaluation during the semester for 25 Internal marks and 50 End Examination marks. Of the 25 marks for Internal, 20 marks shall be awarded for day-to-day work and 5 marks to be awarded by conducting an Internal laboratory test. The End Examination shall be conducted by the teacher concerned and an external Examiner from other institutions.

5.4 For the subject having design and / or drawing, (such as Engineering Graphics, Machine Drawing etc) and estimation, the distribution shall be 30 marks for Internal evaluation (15 marks for day-to-day work

and 5 marks for Internal tests and 10 marks for assignments) and 70 marks for End Examination. There shall be two Internal tests in a Semester and the best of the two shall be considered for the award of marks for Internal tests. However in the I year class, there shall be three Internal tests and the average of best two will be taken into consideration for award of Internal marks.

5.5 The Engineering Drawing Practice Lab, wherever offered is to be treated as a theory subject. Evaluation method adopted for theory subjects shall be followed here as well.

5.6 There shall be mini-Project, in collaboration with an industry (wherever possible) of their specialization, to be taken up during the vacation(data collection, components etc) after III year II Semester examination and implementation/simulation shall be carried out in IV first semester during lab classes. Implementation or construction of mini project will be treated as laboratory. However, the mini project and its report shall be evaluated in IV year I Semester. The mini project shall be submitted in report form and should be presented before the committee, which shall be evaluated for 50 marks. The committee consists of an external Examiner, Head of the Department, the supervisor of mini project and a senior faculty member of the Department. There shall be 25 Internal marks for mini project which will be awarded based on the performance and involvement of the student during mini project period.

5.7 There shall be a seminar presentation in IV year II semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the Department, which shall be evaluated by the Departmental committee consisting of Head of the Department, seminar supervisor and a senior faculty member of the department. The seminar report shall be evaluated for 50 marks. There shall be no external examination for seminar.

5.8 There shall be a comprehensive viva voce examination at the end of IV year II semester for 50 marks which shall be conducted by HOD, senior faculty and external Examiner from other institute.

5.9 The project topic should be approved by Internal Department Committee (IDC). Out of total 150 marks for the project work, 50 marks shall be for Internal Evaluation and 100 marks for the End Semester Examination. The evaluation of project work shall be conducted at the end of the IV year II semester. The project viva voce examination will be conducted by committee consists of an external Examiner from other institute, Head of the Department and the supervisor of the project. The Internal evaluation for 50 marks shall be on the basis of two seminars given by each student on the topic of the project. The Internal evaluation of the project work for 50 marks shall be conducted by committee consists of head of the Department or his nominee, senior faculty member and the supervisor of project.

Table4: Distribution of weightages for examination and evaluation:

S.No	Nature of subject	Marks	Type of examination and mode of assessment		Scheme of Examination
1	Theory	70	End Examination (External evaluation)		End Examination in theory subjects will be for 70 marks.
		30	25	Internal examinations (Internal evaluation)	These 25 marks are awarded to the students based on the performance in three(yearly) or two(semester) Internal examinations with a weightage of 0.5 for best score, 0.25 for better score, 0.25 for other score (yearly) and 0.75 for better score and 0.25 for the other score(semester) respectively.
			05	Assignments (Internal evaluation)	Average of two assignments each of 05 marks
2	practical	50	End lab examination (External evaluation)		This End Examination in practical subjects will be for a maximum of 50 marks.
		25	20	Internal evaluation	Day-to-day performance in lab experiments and record
			05	Internal evaluation	Internal lab examination at the end of year/semester
3	Mini Project	50	End Examination (External evaluation)		This End Examination in miniproject will be for a maximum of 50 marks.
		25	Internal evaluation		Day-to-day performance in executing mini project.
4	Seminar	50	Internal evaluation		Based on the performance in two seminars during semester
5	Comprehensive Viva	50	External evaluation		This end viva voce examinations in all the subjects for 50 marks
6	Project work	100	External evaluation		This end viva voce in project work for 100 marks
		50	Internal evaluation		These 50 marks are awarded based on the performance of the student which includes attendance and regularity
7	Open electives/ Audit courses/ softskills	70	Internal evaluation		These 70 marks are awarded to the students based on the performance of two Internal examinations with a weightage of 0.75 for better score and 0.25 for the other score
		30	Internal evaluation		Based on the two assignments

6.0 Attendance Requirements:

6.1 The student shall be eligible to appear for End Examinations of the semester/ year if he acquires a minimum of 75% of attendance in aggregate of all the subjects of that semester/year.

6.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in a semester / year may be granted by the College Academic Committee.

6.3 The student will not be promoted to the next semester unless he satisfies the attendance requirement of the present semester / year, as applicable. They may seek re-admission for that semester / year when offered next.

6.4 **Shortage of Attendance below 65% in aggregate shall in <u>NO</u> case be condoned.**

6.5 Students whose shortage of attendance is not condoned in any semester / year are not eligible to take their End Examination of that class and their registration shall stand cancelled.

6.6 The stipulated fee shall be payable towards Condonation of shortage of attendance.

7.0 Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.6

7.1 The student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical or design or drawing subject or project if he secures not less than 35% of marks in the End Examination and he has to score minimum of 40% marks from Internal and external exam marks put together to clear the subject.

7.2 The student shall be promoted from II to III year only if he fulfils the academic requirement of securing 40 out of 80 credits from one regular and one supplementary examinations of I year, and one regular examinations of II year I semester irrespective of whether the candidate takes the examination or not.

7.3 The student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing total 72 out of 144 credits from the following examinations, whether the candidate takes the examinations or not.

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

7.4 The student shall register and put up minimum attendance in all 240 credits and earn the 232 credits. Marks obtained in the best 220 credits (excluding the credits obtained in audit courses/soft skills and open electives) shall be considered for the calculation of percentage of marks.

7.5 Students who fail to earn 232 credits as indicated in the course structure including compulsory subjects as indicated in Table-1 within eight academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

Table 5: Promotion rules

Promotion from	Total credits to register	Total credits to be earned for promotion
II year to III year	80	40
III year to IV year	144	72

8.0 Course pattern:

8.1 The entire course of study is of four academic years. The first year shall be on yearly pattern and the second, third and fourth years shall be on semester pattern.

8.2 The student is eligible to appear for the End Examination in a subject, but absent at it or has failed in the End Examination may appear for that subject at the supplementary examination.

Table: 6 Course pattern

Year	Semester	No.of Subjects	No.of Audit subjects	Number of Labs	Total credits	
First year		O7 {ENG-4,EP-5,EC-5,M1-5, MM/EM-5,CDS-6,ED-6}	00	04	1X4=04 4X5=20 2X6=12 4X3=12	48
Second year	First	06	01	03	6X4=24 1X2=02 3x2=06	32
	Second	06	01	03	6X4=24 1X2=02 3x2=06	32
Third year	First	06	01	03	6X4=24 1X2=02 3x2=06	32
	Second	06	01	03	6X4=24 1X2=02 3x2=06	32
Fourth year	First	06	01	02 Mini project	6X4=24 1X2=02 3x2=06	32
	Second	03	01	Seminar Comprehensive Viva Project Viva	3x4 =12 1X2=02 1X2=02 1X4=04 1X12=12	32
					GRAND TOTAL	**240**

9.0 Award of Class:

After the student has satisfied the requirements prescribed for the completion of the programme and is eligible for the award of B.Tech. Degree he shall be placed in one of the following four classes:

Table 7: Award of Division

Class Awarded	% of marks to be secured	
First Class with Distinction	70% and above	From the aggregate marks secured for the best 220 Credits excluding audit courses/ open elective/soft skills credits.
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

(The marks in Internal evaluation and End Examination shall be shown separately in the marks memorandum)

10.0 Supplementary Examinations:

Apart from the regular End Examinations the institute may also schedule and conduct supplementary examinations for all subjects for the benefit of students with backlogs. Such students writing supplementary examinations as supplementary candidates may have to write more than one examination per day.

11.0 Transcripts:

After successful completion of prerequisite credits for the award of degree a Transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued if required after the payment of requisite fee and also as per norms in vogue.

12.0 Rules of Discipline:

12.2 Any attempt by any student to influence the teachers, Examiners, faculty and staff of controller of Examination for undue favours in the exams, and bribing them either for marks or attendance will be treated as malpractice cases and the student can be debarred from the college.

12.3 When the student absents himself, he is treated as to have appeared and obtained zero marks in that subject(s) and grading is done accordingly.

12.4 When the performance of the student in any subject(s) is cancelled as a punishment for indiscipline, he is awarded zero marks in that subject(s).

12.4.1 When the student's answer book is confiscated for any kind of attempted or suspected malpractice the decision of the Examiner is final.

13.0 Minimum Instruction Days:

The minimum instruction days for each semester / I year shall be 95/180 clear instruction days excluding the days allotted for tests/examinations and preparation holidays declared if any.

14.0 Amendment of Regulations:

The college may, from time to time, revise, amend or change the regulations, scheme of examinations and syllabi. However the academic regulations of any student will be same throughout the course of study in which the student has been admitted.

15.0 Transfers

There shall be no branch transfers after the completion of admission process.

16.0 General:

16.2 The Academic Regulation should be read as a whole for the purpose of any interpretation.

16.3 In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic Council is final.

16.4 The Institute may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the Institute.

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

ACADEMIC REGULATIONS FOR B.TECH (LATERAL ENTRY SCHEME)

(Effective for the students getting admitted into II year from the Academic Year 2011-2012 on wards)

1.0 The Students have to acquire 184 credits out of 192 from II to IV year of B.Tech. Program (Regular) for the award of the degree.

2.0 Students, who fail to fulfil the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seat.

3.0 The same attendance regulations are to be adopted as that of B.Tech. (Regular).

4.0 Promotion Rule:

The student shall be promoted from third year to fourth year only if he fulfils the academic requirements of 48 out of 96 credits from the examinations.

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.

5.0 Award of Class:

After the student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B.Tech. Degree he shall be placed in one of the following four classes: The marks obtained in the best 172 credits will be considered for the calculation of percentage and award of class.

Table 1: Award of Division

Class Awarded	% of marks to be secured	From the aggregate marks secured for best 172 Credits. (i.e. II year to IV year) excluding audit/open electives/soft skills
First Class with Distinction	70% and above	
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

(The marks in Internal evaluation and End Examination shall be shown separately in the marks memorandum)

6.0 All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B.Tech. (Lateral Entry Scheme)

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COURSE STRUCTURE

(Common to Branches: ECE, EEE, EIE, CSE & IT)

I B.Tech

Code	Subject	Scheme of instruction periods/week		Credits	Scheme of Examination		
		Theory	Practical		Internal Marks	External Marks	Total Marks
Theory							
A0001101	English	3+1*	-	4	30	70	100
A0002101	Engineering Physics	3+1*	-	5	30	70	100
A0003101	Engineering Chemistry	3+1*	-	5	30	70	100
A0004101	Mathematics – I	3+1*	-	5	30	70	100
A0005101	Mathematical Methods	3+1*	-	5	30	70	100
A0501101	C Programming and Data Structures	3+1*	-	6	30	70	100
A0301101	Engineering Drawing	3+1*	-	6	30	70	100
Practical							
A0591101	C Programming and Data Structures Lab	-	3	3	25	50	75
A0391101	Engineering and IT Workshop	-	3	3	25	50	75
A0091101	Engineering Physics Lab and Engineering Chemistry Lab	-	3	3	25	50	75
A0092101	English Language Communication Skills Lab	-	3	3	25	50	75
	Total	**28**	**12**	**48**	**310**	**690**	**1000**

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COURSE STRUCTURE
II B.TECH, I-SEMESTER

Subject Code	Subject	Hours/ Week			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
A0008103	Mathematics-III	3	1	-	4	30	70	100
A0202103	Field Theory	3	1	-	4	30	70	100
A0303103	Fluid Mechanics and Hydraulic Machinery	3	1	-	4	30	70	100
A0203103	Circuit Theory	3	1	-	4	30	70	100
A0401103	Electronic Devices and Circuits	3	1	-	4	30	70	100
A0402103	Signals and Systems	3	1	-	4	30	70	100
A0007103	Aptitude, Arithmetic, Reasoning and Comprehension (Audit Course)	3	-	-	2	30	70 (Internal Evaluation)	100
A0491103	Electronic Devices and Circuits Lab	-	-	3	2	25	50	75
A0492103	Signals and Systems Simulation Lab	-	-	3	2	25	50	75
A0392103	Fluid Mechanics and Hydraulic Machinery Lab	-	-	3	2	25	50	75
	Contact Periods / Week	**21**	**6**	**9**	**32**	**285**	**640**	**925**

II B.TECH, II-SEMESTER

Subject Code	Subject	Hours/ Week			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
A0010103	Environmental Studies	3	1	-	4	30	70	100
A0206104	Electrical Machines-I	3	1	-	4	30	70	100
A0210104	Network Theory	3	1	-	4	30	70	100
A0406104	Analog Electronic Circuits	3	1	-	4	30	70	100
A0207104	Control Systems	3	1	-	4	30	70	100
A0208104	Generation and Distribution of Electric Power	3	1	-	4	30	70	100
A0009103	Corporate Management Skills (Audit Course)	3	-	-	2	30	70 (Internal Evaluation)	100
A0294104	Circuit Theory Lab	-	-	3	2	25	50	75
A0295104	Circuits Simulation Lab	-	-	3	2	25	50	75
A0296104	Electrical Machines –I Lab	-	-	3	2	25	50	75
	Contact Periods / Week	**21**	**6**	**9**	**32**	**285**	**640**	**925**

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COURSE STRUCTURE

III B.TECH, I-SEMESTER

Subject Code	Subject	Hours/ Week			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
A0211105	Electrical Machines-II	3	1	-	4	30	70	100
A0412105	Digital Electronics	3	1	-	4	30	70	100
A0411105	Linear & Digital IC Applications	3	1	-	4	30	70	100
A0212105	Transmission of Electrical Power	3	1	-	4	30	70	100
A0213105	Power Electronic Converters-I	3	1	-	4	30	70	100
A0012105	Management Science	3	1	-	4	30	70	100
A0214105	Electrical Systems Simulation-I (Audit Course)	3	-		2	30	70 (Internal Evaluation)	100
A0496105	IC and PDC Lab	-	-	3	2	25	50	75
A0297105	Electrical Machines-II Lab	-	-	3	2	25	50	75
A0298105	Control Systems & Simulation Lab	-	-	3	2	25	50	75
	Contact Periods / Week	**21**	**6**	**9**	**32**	**285**	**640**	**925**

III B.TECH, II-SEMESTER

Subject Code	Subject	Hours/ Week			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
A0215106	Electrical Machines-III	3	1	-	4	30	70	100
A0216106	Electrical Measurements	3	1	-	4	30	70	100
A0413105	Microprocessors & Microcontrollers	3	1	-	4	30	70	100
A0217106	Power System Analysis	3	1	-	4	30	70	100
A0218106	Power Electronic Converters-II	3	1	-	4	30	70	100
A0013105	Managerial Economics & Financial Accountancy	3	1	-	4	30	70	100
A0219106	Electrical Systems Simulation-II (Audit Course)	3	-	-	2	30	70 (Internal Evaluation)	100
A0299106	Electrical Measurements Lab	-	-	3	2	25	50	75
A0281106	Power Electronics and Simulation Lab	-	-	3	2	25	50	75
A0093105	Professional Communication and Soft Skills Lab	-	-	3	2	25	50	75
	Contact Periods / Week	**21**	**6**	**9**	**32**	**285**	**640**	**925**

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COURSE STRUCTURE
IV B.TECH, I-SEMESTER

Subject Code	Subject	Hours/ Week			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
A0220107	Renewable Energy Sources	3	1	-	4	30	70	100
A0221107	Power System Operation and Control	3	1	-	4	30	70	100
A0222107	Power System Protection	3	1	-	4	30	70	100
A0223107	Power Semiconductor Drives	3	1	-	4	30	70	100
	Elective-I	3	1	-	4	30	70	100
	Elective-II	3	1	-	4	30	70	100
A0227107	Electrical Systems Simulation-III (ETAP & Power World) (Audit Course)	3	-		2	30	70 (Internal Evaluation)	100
A0282107	Power Systems Lab	-	-	3	2	25	50	75
A0498105	Micro Processor & Micro Controller Lab	-	-	3	2	25	50	75
A0283107	Mini Project	-	-	3	2	25	50	75
	Contact Periods / Week	**21**	**6**	**9**	**32**	**285**	**640**	**925**

IV B.TECH, II-SEMESTER

Subject Code	Subject	Hours/ Week			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
A0228108	Utilization Of Electrical Energy	3	1	-	4	30	70	100
	Elective-III	3	1	-	4	30	70	100
	Elective-IV	3	1	-	4	30	70	100
A0233108	Electrical Systems Simulation-IV (Homer) (Audit Course)	3	-	-	2	30	70 (Internal Evaluation)	100
A0286108	Project	-	-	-	12	50	100	150
A0284108	Seminar	3	-	-	2	50	-	50
A0285108	Comprehensive Viva	-	-	-	4	-	50	50
	Contact Periods / Week	15	3	-	32	220	430	650

ELECTIVES

Elective-I

1. Machine Design (A0224107)
2. Modern Control Theory (A0225107)
3. Instrumentation (A0226107)

Elective-II

1. Programmable logic controllers (A1008107)
2. Embedded System Concepts (A0422107)
3. Digital Signal Processing (A0417106)

Elective-III

1. Object Oriented Programming (A0506104)
2. Neural Networks & Fuzzy Systems (A0229108)
3. Java & Web Technologies (A0540108)

Elective-IV

1. Principles of Power Quality (A0230108)
2. Introduction To HVDC & Facts Devices (A0231108)
3. Special Machines (A0232108)

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(A0001101) ENGLISH

1. INTRODUCTION :

The sweeping changes in the world have elevated English to the status of a tool of global communication and transformed it into e-English. The syllabus has been drafted to improve the competence of students in communication in general and language skills in particular. The books prescribed serve as students' handbooks.

The teacher should focus on the skills of reading, writing, listening and speaking while using the prescribed text and exercises. The classes should be interactive. The students should be encouraged to participate in the classroom proceedings and also to write short paragraphs and essays. The main aim is to encourage two way communications in place of the one-sided lecture.

The text for non-detailed study is meant for extensive reading by the students. They may be encouraged to read some select topics on their own, which could lead into a classroom discussion. In addition to the exercises from the texts done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements etc.

2. OBJECTIVES:

a) To improve the language proficiency of the students in English with an emphasis on LSRW skills.

b) To equip the students to study academic subjects with greater facility through theoretical and practical components of the syllabus.

c) To develop study skills as well as communication skills in formal and informal situations.

3. SYLLABUS:

Listening Skills:

Objectives

1. To enable students to develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation.
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and dialects.

Students should be given practice in listening and identifying the sounds of English language and to mark stress, right intonation in connected speech.

- Listening for general content.
- Intensive listening.
- Listening to fill up information.
- Listening for specific information .

Speaking Skills:

Objectives

1. To make students aware of the role of ability to speak fluent English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.

- Oral practice
- Role play – Individual/Group activities

(Using exercises from all units of the prescribed text)

- Describing objects/situations/people
- Just A Minute (JAM) Sessions.

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To develop the ability to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.

- Skimming the text
- Understanding the gist of an argument
- Identifying the topic sentence
- Inferring lexical and contextual meaning
- Understanding discourse features
- Recognizing coherence/sequencing of sentences

The students shall be trained in reading skills using the prescribed text for detailed study. They shall be examined in reading and answering questions using 'unseen' passages which may be taken from the non-detailed text or other authentic texts, such as magazines/newspaper articles.

Writing Skills:

Objectives

1. To develop an awareness in the students the skill to write exact and formal writing.
2. To equip them with the components of different forms of writing.

- Writing sentences
- Use of appropriate vocabulary
- Paragraph writing
- Coherence and cohesiveness
- Narration / description
- Note Making
- Formal and informal letter writing
- Editing a passage

4. TEXTBOOKS PRESCRIBED:

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into **Eight Units**, are prescribed:

For Detailed study: ENJOYING EVERYDAY ENGLISH, Sangam Books (India) Pvt Ltd Hyderabad, 2009

For Non-detailed study: INSPIRING LIVES, Maruti Publications, Guntur, 2009

UNIT -I

a) Heaven's Gate from **ENJOYING EVERYDAY ENGLISH**.

b) Mokshagundam Visvesaraya from **INSPIRING LIVES**

UNIT -II

a) Sir C.V.Raman from **ENJOYING EVERYDAY ENGLISH.**

b) Mother Teresa from **INSPIRING LIVES.**

UNIT -III

a) The Connoisseur from **ENJOYING EVERYDAY ENGLISH**.

b) Dr. Amartya Kumar Sen from **INSPIRING LIVES.**

UNIT -IV

a) The Cuddalore Experience from **ENJOYING EVERYDAY ENGLISH**.

b) Gertrude Elion from **INSPIRING LIVES.**

UNIT -V

a) Bubbling Well Road from **ENJOYING EVERYDAY ENGLISH**.

b) Vishwanathan Anand from **INSPIRING LIVES.**

UNIT-VI

a) Odds against Us from **ENJOYING EVERYDAY ENGLISH**.

b) Charlie Chaplin from **INSPIRING LIVES.**

UNIT – VII

a) Exercises on Reading and Writing Skills, Reading Comprehension, Letter writing,Report writing

UNIT – VIII

Exercises on Remedial Grammar covering Common errors in English, Subject-Verb agreement, Use of Articles and Prepositions, Active/Passive Voice, Reported speech, Tenses Vocabulary development covering Synonyms & Antonyms, one-word substitutes, prefixes & suffixes, Idioms & phrases, words often confused.

Evaluation: The question paper shall contain two parts, Part A containing questions from Units I- VI and Part B containing questions from units VII & VIII. The student is required to answer five full questions choosing at least one from Part B.

REFERENCES:

1. Technical Communication , Principle and Practice, Meenakshi Raman and Sangita Sharma, OUP, 2009
2. Essential Grammar in Use, (with CD) 3rd edn, Cambridge University Press, 2009.
3. Resumes and Interviews, M.Ashraf Rizvi, Tata - Mcgraw Hill, 2009.
4. Everyday Dialogues in English by Robert J. Dixson, Prentice-Hall of India Ltd., 2006.
5. Communication Skills for Technical Students, T.M.Farhathullah, Orient Blackswan, 2008.
6. Developing Communication Skills, 2nd edn. by Krishna Mohan & Meera Banerji , Macmillan, 2009.
7. English for Technical Communication, Vol. 1 & 2, by K. R. Lakshmi Narayanan, Sci tech. Publications.
8. Basic Communication Skills for Technology, Andrea J Ruthurford, Pearson Education, Asia.
9. Longman Dictionary of Contemporary English with DVD, Pearson Longman.

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(A0002101) ENGINEERING PHYSICS

UNIT I OPTICS:

Interference - Interference in thin films by reflection - Newton's rings - Diffraction - Fraunhofer diffraction at a single slit - Fraunhofer diffraction at a double slit - Diffraction grating - Grating spectrum - polarization - Nicol prism -Theory of circular and elliptical polarized light - Quarter and half wave plates.

UNIT II CRYSTAL STRUCTURES AND X-RAY DIFFRACTION: Introduction -Space lattice - Basis - Unit cell - Lattice parameter - Bravais lattices - Crystal systems - Structure Simple cubic - Body Centered Cubic - Face Centered Cubic crystals - Miller indices of planes and directions in crystals – Separation between successive (h k l) planes - X-ray diffraction by crystal planes - Bragg's law – Laue and Powder methods.

UNIT III PRINCIPLES OF QUANTUM MECHANICS & ELECTRON THEORY:

Waves and Particles - de- Broglie's hypothesis - Heisenberg's uncertainity principle - Schroedinger's one dimensional wave equation (Time Independent) - Particle in a one dimensional potential box - Energy levels - Fermi-Dirac distribution and effect of Temperature(qualitative treatment only) - Scattering - Source of electrical resistance - Kronig-Penney model (qualitative treatment only) - energy bands - metals, semi conductors & insulators.

UNIT IV SEMICONDUCTORS:

Intrinsic and extrinsic semiconductors - Law of mass action - Continuity equation - Drift & diffusion - Einstein's relation - Hall effect - Direct & indirect band gap semiconductors- p-n junction - Band diagram of p-n junction diode - Diode Equation-LED, LCD & Photo diode.

UNIT V MAGNETIC PROPERTIES:

Introduction - Origin of magnetic moment - Classification of magnetic materials - 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 electricity- $BaTio_3$.

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-Neon Laser - GaAs Laser - Applications of Lasers in Industry, Scientific and Medical fields.

UNIT VII FIBER OPTICS:

- 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.

UNIT VIII NANOMATERIALS:

Introduction - Basic principles of nano materials - Fabrication of nano materials - ball milling - plasma arching - Chemical vapour deposition method - sol-gel methods - properties of nano materials - carbon nano tubes - properties and applications of carbon nano tubes - Applications of nano materials.

TEXT BOOKS:

1. Engineering Physics by V. Rajendran & K.Thyagarajan, Tata McGraw-Hill Publishing Co. Ltd.
2. Engineering Physics by M.R.Srinivasan New Age Publications.
3. Engineering Physics by M.N.Avadhanulu, S.Chand Publications, New Delhi.

REFERENCES:

1. Physics Volume 2, by Halliday, Resnick and Krane; John Wiley India.
2. Solid State Physics by C.Kittel, Wiley India.
3. Engineering Physics by Mittal, I.K.International.
4. Introduction to Nanoscience & Nano Technology by K.K Chattopadhya A.N. Banarjee , Prentice – Hall of India Pvt. Ltd.

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(A0003101) ENGINEERING CHEMISTRY

UNIT I

Water: Sources of Water, Types of impurities in Water, Hardness of Water - Temporary and Permanent hardness, Units, Estimation of hardness by EDTA Method, Analysis of Water - Dissolved Oxygen, Disadvantages of Hard Water, Problems on hardness of water, Methods of Treatment of Water for Domestic Purpose - Sterilisation: Chlorination, Ozonisation.

Water for Industrial purpose: Water for Steam Making, Boiler Troubles - Carry Over (Priming and Foaming), Boiler Corrosion, Scales and Sludges, Caustic Embrittlement, Water Treatment - Internal Treatment - Colloidal, Phosphate, Calgon, Carbonate, Sodium aluminates Conditioning of Water. External Treatment - Ion- Exchange Process; Demineralization of Brakish Water - Reverse Osmosis.

UNIT II

Science of Corrosion: Definition, Types of corrosion: Dry Corrosion, (Direct Chemical attack), Wet Corrosion, Theories of Corrosion and Mechanism, Electro Chemical Theory of Corrosion, Galvanic Series, Galvanic Corrosion, Concentration Cell Corrosion, Oxygen absorption type, Factors Influencing Corrosion, Control of Corrosion - Cathodic Protection - Sacrificial anode and Impressed Current, Uses of Inhibitors, Electro Plating and Electro less plating (copper and nickel).

UNIT III

Polymers: Polymerization Reactions - Basic concepts, Types of Polymerization - Addition and Condensation Polymerization, Plastics - Thermosetting and Thermoplastics, Composition, Properties and Engineering Uses of the Following: Teflon, Bakelite, Nylon, Rubber - Processing of Natural Rubber and Compounding, Elastomers - Buna S, Buna N, Polyurethane Rubber; Silicone Rubber, Conducting Polymers, Synthesis and applications of Polyacetylene and Poly aniline Liquid Crystals definition, properties, suitable examples and Engineering Applications.

UNIT IV

Chemistry of nano materials: Nano materials definition, properties and applications.

Explosives and Propellants: Explosives, Classification, precautions during storage, blasting fuses, important explosives, Rocket propellants, classification of propellants**.**

Lubricants : Principles and function of lubricants - Classification and properties of lubricants - Viscosity, flash and fire points, cloud and pour points, aniline point, Neutralization Number and Mechanical Strength.

UNIT V

Electro Chemistry: Conductance - Equivalent Conductance - Molecular Conductance, Conductometric Titrations - Applications of Conductivity Measurements.

Electrochemical Cells: Measurement of EMF, Standard electrode potential, concentration cells, batteries (Ni–Cd cell), Lithium batteries, Fuel cell: hydrogen oxygen fuel cell and methanol fuel cell

Insulators – Definition, Properties and Characteristics of Insulating Materials, Engineering Applications.

UNIT VI:

Phase rule: Definition, Terms involved in Phase Rule and Phase rule equation. Phase diagrams - one component system (water system), two component system (lead- silver system) Eutectics, heat treatment based on iron-carbon phase diagram, hardening, annealing.

UNIT VII:

Fuels and Combustion: Definition and Classification of fuels, Solid, liquid & gaseous fuels, Characteristics of a good fuel, Metallurgical Coke - Characteristics & Manufacture (Otto-Halfmann),

Petroleum - Refining - Synthetic Petrol, Calorific Value & its determination (Bomb Calorimeter - Junker's Gas Calorimeter). Combustion: Flue gas analysis by Orsat's apparatus.

UNIT VIII:

Building Materials:

Cement: composition of Portland cement, analysis, setting & hardening of cement (reactions).

Refractories: Definition, Classification With Examples; Criteria of a Good Refractory Material; Causes for the failure of a Refractory Material.

TEXT BOOKS

1. Chemistry for Engineers Prof. K.N.Jayaveera, Dr.G.V.Subba Reddy and Dr.C.Ramachandraiah, McGraw Hill Higher Education Hyd., 2009.
2. A text book of Engineering Chemistry by S.S. Dara, S.Chand & Co, New Delhi (2008).
3. Text book of Engineering Chemistry by Jain & Jain, Dhanpat Rai Publishing Company, 15th edition New Delhi (2008).

REFERENCE

1. Engineering Chemistry Dr. K. B. Chandrasekhar, Dr. U.N. Dash, Dr. Sujatha Mishra, Scitech Publications (India) Pvt. Limited, Hyderabad. 2009.
2. Fuel Cells principles and applications by B.Viswanath, M.Aulice Scibioh - Universities press.
3. Chemistry of Engineering Materials by C.V. Agarwal, Tara Publication, Varanasi.2008.
4. Physical Chemistry - Glasston & Lewis.
5. Engineering Chemistry (Vol.1&2) by J C Kuriacose and J. Rajaram, Tata McGraw-Hill Co, New Delhi (2004).
6. Applied Chemistry: A Text Book for chemistry for Engineers & Technologists, G.D. Gesser, Springer, 2000

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(A0004101) MATHEMATICS – I

UNIT I

Differential equations of first order and first degree - Exact, linear and Bernoulli equations. Applications to Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

UNIT II

Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax}, Sin ax, cos ax, polynomials in x, e^{ax} V(x), xV(x), method of variation of parameters.

UNIT III

Rolle's Theorem - Lagrange's Mean Value Theorem - (excluding proof). Simple examples of Taylor's and Maclaurin's Series - Functions of several variables - Jacobian - Maxima and Minima of functions of two variables, Lagrangian method of Multipliers with three variables only.

UNIT IV

Raidus of Curvature - Curve tracing - Cartesian, polar and parametric curves. Applications of integration to lengths, volume and surface area of solids of revolution in Cartesian and polar coordinates

UNIT V

Multiple integral: Double and triple integrals - Change of Variables - Change of order of integration.

UNIT VI

Laplace transform of standard functions -Inverse transform - First shifting Theorem, Transforms of derivatives and integrals - Unit step function - Second shifting theorem - Dirac's delta function - Convolution theorem - Laplace transform of Periodic function.

UNIT VII

Differentiation and integration of Laplace transform - Application of Laplace transforms to ordinary differential equations of first and second order.

UNIT VIII

Vector Calculus: Gradient – Divergence - Curl and Their properties; Vector integration - Line integral - Potential function - Area, Surface and volume integrals, Vector integral theorems: Green's theorem - Stoke's and Gauss's Divergence Theorem (excluding their proof), Verification of Green's - Stoke's and Gauss's Theorems.

TEXT BOOKS

1. A Text Book of Engineering Mathematics, Vol – 1, T.K.V. Iyengar, B. Krishna Gandhi and Others S. Chand & Company.
2. A Text Book of Engineering Mathematics, C. Sankaraiah, V.G.S. Book Links.
3. A Text Book of Engineering Mathematics-1,E. Rukmangadachari, E. Keshava Reddy, Pearson Education.

REFERENCES

1. A Text Book of Engineering Mathematics, B.V. Ramana, Tata Mc Graw Hill.
2. A Text Book of Engineering Mathematics, Thomson Book Collection.
3. A Text Book of Advanced Engineering Mathematics – A Computer Approach, N.Bail, M.Goyal & C.Watkins.
4. Engineering Mathematics, Sarveswara Rao Koneru, Universities Press.

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(A0302101) MATHEMATICAL METHODS

UNIT I

Matrices: Elementary row transformations – Rank – Echelon form, normal form – Solution of Linear System of Homogenous and Non Homogeneous equations – Direct Methods – Gauss Elimination, Gauss Jordan methods.

Eigen Values, Eigen vectors – Properties. Cayley – Hamilton Theorem – Inverse and powers of a matrix by Cayley–Hamilton theorem – Diagonolization of matrix. Calculation of powers of matrix.

UNIT II

Real matrices – Symmetric, Skew – Symmetric, orthogonal matrices Linear Transformation – Orthogonal Transformation. Complex matrices: Hermitian, Skew-Hermitian and Unitary matrices – Eigen values and Eigen vectors and their properties. Quadratic forms – Reduction of quadratic form to canonical form and their nature.

UNIT III

Solution of Algebraic and Transcendental Equations: Introduction – The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method.

Interpolation: Introduction – Finite differences – Forward Differences – backward Differences –Newton's forward and backward difference formulae for interpolation – Lagrange's Interpolation formula.

UNIT IV

Curve fitting: Fitting a straight line – Second degree curve – Exponential curve-Power curve by method of least squares. Numerical Differentiation and Integration – Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule.

UNIT V

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods – Milne's Predictor-Corrector Method.

UNIT VI

Fourier Series: Determination of Fourier coefficients – Fourier series of Even and odd functions – Fourier series in an arbitrary interval – Even and odd periodic continuation – Half-range Fourier sine and cosine expansions. Fourier integral theorem (statement only) – Fourier sine and cosine integrals, Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – Finite Fourier transforms.

UNIT VII

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Method of separation of variables – Solutions of one dimensional wave equation, heat equation and two-dimensional Laplace equation under initial and boundary conditions.

UNIT – VIII

z-transform – Inverse z-transform – Properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of difference equations by z-transforms.

TEXT BOOKS:

1. Mathematical Methods, T.K.V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
2. Mathematical Methods, C. Sankaraiah, V.G.S. Book Links.
3. Mathematical Methods, G. Shanker Rao, E. Keshava Reddy, I. K. International Publishing House Pvt. Ltd.

REFERENCES:

1. Numerical Methods for Scientific and Engineering Computation , M.K. Jain, S.R.K. Iyengar & R.K. Jain, New Age international Publishers.
2. Mathematical Methods – Pal – Oxford.
3. Introduction to Numerical Analysis – S.S. Sastry Printice Hall of India.
4. Mathematical Methods, S.K.V.S. Sri Ramachary, M. Bhujanga Rao, P.B. Bhaskar Rao & P.S. Subramanyam, BS Publications.

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(A0501101) C PROGRAMMING AND DATA STRUCTURES

UNIT I

Overview of Computers and Programming - Electronic Computers then and Now, Computer Hardware, Computer Software, Algorithm, Flowcharts, Software Development Method, Applying the Software Development Method.

UNIT II

Introduction to C Language - C Language Elements, Variable Declarations and Data Types, Executable Statements, General Form of a C Program, Expressions, Precedence and Associativity, Expression Evaluation, Operators and Expressions, Type Conversions, Decision Statements - If and Switch Statements, Loop Control Statements - while, for, do-while Statements, Nested for Loops, Other Related Statements -break, continue, goto.

UNIT III

Functions - Library Functions, Top-Down Design and Structure Charts, Functions with and without Arguments, Communications Among Functions, Scope, Storage Classes - Auto, Register, Static, Extern, Scope rules, Type Qualifiers, Recursion - Recursive Functions, Preprocessor Commands.

Arrays - Declaring and Referencing Arrays, Array Subscripts, Using for Loops for Sequential Access, Using Array Elements as Function Arguments, Arrays Arguments, Multidimensional Arrays.

UNIT IV

Pointers - Introduction, Features of Pointers, Pointer Declaration, Arithmetic Operations With Pointers, Pointers and Arrays, Pointers and Two-Dimensional Arrays, Array of Pointers, Pointers to Pointers, Void Pointers, Memory Allocation Functions, Programming Applications, Pointer to Functions, Command- Line Arguments.

Strings - String Basics, String Library Functions, Longer Strings, String Comparison, Arrays of Pointers, Character operations, String-To-Number and Number-To- String Conversions, Pointers and Strings.

UNIT V

Structure and Union – Introduction, Features of Structures. Declaration and Initialization of Structures, Structure within Structure, Array of Structures, Pointer to Structure, Structure and Functions, typedef, Bit Fields, Enumerated Data Type, Union, Union of Structures.

UNIT VI

Files - Introduction, Streams and File Types, Steps for File Operations, File I/O Structures, Read and Write, Other File function, Searching Errors in Reading/Writing of Files, Low Level Disk I/O, Command Line Arguments, Application of Command Line Arguments, File Status functions (error handling).

UNIT VII

Data Structures - Overview of Data Structure, Representation of a Stack, Stack Related Terms, Operation on a Stack, Implementation of a Stack, Representation of Arithmetic Expressions, Infix, Prefix, and Postfix Notations, Evaluation of Postfix Expression, Conversion of Expression from Infix to Postfix, Recursion, Queues - Various Positions of Queue, Representation of Queue, Insertion, Deletion, Searching Operations.

Linked List - Singly Linked List, Linked List with and without header, Insertion, Deletion and Searching Operations.

UNIT VIII

Searching and Sorting - Exchange (Bubble) Sort, Selection Sort, Quick Sort, Insertion Sort, Merge Sort. Searching- Linear and Binary Search Methods.

TEXT BOOKS :

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education
2. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

REFERENCES :

1. Programming in C – Stephen G. Kochan, III Edition, Pearson Eductaion.
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press.
3. C and Data Structures, a snapshot oriented treatise with live engineering examples, Dr.N.B.Venkateswarlu, Dr. E.V.Prasad, S. Chand.
4. C and Data Structures, E.Balaguruswamy, Tata Mc Graw Hill.
5. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI, Eighth Edition.

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(A0301101) ENGINEERING DRAWING

UNIT – I

INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Graphics and their Significance – Drawing Instruments and their Use – Conventions in Drawing – Lettering – BIS Conventions.

Curves used in Engineering Practice:

a) Conic Sections including the Rectangular Hyperbola – General method only.

b) Cycloid, Epicycloids and Hypocycloid

c) Involutes.

d) Helices

UNIT – II

PROJECTION OF POINTS AND LINES: Principles of Orthographic Projection – Conventions – First and Third Angle Projections. Projections of Points, Lines inclined to one or both planes, Problems on projections, Finding True lengths & traces only.

UNIT – III

PROJECTIONS OF PLANES: Projections of regular Plane surfaces, Projection of lines and planes using auxiliary planes.

UNIT – IV

PROJECTIONS OF SOLIDS: Projections of Regular Solids inclined to one or both planes – Auxiliary Views.

UNIT – V

SECTIONS & DEVELOPMENTS OF SOLIDS: Section Planes and Sectional views of Right Regular Solids– Prism, Cylinder, Pyramid and Cone – True shapes of sections.

Development of Surfaces of Right Regular Solids – Prisms, Cylinder, Pyramid, Cone and their Sectional parts.

UNIT – VI

ISOMETRIC & ORTHOGRAPHIC PROJECTIONS: Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids - Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts.

Conversion of Isometric Views to Orthographic Views - Conventions.

UNIT – VII

INTERPENETRATION OF RIGHT REGULAR SOLIDS: Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone, Square Prism Vs Square Prism.

UNIT – VIII

PERSPECTIVE PROJECTIONS: Perspective View: Plane Figures and Simple Solids,Vanishing Point Methods (General Method only).

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhat / Charotar
2. Engineering Drawing, Johle /Tata McGraw-Hill
3. Engineering Drawing, Shah and Rana, 2/e Pearson education

REFERENCES:

1. Engineering Drawing and Graphics, Venugopal/ New age
2. Engineering Drawing, B.V.R. Guptha, J.K. Publishesrs
3. Engineering Drawing, K.L. Narayana, P. Khanniah, Scitech Pub
4. Engineering Drawing, Venkata Reddy, B.S.Publishers.

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(Common to all Branches)
For Branches: E.C.E, E.E.E, E.I.E, C.S.E, I.T, M.E, C.E.

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(A0591101) C PROGRAMMING AND DATA STRUCTURES LAB

Objectives:

- To make the student learn a programming language.
- To teach the student to write programs in C to solve the problems.
- To introduce the student to simple linear data structures such as lists, stacks, queues.

Recommended Systems/Software Requirements:

- Intel based desktop PC with ANSI C Compiler and Supporting Editors

Exercise l

a) Write a C 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 C program to generate the first n terms of the sequence.
c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Exercise 2

a) Write a C program to calculate the following Sum:

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

b) Write a C program toe find the roots of a quadratic equation.

Exercise 3

Write C programs that use both recursive and non-recursive functions

i) 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.

Exercise 4

a) The total distance travelled by vehicle in 't' seconds is given by distance $S = ut+1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2) respectively. Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Exercise 5

a) Write a C program to find both the largest and smallest number in a list of integers.
b) Write a C program that uses functions to perform the following:
i) Addition of Two Matrices
ii) Multiplication of Two Matrices

Exercise 6

a) Write a C program that uses functions to perform the following operations:
i) To insert a sub-string in to a given main string from a given position.
ii) To delete n Characters from a given position in a given string.
b) Write a C program to determine if the given string is a palindrome or not

Exercise 7

a) Write a C program that displays the position or index in the string S where the string T begins, or –1 if S doesn't contain T.
b) Write a C program to count the lines, words and characters in a given text.

Exercise 8

a) Write a C program to generate Pascal's triangle.
b) Write a C program to construct a pyramid of numbers.

Exercise 9

Write a C program to read in two numbers, x and n, and then compute the sum of the geometric progression:

$1+x+x^2+x^3+\ldots\ldots\ldots\ldots+x^n$

For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

Print x, n, the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Find if any values of x are also illegal? If so, test for them too.

Exercise 10

1) 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 a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
2) Write a C program to convert a Roman numeral to its decimal equivalent.

Exercise 11

Write a C 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.)

Exercise 12

a) Write a C program which copies one file to another.
b) Write a C program to reverse the first n characters in a file.

(Note: The file name and n are specified on the command line.)

Exercise 13

a) Write a C programme to display the contents of a file.
b) Write a C programme to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

Exercise 14

Write a C program that uses functions to perform the following operations on singly linked list.:

i) Creation
ii) Insertion
iii) Deletion
iv) Traversal

Exercise 15

Write C programs that implement stack (its operations) using

i) Arrays
ii) Pointers

Exercise 16

Write C programs that implement Queue (its operations) using

i) Arrays
ii) Pointers

Exercise 17

Write a C program that uses Stack operations to perform the following:

i) Converting infix expression into postfix expression
ii) Evaluating the postfix expression

Exercise 18

Write a C program that implements the following sorting methods to sort a given list of integers in ascending order

i) Bubble sort
ii) Selection sort

Exercise 19

Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:

i) Linear search
ii) Binary search

Exercise 20

Write C program that implements the Quick sort method to sort a given list of integers in ascending order.

Exercise 21

Write C program that implement the Merge sort method to sort a given list of integers in ascending order.

Exercise 22

Write C programs to implement the Lagrange interpolation and Newton - Gregory forward interpolation.

Exercise 23

Write C programs to implement the linear regression and polynomial regression algorithms.

Exercise 24

Write C programs to implement Trapezoidal and Simpson methods.

REFERENCE BOOKS

1. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
2. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
3. Computer Basics and C Programming, V. Rajaraman, PHI Publications.
4. Programming in C and Data Structures, J.R.Hanly, Ashok.N.K.Kamthane and A.Ananda Rao, Pearson Education.

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(A0391101) ENGINEERING AND IT WORKSHOP

ENGINEERING WORKSHOP

Objectives: The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially he should know the labour involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

1. TRADES FOR EXERCISES:

a) Carpentry shop– Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, cross lap joint, mortise and tenon T joint, Bridle T joint from out of 300 x 40 x 25 mm soft wood stock.

b) Fitting shop– Two joints (exercises) from: square joint, V joint, half round joint or dove tail joint out of 100 x 50 x 5 mm M.S. stock.

c) Sheet metal shop– Two jobs (exercises) from: Tray, cylinder, hopper or funnel from out of 22 or 20 guage G.I. sheet.

d) House-wiring– Two jobs (exercises) from: wiring for ceiling rose and two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, wiring for a water pump with single phase starter.

e) Foundry– Preparation of two moulds (exercises): for a single pattern and a double pattern.

f) Welding – Preparation of two welds (exercises): single V butt joint, lap joint, double V butt joint or T fillet joint.

2. TRADES FOR DEMONSTRATION:

a) Plumbing

b) Machine Shop

c) Metal Cutting

Apart from the above the shop rooms should display charts, layouts, figures, circuits, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, Plastics, steels, meters, gauges, equipment, CD or DVD displays, First aid, shop safety etc. (though they may not be used for the exercises but they give valuable information to the student). In the class work or in the examination knowledge of all shop practices may be stressed upon rather than skill acquired in making the job.

REFERENCE BOOKS:

1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009.
2. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.
3. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas.
4. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

IT WORKSHOP

Objectives:

The IT Workshop for engineers is a training lab course. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point and Publisher.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. **The students should work on a working PC (PIV or higher)to disassemble and assemble back to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.**

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace for usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office tools and LaTeX. (**It is recommended to use Microsoft office 2007 in place of MS Office 2003)**

PC Hardware

Exercise 1 - Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Exercise 2 - Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video shall be given as part of the course content.

Exercise 3 - Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Exercise 4 - Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Exercise 5 - Task 5: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Exercise 6 - Task 6: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

OFFICE TOOLS

LaTeX and Word

Exercise 7 - Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 1: Using LaTeX and Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

EXCEL

Exercise 8 - Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

LaTeX and MS/equivalent (FOSS) tool Power Point

Exercise 9 - Task1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this Exercise includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Powerpoint. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Exercise 10 - Task 2 : Second Exercise helps students in making their presentations interactive. Topic covered during this Exercise includes : Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

Internet & World Wide Web **2 Exercises**

Exercise 11 - Task 1: **Orientation & Connectivity Boot Camp:** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers.

Exercise 12 - Task 2: **Search Engines & Netiquette:** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated by the student to the satisfaction of instructors.

Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install an anti virus software, configure their personal firewall and windows update on their computer.

REFERENCES:

1) Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2) LaTeX Companion – Leslie Lamport, PHI/Pearson.
3) Introduction to Computers, Peter Norton, 6/e Mc Graw Hill
4) Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education
5) Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dreamtech
6) IT Essentials PC Hardware and Software Companion Guide, Third Edition by David Anfinson and
7) Ken Quamme. – CISCO Press, Pearson Education.

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(A0091101) ENGINEERING PHYSICS & ENGINEERING CHEMISTRY LAB

ENGINEERING PHYSICS LAB

Any TEN of the following experiments are to be performed during the Academic year.

S.No	Name of the Experiment
1.	Determination of wavelength of given source – spectrometer – normal incidence method
2.	Dispersive power of the prism – Spectrometer
3.	Determination of wavelength of a laser source - Diffraction Grating
4.	Determination of particle size by using a laser source
5.	Determination of thickness of a thin wire using parallel fringes
6.	Newton's Rings
7.	Magnetic field along the axis of a current carrying coil – Stewart and Gee's method
8.	Numerical aperture of an optical fiber
9.	Hall Effect
10.	B – H Curve
11.	Energy gap of a material of p-n junction
12.	Determination of rigidity modulus of a wire material – Torsional pendulum
13.	Determination of dielectric constant
14.	Verification of laws of stretched string – Sonometer
15.	Melde's experiment – Transverse & Longitudinal modes

Equipment required:

Spectrometer, Grating, Prism, Mercury vapour lamp, Sodium vapour lamp, Travelling Microscope, Wedge arrangement, Newton rings setup, Stewart-Gee's apparatus, He-Ne laser source, Optical fiber, Hall effect kit, B-H loop kit, Energy gap kit (four probe method), Torsional pendulum, Dielectric constant kit, Sonometer, Melde's apparatus

ENGINEERING CHEMISTRY LAB

S.No	Name of the Experiment
1)	Preparation of Standard Potassium Dichromate and Estimation of Ferrous Iron
2)	Preparation of Standard Potassium Dichromate and Estimation of Copper, by Iodometry
3)	Preparation of Standard EDTA solution and Estimation of Hardness of Water
4)	Preparation of Standard EDTA and Estimation of Copper
5)	Determination of Manganese in Steel and Iron in Cement
6)	Determination of strength of the given Hydrochloric acid against standard sodium hydroxide solution by Conducto metric titration
7)	Determination of viscosity of the oils through Redwood viscometer
8)	Determination of calorific value of fuel using Bomb calorimeter
9)	Estimation of dissolved oxygen
10)	Determination of Eutectic Temperature of binary system (Urea – Benzoic Acid)

BOOKS:

1. Chemistry-lab manual by Dr K.N.Jayaveera and K.B. Chandra Sekhar, S.M.Enterprizes Ltd.
2. Vogel's Book of Quantitative Inorganic Analysis, ELBS Edition.

Equipment Required:

- Glass ware: Pipettes, Burettes, Volumetric Flasks, Beakers, Standard flasks, Measuring jars, Boiling Test tubes, reagent bottles, (Borosil)
- Analytical balance (keroy) (15 Nos)
- Calorimeter
- Bomb Calorimeter
- Redwood viscometer No.1& No.2
- Conductometer/ Conductivity bridge
- Wash bottles, test tube stands, burette stands
- Gas cylinders with Bunsen burners
- Chemicals: Hydrochloric acid, sodiumhydroxide, EDTA, EBT indicator, fast sulfon black-f, urea, benzoic acid, methanol, Mohr's salt, copper sulphate, magnesium sulphate, ammonia, ammonium sulphate, calcium sulphate etc.,

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(A0092101) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

The **Language Lab** focuses on the production and practice of sounds of language and equips students with the use of English in everyday situations and contexts.

Objectives:

1. To train students to use language effectively in everyday conversations, to participate in group discussions, to help them face interviews, and sharpen public speaking skills
2. To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning
3. To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm
4. To initiate them into greater use of the computer in resume preparation, report- writing, format-making etc.
5. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required ability to face computer-based competitive exams such GRE, TOEFL, GMAT etc.

SYLLABUS:

The following course content is prescribed for the **English Language Laboratory** sessions:

- ♣ Introduction to the Sounds of English - Vowels, Diphthongs & Consonants.
- ♣ Introduction to Stress and Intonation.
- ♣ Situational Dialogues (giving directions etc.)
- ♣ Speaking on the mobiles and telephone conversation.
- ♣ Role Play.
- ♣ Oral Presentations- Prepared and Extempore.
- ♣ 'Just A Minute' Sessions (JAM).
- ♣ Describing Objects / Situations / People.
- ♣ Information Transfer.
- ♣ Debate

Minimum Requirement:

The English Language Lab shall have two parts:

i) **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

- ♣ P – IV Processor
- ♣ Speed – 2.8 GHZ
- ♣ RAM – 512 MB Minimum
- ♣ Hard Disk – 80 GB
- ♣ Headphones of High quality

PRESCRIBED SOFTWARE: GLOBARENA

Suggested Software:

- ♣ Cambridge Advanced Learners' English Dictionary with CD.
- ♣ The Rosetta Stone English Library
- ♣ Clarity Pronunciation Power – Part I

- ♣ Mastering English in Vocabulary, Grammar, Spellings, Composition
- ♣ Dorling Kindersley series of Grammar, Punctuation, Composition etc.
- ♣ Language in Use, Foundation Books Pvt Ltd with CD
- ♣ Learning to Speak English - 4 CDs
- ♣ Microsoft Encarta with CD
- ♣ Murphy's English Grammar, Cambridge with CD
- ♣ English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. English Pronouncing Dictionary Daniel Jones Current Edition with CD.
2. Spoken English- R. K. Bansal and J. B. Harrison, Orient Longman 2006 Edn.
3. Speaking English Effectively by Krishna Mohan & NP Singh (Macmillan)
4. A Practical Course in English Pronunciation, (with two Audio cassettes) by J. Sethi, Kamlesh Sadanand & D.V. Jindal, Prentice-Hall of India Pvt. Ltd., New Delhi.
5. Body Language , Your Success Mantra , Dr Shalini Verma, S.Chand & Co, 2008
6. English Dictionary for Advanced Learners, (with CD) International edn. Macmillan 2009
7. A Handbook for Englsih language Laboratories, E.Sureshkumar, P.Sreehari, Foundation Books, 2009
8. DELTA's key to the Next Generation TOEFL Test, 6 audio CDS, New Age International Publishers, 2007

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Paper:

- ♣ The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
- ♣ For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

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(A0008103) MATHEMATICS – III

(Common to ECE, EEE, EIE)

OBJECTIVE:

- Beta And Gamma functions are used to solve some special integrals that are not able to by using general methods.
- The use of the concept complex analysis is to find the solution of the equations which does not have solution in real plane.
- The concept of complex analysis is widely used in space study, aero system, potential functions, fluid mechanics etc.
- This course is intended to impart knowledge to students in the areas of complex variables, analyticity, complex integration, Taylor's series, Laurent series, contour integrals, Argument principle and conformal mappings.

OUTCOMES:

- Improves analytical and design skills

UNIT - I

Functions of a complex variable – Continuity – Differentiability – Analyticity –Properties – Cauchy - Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions – Milne -Thompson method. Elementary functions: Exponential, trigonometric, hyperbolic functions and their properties - General power Z^c (c is complex), principal value.

UNIT-II

Complex integration: Line integral-evaluation along a path by indefinite integration-Cauchy's integral theorem-Cauchy's integral formula-Generalized integral formula.

UNIT-III

Complex power series: Radius of convergence-Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point-Isolated singular point-pole of order m- essential singularity.

UNIT-IV

Residue- Evaluation of residue by formula and by Laurent series – Residue theorem. Evaluation of integrals of the type:

a) improper real integrals $\int_{\infty}^{\infty} f(x)dx$ b) $\int_0^{2\pi} f(cs\theta, sin\theta)d\theta$

c) $\int_{-\infty}^{\infty} e^{imx} f(x)dx$ d) integrals by indentation.

UNIT-V

Argument principle –Rouche's Theorem – determination of number of zeros of complex polynomials-Maximum Modulus principle-Fundamental theorem of Algebra, Liouville's Theorem.

UNIT-VI

Con formal mapping: Transformation by e^z, ln z ,z^2, z^n (n positive integer)sin z,cosz, z + a/z, Translation, rotation, inversion and bilinear transformation – fixed -points- cross ratio- properties- invariance of circles and cross ratio – determination of bilinear transformation mapping 3 given point

TEXT BOOKS:

1. A Text book of Engineering Mathematics, Vol – III by T.K.V. Iyengar, B. Krishna Gandhi and others, S. Chand and company.
2. Higher Engineering Mathematics by B.S.Grewal, Khanna Publishers.
3. Engineering Mathematics by B.V. Ramana, Tata McGraw Hill .

REFERENCES:

1. Advanced Engineering Mathematics by Erwin Kreyszig - Wiley Publications.
2. Engineering Mathematics – III A by Dr.M.K. Venkat araman – The National Publishing co.
3. A text book of Engineering Mathematics by N.P.Bali, Iyengar – Lakshmi Publications (Pvt ltd)

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(A0202103) FIELD THEORY

OBJECTIVES:

- To provide the basic skills required to understand, develop, and design various engineering applications involving electromagnetic fields.
- To lay the foundations of electromagnetism and its practice in modern communications such as wireless, guided wave principles such as fiber optics and electronic electromagnetic structures including those on the sub-micron scale.
- To provide basic laboratory exposure to electromagnetic principles and applications.

OUTCOMES:

- Helps in developing the theory of power transmission lines -and electrical machines

UNIT-I

Electrostatics-I: Coulomb's law and electrical field intensity: Coulomb's law, Field due to different charge distributions.

Electric flux density, Gauss's law and divergence: Concept of electric flux density, Gauss's law and its applications, Maxwell's first eqn. and divergence theorem for electric flux density.

Electrical potential & Dipole: Energy expanded in moving a point charge in electrical field, Line integral, Definition of potential difference and potential, Potential field of a point charge and system of charges, Potential gradient, Electric Dipole, potential and EFI due to an electric dipole, Torque on an Electric dipole in an electric field.

UNIT-II

Electrostatics-II: Conductors, dielectrics and capacitance: Definition of currents and current density, Continuity equation, Behavior of conductors inside an electric field, Dielectric materials, Characteristics, Dielectric polarization, Boundary conditions, Energy density in electrostatic field, Capacitance of a parallel plate capacitor, Coaxial cable and spherical capacitors. Poisson's and Laplace equation, Examples of solution of Laplace and Poisson's equations

UNIT-III

Magneto statics: Biot–savart Law and its applications: Magnetic field intensity – Biot–savart Law -Magnetic field due to straight conductors, circular loop and solenoid current Carrying wire –Magnetic flux density (B) – B in free space, Maxwell's second Equation.

Ampere's circuital law and its applications: Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament, Point form of Ampere's circuital law, Maxwell's third equation, Curl (H)=Jc, Field due to a circular loop, rectangular and square loops.

UNIT-IV

Magnetic forces: Lorentz Law of force ,Force on a moving charge, Force on a differential current element, Force on a straight and a long current carrying conductor in a magnetic field, Force between two straight long and parallel current carrying conductors ,Force and torque on a close circuit.

UNIT-V

Magnetic potential and inductance: Scalar Magnetic potential and its limitations, vector magnetic potential and its properties, vector magnetic potential due to simple configurations, vector Poisson's equations. Self and Mutual inductance, Neuman's formulae, Determination of self-inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane, energy stored and density in a magnetic field.

UNIT-VI

Electro Dynamic Fields: Faraday's laws and its integral and point forms, induced emf – Transformer and motional EMF –Maxwell's equations (differential and integral forms) – Displacement current – Relation between field theory and circuit theory - Modification of Maxwell's equations for time varying fields, Poynting Theorem and Poynting vector.

Text Books:

1. " Electromagnetic Fields"- Sadiku, Oxford Publications

References:

1. Schaums Outline of Theory and Problems of Electromagnetics- EDMINISTER JOSEPH. A.
2. Engineering Electromagnetics- William H.Hayt & John.A.Buck Mc.Graw-Hill Companies 7th edition - 2006

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II B.Tech I-Sem (EEE) T C

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(A0303103) FLUID MECHANICS AND HYDRAULIC MACHINERY

(Common to EEE, ME)

OBJECTIVES:

- At the end of this course, the student will understand the some fundamental aspects of fluid motion, including important fluid properties, regimes of flow, and pressure variations in fluids at rest and in motion, fluid kinetics.
- Emphasis is placed on understanding how flow phenomena are described mathematically. The effects of fluid friction on pressure and velocity distributions are also considered in some detail.
- The similitude, dimensional analysis and flow measurement should be able to apply to the analysis and of hydraulic machines.
- The student will be able to apply the knowledge to solve more complicated problems and study the effect of problem parameters and able to describe the construction and working of different types of hydraulic machines and also plot the performance curves of hydraulic machines.
- The student will be prepared to continue the study and analyze the fluid flows and hydraulic machines to solve the complicated practical problems.

OUTCOMES:

- To introduce design concepts of turbines and engines

UNIT I

Fluid Statics: Dimensions and units: Physical properties of fluids-specific gravity, viscosity, surface tension-vapor pressure and their influence on fluid motion- atmospheric gauge and vacuum pressure –measurement of pressure- Piezometer, U-tube and differential manometers. Hydrostatic force on a plane area

UNIT II

Fluid Kinematics: 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. **Fluid dynamics:** 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

Closed conduit flow: Laminar and turbulent flow through pipes: Reynolds experiment significance of Reynold's number, formulae for laminar flow through circular pipes, Turbulent flow-Darcy Weisbach equation, friction factor and Mody's diagram - 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.

UNIT IV

Basics of Turbo Machinery: 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

Hydraulic Turbines : Introduction to hydroelectric power station-heads and efficiencies-Classification of turbines, impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, work done, efficiencies , hydraulic design –draft tube theory-functions and efficiency.

Performance of Hydraulic Turbines: Geometric similarity, Unit and specific quantities, characteristic curves, governing of turbines, cavitation, selection of type of turbine.

UNIT VI:

Centrifugal Pumps: Classification, working, Work done and efficiency, loss of head; specific speed, minimum starting speed and characteristic curves for centrifugal pumps. Pumps in series and parallel, NPSH. **Reciprocating Pumps:** Working, Discharge, slip, indicator diagrams, Characteristic curves.

TEXT BOOKS:

1. Hydraulics, fluid mechanics and Hydraulic machinery MODI and SETH.
2. Fluid Mechanics and Hydraulic Machines by R. K. Rajput.
3. Fluid Mechanics and Hydraulic Machines by R.K. Bansal

REFERENCES:

1. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, Kotaria & Sons.
2. Fluid Mechanics and Machinery by D. Rama Durgaiah, New Age International.
3. Hydraulic Machines by Banga & Sharma, Khanna Publishers.
4. Instrumentation for Engineering Measurements by James W. Dally, William E. Riley, John Wiley & Sons Inc. (Chapter 12 – Fluid Flow Measurements).

II B.Tech I-Sem (EEE)

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(A0203103) CIRCUIT THEORY

OBJECTIVES:

- This course introduces the basic concepts of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline.
- The emphasis of this course if laid on the basic analysis of circuits which include single phase circuits, magnetic circuits, theorems, transient analysis and network topology

OUTCOMES:

- Improves analytical and design skills

UNIT – I

DC CIRCUITS: Introduction of Circuit Concept – R-L-C parameters – Types of Voltage and Current sources – Source transformation – Voltage-Current relationship for passive elements – Kirchhoff's laws – Network Reduction Techniques – Series, Parallel, Series-Parallel, Star-to-Delta or Delta-to-Star transformation, Nodal Analysis, Mesh Analysis, Super Node and Super Mesh Analysis

UNIT – II

AC CIRCUITS: R.M.S. and Average values and form factor of different periodic wave forms, Steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation – Concept of Reactance, Impedance, Susceptance and Admittance – Phase and Phase difference - Concept of Power factor, Real and Reactive Powers - j-notation, Complex and Polar forms of representation, Complex Power

UNIT - III

LOCUS DIAGRAMS: Locus diagrams - Series R-L, R-C, R-L-C and parallel combinations with variation of various parameters

UNIT – IV

RESONANCE: Resonance – Series, Parallel circuits, Concept of Bandwidth and Q-factor

UNIT - V

NETWORK THEOREMS: Network theorems : (Without proof) : Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity, Millman's, Tellegen's and Compensation theorems for dc and ac excitations

UNIT - VI

MAGNETIC CIRCUITS: Magnetic Circuits – Faraday's Laws of electromagnetic induction – Concept of self and mutual inductances – dot convention – coefficient of coupling – Composite Magnetic Circuits – Analysis of Series and Parallel Magnetic Circuits

TEXT BOOKS:

1. Network Theory – Sudhakar and Shymmohan, TMH Publications
2. Circuit Theory (Analysis & Synthesis) – A.Chakrabarthi, Dhanpat Rai & Co

REFERENCES:

1. Electric Circuits - J. Edminister & M. Nahvi, - Schaum's Outlines, Tata Mc Graw-Hill Publishing Company Ltd., 1999.
2. Engineering Circuit Analysis - by William Hayt and Jack E. Kemmerly, Mc Graw-Hill Companies, 5th edition.
3. Network Analysis –M.E Van Valkenberg

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGG & TECHNOLOGY, NANDYAL

AUTONOMOUS

ELECTRICAL AND ELECTRONICS ENGINEERING

II B.Tech I-Sem (EEE)

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(A0401103) ELECTRONIC DEVICES AND CIRCUITS

(Common to ECE, EIE, EEE)

OBJECTIVES:

- The course intends to provide an overview of the principles, operation and application of the analog building blocks like diodes, BJT, FET etc for performing various functions.
- To provide an overview of amplifiers, feedback amplifiers and oscillators.
- To gain the knowledge on existing and future analog circuits.

OUTCOMES:

- To introduce basic semiconductor devices.

UNIT- I

SEMICONDUCTOR DIODE CHARACTERISTICS: PN junction Diode equation, VI characteristics of p-n diode, Static and Dynamic Resistances, Temperature dependence of VI characteristic, Diode equivalent circuits, Diode capacitances, Breakdown Mechanisms in Semi Conductor Diodes, Zener diode characteristics, Principle of operation and Characteristics of Tunnel Diode with the help of energy band diagrams, Varactar Diode, Schottky Barrier Diode, Thermistor.

UNIT- II

RECTIFIERS, FILTERS AND REGULATORS: PN junction as a Rectifier, Half wave rectifier, ripple factor, full wave rectifier, Bridge rectifier, Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L- ?section filter, Π- section filter, comparison of various filter circuits? in terms of ripple factors, Simple circuit of a regulator using Zener diode

UNIT- III

BJT TRANSISTORS: Operation of BJT, Transistor as an amplifier, Junction transistor, Detailed study of currents in a transistor, Input and Output characteristics of transistor in CB, CE, and CC configurations, Relation between Alpha, Beta and Gamma.BJT specification, Transistor as an Amplifier, Principle of operation and characteristics of SCR

UNIT-IV

TRANSISTOR BIASING AND STABILISATION: DC and AC Load lines, Operating point, Importance of Biasing, Fixed bias, Collector to Base, Voltage Divider bias, Bias stability, Stabilization factors, (S, S', S''), Compensation techniques, (Compensation against variation in V_{BE}, I_{co},) Thermal run away, Thermal stability in CE configuration

UNIT- V

FET TRANSISTORS: Operation and Characteristics, Pinch-Off voltage, Small signal model of JFET, MOSFET characteristics (Enhancement and depletion mode), Symbols of MOSFET, Comparison of Transistors (BJT, FET, and MOSFET), Principle of operation and characteristics of UJT

UNIT-VI

BJT AND FET AMPLIFIERS: Small signal low frequency transistor amplifier circuits, h-parameter representation of a transistor, Analysis of single stage transistor amplifier (CE, CB, and CC) using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of transistor configurations in terms of A_I , $R_{i\,,}$ A_v , $R_{o,}$ Small signal model of JFET, Analysis of single stage FET amplifier (CS, CG, and CD) using h-parameters

TEXT BOOKS:

1. Electronic Devices and Circuits – J.Millman, C.C.Halkias, and Satyabratha Jit Tata McGraw Hill, 2nd Ed., 2007.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 9th Edition, 2006.
3. Electronic Devices and Circuits- David A. Bell, 5th Edition, 2008, Oxford University Press.

REFERENCES:

1. Electronic Devices and Circuits – T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson
2. Education, 6th edition, 2004.
3. Principles of Electronic Circuits – S.G.Burns and P.R.Bond, Galgotia Publications, 2nd Edn.., 1998.
4. Microelectronics – Millman and Grabel, Tata McGraw Hill, 1988.
5. Electronic Devices and Circuits – Dr. K. Lal Kishore, B.S. Publications, 2nd Edition, 2005.
6. Electronic Devices and Circuits- Prof GS N Raju I K International Publishing House Pvt. Ltd 2006

II B.Tech I-Sem (EEE)

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(A0402103) SIGNALS AND SYSTEMS

(Common to ECE, EEE, EIE)

OBJECTIVES:

- Basic operations on Matrices.
- Generation of various signals and sequences (Periodic and aperiodic).
- Convolution between signals and sequences.
- Autocorrelation and cross correlation between signals and sequences.
- Verification of linearity and time invariance properties of a given continuous/discrete system.
- Locating zeros and poles and plotting the pole-zero maps in S-plane and Z-plane for the given transform functions.

OUTCOMES:

- Improves analytical and design skills

UNIT-1

INTRODUCTION TO SIGNALS: Analogy between vectors and signals, Orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, Closed or complete set of orthogonal functions, Orthogonality in complex functions, Exponential and sinusoidal signals, Concepts of Impulse function, Unit step function, Signum function

UNIT-2

REPRESENTATION OF SIGNALS USING FOURIER SERIES AND FOURIER TRANSFORMS: Representation of Fourier series, Continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Complex Fourier spectrum, Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and Signum function.

UNIT-3

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS: Linear system, impulse response, Response of a linear system, Linear time invariant (LTI) system, Linear time variant (LTV) system, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time.

UNIT-4

CONVOLUTION AND CORRELATION OF SIGNALS: Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Convolution property of Fourier transforms. Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between auto correlation function and energy/power spectral density function. Relation between convolution and correlation, Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering

UNIT-5

LAPLACE TRANSFORMS: Review of Laplace transforms, Partial fraction expansion, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's relation between L.T's, and F.T. of a signal.

UNIT-6

SAMPLING THEOREM AND Z-TRANSFORM: Representation of continuous time signals by its sample - Sampling theorem – Reconstruction of a Signal from its samples, aliasing – discrete time processing of continuous time signals, sampling of band pass signals. Fundamental difference between continuous and discrete time signals, discrete time signal representation using complex exponential and sinusoidal components, Periodicity of discrete time using complex exponential signal, Concept of Z- Transform of a discrete sequence. Distinction between Laplace, Fourier and Z transforms. Region of convergence in Z-Transform, constraints on ROC for various classes of signals, Inverse Z-transform, properties of Z-transforms

TEXT BOOKS

1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.

REFERENCES

1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2nd Edition.
2. Network Analysis - M.E. Van Valkenburg, PHI Publications, 3rd Edn., 2000.
3. Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition, 2008.
4. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, Pearson education.3rd Edition, 2004.
5. Signals and Systems- S.C Goyal, Technical Publication

II B.Tech I-Sem (EEE)

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(A0007103) APTITUDE, ARITHMETIC, REASONING AND COMPREHENSION
(AUDIT COURSE)

OBJECTIVES:

- To improve analytical & reasoning skills

OUTCOMES:

- To improve the placement opportunities

QUANTITATIVE APTITUDE

- Number Systems, Averages, Problems on ages, Allegations, Percentages, Profit and Loss, Simple interest and Compound Interest, Ratio and Proportions and Variation, Time and Work, Time and Distance, Mensuration, Functions, Set Theory, Permutation and Combinations, Probability, Progressions, Inequalities, Coordinate Geometry, quadratic Equations, Logarithms
- HCF and LCM, Decimal Fractions, Simplification, Square Roots and Cube Roots, Surds and Indices, Pipes and Systems, Area, Volume and Surface Areas, Races and Games, Calendar, Clocks, Stocks and Shares, True Discount, Banker's Discounts
- Data Interpretation – Tabulation – Bar Graphs – Pie Charts – Line Graphs.

REASONING

Directions, Blood Relations, Problems on cubes, Series and sequences, odd man out, Coding and decoding, Data Sufficiency, logical deductions, Arrangements and Combinations, Groups and Teams, General Mental Ability, Puzzles to puzzle you, More Puzzles, Brain Teasers, Puzzles and Teasers.

REFERENCES:

1. Arun Sharma (2003), *How to Prepare for Quantitative Aptitude*, TMH Publishers, New Delhi.
2. R.S. Aggarwal (2005), *Quantitative Aptitude*, S.Chand Publishers, New Delhi.
3. Sharon Weiner-Green, Ira K.Wolf (2006), *Barron's GRE,* Galgotia Publications, New Delhi.
4. R.S Aggarwal (1998), *Verbal and Non-Verbal Reasoning,* S.Chand Publishers, New Delhi.
5. Shakuntala Devi (2005), *Puzzles to Puzzle You,* Orient Paper Backs Publishers, New Delhi.
6. Shakuntala Devi (2006), *More Puzzles,* Orient Paper Backs Publishers, New Delhi.
7. Ravi Narula (2005), *Brain Teasers,* Jaico Publishing House, New Delhi.
8. George J Summers (2005), *Puzzles and Teasers,* Jaico Publishing House, Mumbai.

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(A0491103) ELECTRONIC DEVICES & CIRCUITS LAB

(Common to ECE, EEE, EIE)

OBJECTIVES:

- To understand the performance characteristics of diodes, BJT, FET.
- To develop the knowledge on qualitative analysis and makes use of simple models and equation to illustrate the concepts involved.
- To observe the I/O characteristics of Semiconductor switching devices

OUTCOMES:

- Verification of theoretical concepts through experimentation

Electronic Workshop Practice (in 3 lab sessions):

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of Active Devices, Diodes, BJTs, Low power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, SCR, UJT.
3. Study and operation of
   - Multi-meters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies.
4. Study and Operation of CRO.

(For Laboratory examination – Minimum of 10 experiments)

1. Generating the Lissajious patterns and finding unknown frequency.
2. PN Junction diode characteristics.
3. Zener diode characteristics and Zener as a Regulator.
4. Transistor CB characteristics (Input and Output).
5. Transistor CE characteristics (Input and Output).
6. Rectifier without filters (Full wave & Half wave).
7. Rectifier with filters (Full wave & Half wave).
8. FET characteristics.
9. MOSFET characteristics.
10. SCR characteristics.
11. UJT characteristics.
12. Series and shunt regulators using transistors.

Equipment required for Laboratories:

1. Regulated Power supplies (RPS) - 0-30v
2. CROs - 0-20M Hz.
3. Function Generators - 0-1 M Hz.
4. Multimeters
5. Decade Resistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Micro Ammeters (Analog or Digital) - 0-20 µA, 0-50µA, 0-100µA, 0-200µA
8. Voltmeters (Analog or Digital) - 0-50V, 0-100V, 0-250V
9. Electronic Components - Resistors, Capacitors, BJTs, LCDs, SCRs, UJTs, FETs, LEDs, MOSFETs, diodes (Ge & Si type), transistors (NPN & PNP type)

II B.Tech I-Sem (EEE)

P	C
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(A0492103) SIGNALS & SYSTEMS SIMULATION LAB

(Common to ECE, EEE, EIE)

OBJECTIVES:

- To simulate and test different signals and theorems

OUTCOMES:

- Verification of theoretical concepts through experimentation

1. Basic operations on Matrices.
2. Generation of various signals and sequences (Periodic and aperiodic). Such as unit impulse, unit step, square, saw tooth, triangular, sinusoidal, ramp, sinc function.
3. Operation on signals and sequences such as addition, multiplication, scaling, shifting, folding, computation of energy and average power.
4. Finding the even and odd parts of signal or sequence and real imaginary parts of signals.
5. Convolution between signals and sequences.
6. Autocorrelation and cross correlation between signals and sequences.
7. Verification of linearity and time invariance properties of a given continuous/discrete system.
8. Computation of unit sample, unit step and sinusoidal responses of the given LTI system and verifying its physical realizability and stability properties.
9. Gibbs phenomenon.
10. Finding the Fourier transform of a given signal and plotting its magnitude and phase spectrum.
11. Waveform synthesis using Laplace Transform.
12. Locating zeros and poles and plotting the pole-zero maps in S-plane and Z-plane for the given transform functions.
13. Generation of Gaussian noise (real and complex), computation of its mean, M.S.Values and its skew, kurtosis and PSD, probability distribution function.
14. Sampling theorem verification.
15. Removal of noise by auto correlation/cross correlation in a given signal corrupted by noise.
16. Impulse response of a raised cosine filter.
17. Verification of Weiner-Khinchine relations.
18. Checking a Random process for stationary in wide sense.

Using Licensed MATLAB of version 7.0 and above

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(A0392103) FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

(Common to EEE, ME)

OBJECTIVES:

- Verification of theoretical concepts through experimentation

OUTCOMES:

- Verification of theoretical concepts through experimentation

List of Experiments:

1. Verification of Bernoulli's Equation
2. Calibration of Mouthpiece/orifice
3. Calibration of Triangular/Rectangular Notch
4. Calibration of Venturi meter
5. Calibration of Orifice meter
6. Determination of Friction Factor for a given pipe line
7. Impact of Jet on Vanes
8. Performance Test on Pelton Wheel
9. Performance Test on Francis Turbine
10. Performance Test on Kaplan Turbine
11. Performance Test on Single Stage Centrifugal Pump
12. Performance Test on Reciprocating Pump

II B.Tech II-Sem (EEE)

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(A0010103) ENVIRONMENTAL STUDIES

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

OBJECTIVES:

- To make students aware of the environment problems. Topics in the subject help the student know about the natural resources their depletion, effects and solutions for the problems.

OUTCOMES:

- To understand the realistic needs keeping in mind the environmental, social, ethical responsibilities

UNIT-I

Introduction of Environmental Studies-Natural Resources: Definition, The Global environment and its segments; Structure and composition of atmosphere, hydrosphere, lithosphere and biosphere Scope and Importance of Environmental Studies – Need for Public Awareness. Renewable and non-renewable resources – Natural resources and associated problems – Forest resources: Introduction –deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources :Introduction– Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Introduction, environmental effects of extracting and using mineral resources, case studies. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. - Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

UNIT – II

ECOSYSTEMS: Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem:

a) Forest ecosystem
b) Grassland ecosystem
c) Desert ecosystem
d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT – III

BIODIVERSITY AND ITS CONSERVATION: Introduction - Definition: genetic, species and ecosystem diversity. - Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a mega diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. - Endangered and endemic species of India - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – IV

ENVIRONMENTAL POLLUTION: Definition, Cause, effects and control measures of :

a) Air pollution
b) Water pollution
c) Soil pollution
d) Marine pollution
e) Noise pollution
f) Thermal pollution
g) Nuclear hazards

Solid waste Management: Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT–V

SOCIAL ISSUES AND THE ENVIRONMENT: From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, and watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case Studies -Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. -Wasteland reclamation. –Consumerism and waste products. – Environment Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT–VI

HUMAN POPULATION AND THE ENVIRONMENT: Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. ,Infectious deseases,-Tuber colossi,cancer,Water Borne Deseases-Malaria,Diheria -Women and Child Welfare. - Role of information Technology in Environment and human health. -Case Studies.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.
3. A Basic Course in environmental Studies by S.Deswal and A.Deswal ,Dhanpat Rai & Co

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AUTONOMOUS

ELECTRICAL AND ELECTRONICS ENGINEERING

II B.Tech II-Sem (EEE)

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(A0206104) ELECTRICAL MACHINES-I

OBJECTIVES:

- Electrical machines course is one of the important courses of the electrical discipline.
- In this course the different types of DC motors and generators which are widely used in industry are covered.
- It also helps to study the performance aspects of DC motors and generators
- To provide basic laboratory exposure to DC machine principles and applications.

OUTCOMES:

- It helps to study the performance aspects of DC motors and generators

UNIT-I

D.C GENERATORS: Principle of operation – Elementary Generator - Constructional details - types of armature windings - use of equalizer rings - dummy coils - E.M.F. equation – Types of DC generators – Power division - problems

Armature reaction-Remedies for field distortion - Armature, Ampere-turns – Compensating winding – commutation – methods of improving commutation – equalizer connections

UNIT-II

D.C GENERATORS- CHARACTERISTICS: Characteristics of DC generators - building up of e.m.f of self excited dc shunt generator - causes for failure – critical field resistance and critical speed – characteristics of shunt, series and compound generators – applications of DC generators – parallel operation of DC generators – reasons for paralleling – requirements – paralleling of shunt, compound generators - use of equalizer bar

UNIT – III

DC MOTORS: Principle of operation – back or counter e.m.f – comparison between motor and generator action - torque developed – Mechanical power developed by a DC motor –types of DC motors - motor characteristics – comparison of DC motor characteristics - applications of DC motors - speed control of DC motors

TYPES OF STARTERS: Starting of dc motors – starters for shunt and compound motors, series motor – calculation of starter steps for DC shunt motor.

UNIT-IV

LOSSES, EFFICIENCY AND TESTING OF DC MACHINES: Losses & efficiency – losses-copper, iron, mechanical – efficiency of DC machines – condition for maximum efficiency

TESTING OF D.C MACHINES: Brake test – Swinburne's test – Hopkinson's test – Retardation test — Field's test – temperature rise test

UNIT-V

TRANSFORMERS: General aspects – basic definitions - working principle – rating – kinds of transformers – construction - Types –windings, terminals, tappings, bushings – transformer cooling - ideal transformer – e.m.f. equation – transformation ration - operation on no-load, load – resistance and magnetic leakage - equivalent resistance and reactance – voltage drop in a transformer – regulation - Kapp regulation diagram - equivalent circuit

UNIT-VI

TESTING OF TRANSFORMERS: Transformer tests - O.C and S.C tests – Sumpner's or Back to Back test- Transformer losses, efficiency - All-day efficiency - Auto transformers – polarity of transformers – per unit values – parallel operation of transformers – Induction regulators.

TEXT BOOKS:

1. "Electric Machines" - R.K Rajput (1998), Laxmi Publicationd (P) Ltd.
2. Theory & performance of Electrical Machines- J.B.Gupta, S.K.Kataria & Sons, 2009

REFERENCES:

1. Electric Machinery-A.E. Fritzgerald, C. Kingsley and S. Umans, Mc Graw Hill companies, 5th edition
2. H.Cotton (1997), "Advanced Electrical Technology", Wheeler Publishers.
3. I.J.Nagrath & D.P. Kothari (2002), "Electric Machines", TMH.

II B.Tech II-Sem (EEE) T C
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(A0210104) NETWORK THEORY

OBJECTIVES:

- To impart strong foundation in network analysis and synthesis
- To introduce three phase circuit and analysis
- To design filters using basic electrical elements
- To give strong foundation in all electrical core subjects

OUTCOMES:

- Improves analytical and design skills

UNIT – I

GRAPH THEORY: Network topology - Definitions – Graph – Tree, Basic cutset and Basic Tie set matrices for planar network – Loop and Nodal methods of analysis of Networks with dependent and independent voltage and current sources - Duality & Dual networks.

UNIT – II

THREE PHASE CIRCUITS: Three phase circuits : Phase sequence – Star and delta connection – Relation between line and phase voltages and currents in balanced systems – Analysis of balanced and Unbalanced 3 phase circuits – Application of Millman's theorem to unbalanced circuits - Measurement of 3 phase power, active power and reactive power.

UNIT – III

DC TRANSIENT ANALYSIS: Transient response of RL, RC, RLC circuits (Series and Parallel combinations) for D.C excitation - Initial conditions –Classical method and Laplace transform methods of solutions – Response of RL, RC, RLC for step, ramp, pulse and impulse excitations using Laplace transform methods.

UNIT – IV

AC TRANSIENT ANALYSIS: Transient response of RL, RC, RLC circuits (Series and Parallel combinations) for sinusoidal excitations - Initial conditions –Classical method and Laplace transform methods of solutions.

UNIT – V

TWO PORT NETWORKS-I: Two Port network parameters – Z, Y, (ABCD) Transmission and Hybrid parameters for Resistive Networks and their relations

UNIT – VI

TWO PORT NETWORKS-II: Concept of Transformed Network – 2 port network parameters using transformed variables-cascaded networks - Filters – Low pass- High pass and Band pass filters – Constant K and M-derived filters and composite filter design.

TEXT BOOKS:

1. Network Theory – Sudhakar and Shymmohan, TMH Publications
2. Circuit Theory (Analysis & Synthesis) – A.Chakrabarthi, Dhanpat Rai & Co

REFERENCES:

1. Electric Circuits - J. Edminister & M. Nahvi, - Schaum's Outlines, Tata Mc Graw-Hill Publishing Company Ltd., 1999.
2. Engineering Circuit Analysis - by William Hayt and Jack E. Kemmerly, Mc Graw-Hill Companies, 5th edition.
3. Network Analysis –M.E Van Valkenberg

II B.Tech II-Sem (EEE)

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(A0406104) ANALOG ELECTRONIC CIRCUITS

OBJECTIVES:

- This course presents a thorough study of the following basic circuits and techniques: Transmission networks like differentiator and integrator.
- These include how pulse type signals are transmitted, shaped or amplified by linear circuits.
- To study Clippers, Comparators, Clampers, the transistor as switch, switching timings, different multi-vibrators and time-base generators.

OUTCOMES:

- It helps to know about different multi vibrators, wave shaping circuits

UNIT- I

LARGE SIGNAL AMPLIFIERS: Class-A Power 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 Runaway, Heat sinks

UNIT- II

FEEDBACK AMPLIFIERS: Concept of feedback, Classification of feedback amplifiers, Generalcharacteristics of negative feedback amplifiers, Effect of Feedback on input and output characteristics,Voltage series, voltage shunt, current series, and current shunt feedback amplifiers –simple problems

UNIT-III

OSCILLATORS: Condition for oscillations - RC-phase shift oscillators with Transistor and FET, Hartley andColpitts oscillators, Wein bridge oscillator, Crystal oscillators, Frequency and amplitude stability of oscillators,

UNIT IV

LINEAR WAVESHAPING: High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. RC network as differentiator and integrator, attenuators, RL and RLC circuits and their response for step input, Ringing circuit.

UNIT V

NON-LINEAR WAVE SHAPING: Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper, Comparators, applications of voltage comparators, clamping operation, clamping circuits using diode with different inputs, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, Transfer characteristics of clampers.

UNIT VI

MULTIVIBRATORS & TIME BASE GENERATORS: Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors. General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators.

TEXT BOOKS

1. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall,9th Edition, 2006.
2. Solid State Pulse circuits - David A. Bell, PHI, 4th Edn.., 2002 .

REFERENCES

1. Electronic Devices and Circuits – J.Millman, C.C.Halkias, and Satyabratha Jit Tata McGraw Hill, 2nd Ed., 2007
2. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, McGraw-Hill, 1991.

II B.Tech II-Sem (EEE)

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(A0207104) CONTROL SYSTEMS

(Common to ECE, EIE, EEE)

OBJECTIVES:

- Be prepared to apply mathematics, established scientific and engineering knowledge, for the development and implementation of a broad range of electronic systems
- Be knowledgeable about current technologies and be prepared to adapt to technology advances and ensure professional growth through an appreciation for lifelong learning.
- Basic skill in methods of design and analysis across a broad range of electrical and computer engineering areas

OUTCOMES:

- To know various applications and analytical methods of control systems

UNIT-I

NTRODUCTION: Concepts of control systems – Open loop and closed loop control systems and their differences, examples – Types of feedback control systems. Mathematical modelling of Electrical & Mechanical(translational & rotational) systems, differential equations- Electrical analogous (F-V,F-I) of mechanical system- use of Laplace transforms in control systems-Transfer function: concepts, features-Transfer functions of above systems

UNIT-II

BLOCK DIAGRAM & SIGNAL FLOW GRAPH REPRESENTATION: Block diagram representation of electrical systems and reduction techniques - Signal flow graphs and reduction using mason's gain formula-Transfer function of DC servomotor, AC servomotor

UNIT-III

TIME RESPONSE ANALYSIS: Definition & classification of time response- Standard test signals – Type & order of a system- Transient response of fist order and 2^{nd} order systems for step input- Transient response specifications- Steady state response- Steady sate errors and error constants- Effects of PD, PI & PID controllers.

UNIT- IV

STABILITY ANALYSIS IN S-DOMAIN: The concept of stability - Routh stability criterion, special cases, advantages and limitations.

Root locus technique: The root locus concept, construction of root loci- Effects of adding poles and zero's to G(s) H(s) on the root loci.

UNIT- V

FREQUENCY RESPONSE ANALYSIS: Introduction – Steady state response to sinusoidal input (frequency response) - Bode diagrams- Phase margin and gain margin- Stability analysis from Bode plots- Determination of transfer function from Bode diagram.

UNIT – VI

POLAR AND NYQUIST PLOTS: Polar plots - Nyquist plots- Stability analysis

TEXT BOOKS:

1) Control System Engineering – I.J. Nagarath and M.Gopal, New age international (P) limited, 2^{nd} edition
2) Control systems – U A Bakshi & V U Bakshi, Technical Publications, Pune

REFERENCES:

1) Automatic control systems – B.C. kuo, Jhon wiley and son's 2003
2) Modern control engineering – Katsuhiko Ogata, PHI, 3^{rd} edition1998
3) Control Systems Engineering- NISE, 3^{rd} Edition-John Wiley

II B.Tech II-Sem (EEE)

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(A0208104) GENERATION AND DISTRIBUTION OF ELECTRIC POWER

OBJECTIVE:

- Power Systems-I is one of the important courses of the electrical discipline.
- This course helps to know different means of Electrical Generation, Distribution of power considering economical aspects.

OUTCOME:

- To know Generation, distribution of power considering economical aspects

UNIT I

ENERGY GENERATION WITH CONVENTIONAL SOURCES: Thermal Power Stations (TPS): Line Diagram of TPS, description of various parts like Economizers, Boilers, Super Heaters, Turbines, Condensers, Chimneys and Cooling Towers. Paths of air, coal, Flue gases.

Hydro Power Stations (HPS): Selection of site, Classification, Layout, description of Main Components.

UNIT II

NUCLEAR POWER STATION (NPS): Nuclear Fission, Chain reaction, Nuclear Fuels-Principle of operation of Nuclear reactor-its Parts, Radiation Hazards, Shielding and Safety Precautions-Types of nuclear reactors and brief description of PWR, BWR & FBR.

UNIT III

SUBSTATIONS: Classification of Substations - Air insulated substations (AIS)-indoor and outdoor substations. Bus bar arrangements in substations: simple arrangements like single bus bar, sectionalized single bus bar, main and transfer bus bar system with relevant diagrams.

Gas insulated Substations (GIS): advantages, different types, single line diagram, bus bar, construction aspects, installation and maintenance of GIS. Comparison of AIS and GIS

UNIT IV

DISTRIBUTION SYSTEM: Classification and comparison of AC & DC Distribution Systems - Comparison of Underground and over head Distribution System - Voltage drop calculations in DC distribution for following cases – Radial Distributor-fed one end, both ends (equal and unequal voltages), Ring main Distributor, and inter grid-Voltage drop calculations in AC distribution for following cases – p.f. refer to receiving end voltage and w.r.t load voltages.

UNIT V

ECONOMIC ASPECTS OF POWER GENERATION: Load Curve, Load duration Curves- Load, demand, diversity, capacity, utilization and plant use factors-numerical problems.

UNIT VI:

TARIFF METHODS: Cost of generation & their division into fixed, semi fixed & running cost - Desirable characteristics of tariff method – tariff methods – flat rate, block-rate tariff, two part tariff, three part tariff & power factor tariff methods & numerical problems.

TEXT BOOKS:

1. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A.Chakrabarthy, Dhanpat Rai & Co Pvt. Ltd.
2. Principles of power systems - by V.K.Mehata and Rohit Mehata S.Chand
3. Power Systems Engineering by R.K Rajput,Laxmi Publishhers

REFERENCES:

1. Element Power station design and practice by M.V Deshpande,wheeler Publishing.
2. Power System Analysis and Design by B.R.Gupta, Wheeler Publishing.
3. Electrical Power Generation ,Transmission and distribution by S.N Singh

II B.Tech II-Sem (EEE)

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(A0009103) CORPORATE MANAGEMENT SKILLS

OBJECTIVES:

- To make the students aware of the corporate culture do & don'ts and managerial policies and structure
- To motivate the students towards learning through right way of communicating

OUTCOMES:

- To improve communication, behavioural skills

UNIT I

Concept of Communication – Significance, Scope and functions of Business Communication – Process and dimensions of communication – Essentials of good communication – Channels of communication – Formal, informal communication – Upward, Downward, Horizontal communication – Grapevine Phenomenon.

UNIT II

Types of communication: **Verbal – Oral Communication:** Advantages and limitations of oral communication, written communication – Characteristics, significance, advantages & Limitations of written communication.

UNIT III

Non verbal Communication: Sign language – Body language – Kinesics – Proxemics – Time language and Hap tics: Touch language.

UNIT IV

Interpersonal communication – Interpersonal communication – Communication models: Exchange theory – Johari window – Transactional analysis, Communication styles.

UNIT V

Managing Motivation to Influence Interpersonal communication – Inter-personal perception – Role of emotion in inter personal communication.

UNIT VI

Barriers to communication: Types of barriers – Technological – Socio-Psychological barriers – Overcoming barriers. Listening – Types of listening – Tips for effective listening..

REFERENCES:

1. Business Communication, Meenakshi Raman, Oxford University Press.
2. Business Communication, Raymond V.Lesikar, Neeraja Pandit et al.,TMH
3. English for Business Communication, Dr.T.M Farhatulla, Prism books Pvt. Ltd.
4. Business Communications,Hudson,5/e,Jaico Publications
5. Business communication for managers, Penrose, Raspbery, Myers, Cengage
6. The Skills of Communication, Bills Scot, Gower publishing company Limited, London.
7. Effective Communication, Harward Business School, Harward Business Review No.1214.
8. Essentials of Business Communication, Rajendra Pal, JS.Korlahhi, S.Chand

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(A0294104) CIRCUIT THEORY LAB

OBJECTIVES:

- Verification of theoretical concepts through experimentation

OUTCOMES:

- To know the basics and resolving of different electrical circuits

1. Series and Parallel Resonance
2. Locus Diagram of RL & RC Series Circuits
3. Verification of Thevenin's & Norton's Theorem
4. Verification of Maximum Power Transfer and Reciprocity Theorem
5. Verification of Superposition & Millmann's Theorem
6. Verification of Compensation Theorem
7. Measurement of Active Power for Star and Delta Connected Balanced Loads
8. Measurement of Three Phase Power By Two Wattmeter Method For Unbalanced Loads
9. Z & Y Parameters
10. Hybrid & ABCD Parameters
11. Determination of Self, Mutual Inductances and Coefficient of Coupling

II B.Tech II-Sem (EEE)

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(A0295104) CIRCUITS SIMULATION LAB

OBJECTIVES:

- Verification of theoretical concepts through experimentation

OUTCOMES:

- Analysis of electrical and electronic circuits using MATLAB & PSPICE

I. PSPICE Simulation of the following

1. To draw the V-I characteristics of a diode
2. To draw the DC transfer characteristics of Zener diode
3. To draw the output characteristics of BJT(NPN) transistor
4. To draw the input/output characteristics of JFET
5. Calculate the dc voltage gain, the input resistance and the output resistance of a differential amplifier with a transistor voltage source.

II. MATLAB Simulation of the following

1. Analysis of Series RLC Circuit
2. Verification of Super Position Theorem
3. Verification of Thevinin's Theorem
4. Verification of Norton's Theorem
5. Verification of Maximum Power Transfer Theorem

II B.Tech II-Sem (EEE)

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(A0296104) ELECTRICAL MACHINES –I LAB

OBJECTIVES:

- Verification of theoretical concepts through experimentation
- To study the behavior and characteristics of different machines

OUTCOMES:

- Verification of theoretical concepts through experimentation

Note: The following experiments are to be performed compulsorily

1. Magnetization characteristics of DC shunt generator. Determination of critical field resistance and critical speed.
2. Load test on DC compound generator. Determination of characteristics.
3. Swinburne's test. Predetermination of efficiencies.
4. Brake test on DC compound motor. Determination of performance curves.
5. Hopkinson's test on DC shunt machines. Predetermination of efficiency.
6. Separation of losses in a DC shunt motor.
7. O.C & S.C test on single phase transformer.
8. Sumpner's test on a pair of single phase transformers

Note: A minimum of two experiments are to be performed from the following.

1. Load test on DC shunt generator. Determination of characteristics.
2. Brake test on DC shunt motor. Determination of performance curves.
3. Field's test on DC series machines. Determination of efficiency
4. Speed control of Dc shunt motor.

III B.Tech I-Sem (EEE)

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(A0211105) ELECTRICAL MACHINES-II

OBJECTIVE:

- This course is an extension of Electrical machines-I which facilitates to study the performance of Transformers and Induction motors
- In this course the different types of AC machines which are widely used in industry are covered.
- To provide basic laboratory exposure to AC machine principles and applications.

OUTCOMES:

- To familiarize the working of transformers and their performance behavior

UNIT –I

POLY PHASE TRANSFORMERS: Polyphase transformers - Polyphase connections - Y/Y, Y/Δ, Δ/Y, Δ/Δ and open Δ, Third harmonics in phase voltages-three winding transformers-tertiary windings-determination of Zp, Zs and Zt transients in switching - off load and on load tap changing; Scott connection.

UNIT – II

POLY PHASE INDUCTION MOTORS: Poly phase induction motors-construction details of cage and wound rotor machines-production of a rotating magnetic field - principle of operation - rotor emf and rotor frequency - rotor reactance, rotor current and pf at standstill and during operation.

UNIT-III

CHARACTERISTICS OF INDUCTION MOTORS: Rotor power input, rotor copper loss and mechanical power developed and their inter relation-torque equation- expressions for maximum torque and starting torque - torque slip characteristic - equivalent circuit - phasor diagram - crawling and cogging -double cage and deep bar rotors**.**

UNIT-IV

TESTING OF INDUCTION MOTORS: Load test - Circle diagram-no load and blocked rotor tests-predetermination of performance-methods of starting and starting current and torque calculations

UNIT-V

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 – Doubly Fed Induction Generator- working principle

UNIT – VI

SINGLE PHASE MOTORS: Single phase induction motor – Constructional features-Double revolving field theory – Elementary idea of cross-field theory – split-phase motors – shaded pole motor-equivalent circuit – No load & Blocked rotor test.

TEXT BOOKS:

1. Theory and Performance of Electrical machines- J.B.Gupta
2. Electrical Machinery by P.S.Bimbhra, Khanna Publishers

REFERENCE BOOKS:

1. Electric machinery - A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw Hill Companies, 5th edition
2. Generalized theory of Electrical Machines by P.S.Bimbra
3. Electric Machines –by I.J.Nagrath & D.P.Kothari,Tata Mc Graw Hill, 7th Edition 2005.
4. Electrical Machines, 2nd edition – by Ashfaq Hussain

III B.Tech I-Sem (EEE)

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(A0410105) DIGITAL ELECTRONICS

OBJECTIVES:

- Understand the different number system, its conversions and binary arithmetic.
- Know the fundamentals of Boolean algebra and theorems, Karnaugh maps including the minimization of logic functions to SOP or POS form.
- Analysis of logic circuits and optimization techniques to minimize gate count, signals, IC count, or time delay.
- To strengthen the principles of logic design and use of simple memory devices, flip-flops, and sequential circuits.
- To fortify the documentation standards for logic designs, standard sequential devices, including counters and registers.
- To understand the logic design of programmable devices, including PLDs, RAMS, and ROMS including its sequencing and control.

OUTCOMES:

- To give fundamentals required for MPMC, embedded systems

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 & 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 gates –universal gates-Multilevel NAND/NOR realizations. Map method, Prime implicants, Don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime –Implicant chart.

UNIT III

COMBINATIONAL LOGIC DESIGN: Design using conventional logic gates, Encoder, Decoder, Multiplexer, De-Multiplexer, Modular design using IC chips, MUX Realization of switching functions Parity bit generator, Code-converters, Hazards and hazard free realizations.

UNIT IV

PROGRAMMABLE LOGIC DEVICES, THRESHOLD LOGIC: Basic PLD's-ROM, PROM, PLA, PLD Realization of Switching functions using PLD's. Capabilities and limitations of Threshold gate, Synthesis of Threshold functions, Multigate Synthesis.

UNIT V

SEQUENTIAL CIRCUITS: 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 modulo-N Ring & Shift counters, Serial binary adder, sequence detector, Mealy and Moore models.

UNIT VI

ALGOROTHIMIC 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.

TEXTBOOKS:

1. Switching & Finite Automata theory – Zvi Kohavi, TMH,2nd Edition.
2. Digital Design – Morris Mano, PHI, 3rd Edition, 2006.

REFERENCES:

1. An Engineering Approach to Digital Design – Fletcher, PHI. Digital Logic – Application and Design – John M. Yarbrough, Thomson.
2. Fundamentals of Logic Design – Charles H. Roth, Thomson Publications, 5th Edition, 2004.
3. Digital Logic Applications and Design – John M. Yarbrough, Thomson Publications, 2006.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGG & TECHNOLOGY, NANDYAL

AUTONOMOUS

ELECTRICAL AND ELECTRONICS ENGINEERING

III B.Tech I-Sem (EEE)

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(A0411105) LINEAR & DIGITAL IC APPLICATIONS

OBJECTIVE:

- Qualitative understanding of the inner-workings of some linear ICs such as op amps
- Analysis and design of linear op amp circuits
- Analysis and design of nonlinear op amp circuits
- Analysis and design of nonlinear circuits using other ICs such as monolithic comparator ICs
- Studying the practical considerations of op amps and their effects on the analysis and design of linear and nonlinear op amp circuits
- Introducing other ICs in common use in electronic systems; e.g., converters such as A/D, D/A, V/F, F/V, etc.

OUTCOMES:

- To introduce various OP-amp's ,timers and its applications

UNIT I

INTEGRATED CIRCUITS: Classification, chip size and circuit complexity, basic information of Op-amp, ideal and practical Op-amp, internal circuits, Op-amp characteristics, DC and AC characteristics, 741 op-amp and its features, modes of operation-inverting, non-inverting, differential.

UNIT II

OP-AMP APPLICATIONS: Basic application of Op-amp, instrumentation amplifier, ac amplifier, Voltage to Current and Current to Voltage converters, sample & hold circuits, multipliers and dividers, Differentiators and Integrators, Comparators, Schmitt trigger, Multivibrators, introduction to voltage regulators, features of 723.

UNIT III

ACTIVE FILTERS & OSCILLATORS: Introduction, 1st order LPF, HPF filters. Band pass, Band reject and all pass filters. Oscillator types and principle of operation – RC, Wien and quadrature type, waveform generators – triangular, sawtooth, square wave and VCO.

UNIT IV

TIMERS & 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 of 565.

UNIT V

D-A AND A- D CONVERTERS: Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC. DAC and ADC specifications.

UNIT VI

LOGIC FAMILIES: Classification of Integrated circuits, comparison of various logic families, standard TTL NAND Gate- Analysis& characteristics, TTL open collector O/Ps, Tristate TTL, MOS & CMOS open drain and tristate outputs, CMOS transmission gate, IC interfacing- TTL driving CMOS & CMOS driving TTL .

TEXT BOOKS

1. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd, 2nd Ed., 2003.
2. Op-Amps & Linear ICs – Ramakanth A. Gayakwad, PHI, 1987.
3. Digital Fundamentals – Floyd and Jain, Pearson Education,8th Edition, 2005.

REFERENCES:

1. Operational Amplifiers and Linear Integrated Circuits – R.F. Coughlin and Fredrick F. Driscoll, PHI, 1977.
2. Operational Amplifiers and Linear Integrated Circuits: Theory and Applications –Denton J. Daibey, TMH.
3. Design with Operational Amplifiers and Analog Integrated Circuits - Sergio Franco, McGraw Hill, 3rd Ed., 2002.
4. Digital Fundamentals – Floyd and Jain, Pearson Education, 8th Edition, 2005.

III B.Tech I-Sem (EEE)

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(A0212105) TRANSMISSION OF ELECTRICAL POWER

OBJECTIVE:

- This course is an extension of Power Systems-I course.
- It deals with the basic theory of transmission lines modeling and their performance analysis.
- It also gives emphasis on mechanical design of transmission lines, cables and insulators.

OUTCOME:

- It deals with basic theory, design and analysis of transmission lines

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 & 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 three phase, single and double circuit lines, Numerical Problems.

UNIT-II

PERFORMANCE OF ALL TYPES OF TRANSMISSION LINES: Classification of Transmission Lines - Short, medium and long line and their model - representations - Nominal-T, Nominal-Pie and A, B, C, D Constants. Numerical Problems. Mathematical Solutions to estimate regulation and efficiency of all types of lines - Numerical Problems.

Long Transmission Line-Rigorous Solution, evaluation of A,B,C,D Constants, Interpretation of the Long Line Equations – Representation of Long lines – Equivalent T and Equivalent – π – surge Impedance and surge Impedance loading - wavelengths and Velocity of propagation – Ferranti effect, Charging current.

UNIT – III

POWER SYSTEM TRANSIENTS: Types of System Transients - Travelling 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 (Numerical Problems). Bewley's Lattice Diagrams (for all the cases mentioned with numerical examples).

UNIT-IV

CORONA: Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference.

UNIT-V

STUDY OF INSULATORS AND SAG ON OVERHEAD LINES: Types of Insulators, String efficiency and Methods for improvement, Numerical Problems - voltage distribution, calculation of string efficiency, Capacitance grading and Static Shielding.

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 its applications.

UNIT-VI

UNDERGROUND 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. Numerical problems.

TEXT BOOKS:

1. Principles of Power Systems by V. K. Mehta & Rohith Mehta.
2. Electrical power systems - by C.L.Wadhwa, New Age International (P) Limited, Publishers,1998.

REFERENCES:

1. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A Chakrabarthy, Dhanpat Rai & Co Pvt. Ltd.
2. Power System Analysis and Design by B.R.Gupta, S. Chand & Co, 6th Revised Edition, 2010.
3. Modern Power System Analysis by I.J.Nagarath and D.P.Kothari, Tata McGraw Hill, 2nd Edition.
4. Power System Engineering by R. K. Rajput, Laxmi Publications, 1st Edition.

III B.Tech I-Sem (EEE) T C
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(A0213105) POWER ELECTRONIC CONVERTERS-I

OBJECTIVE:

- This course introduces the basic concepts of power semiconductor devices, converters, choppers, inverters and their analysis.
- With the advent of semiconductor devices, revolution is taking place in the power transmission; distribution and utilization.
- To provide basic laboratory exposure to power semiconductor device principles and applications.

OUTCOMES:

- Introduces basic concepts of power semiconductor devices, converters, choppers etc.

UNIT – I

POWER SEMI CONDUCTOR DEVICES: Introduction- Power Diodes-Diode Characteristics- Power Transistors- Bi-polar Transistor (BJT) - Characteristics- Field Effect Transistor (MOSFET) - Characteristics- Insulated Gate Bipolar Transistor (IGBT)- Thyristors-SCR- Characteristics of Thyristors- Advantages- Limitations and comparison of above devices.

UNIT – II

SCR TRIGGERING AND COMMUTATION CIRCUITS: Two transistor analogy – SCR – R and RC Triggering - UJT firing circuit – Line Commutation and Forced Commutation circuits–di/dt and dv/dt protection using Snubber circuit – Specifications and Ratings of SCR's, BJT, IGBT - Numerical problems

UNIT – III

SERIES AND PARALLEL OPERATION OF THYRISTORS: Series operation of thyristors-Need for equalizing network-network design-triggering of series connected thyristors-Parallel operation of thyristors-Methods for ensuring proper current sharing-triggering of thyristors in parallel-String efficiency-Derating-Numerical Problems

UNIT – IV SINGLE PHASE HALF CONTROLLED CONVERTERS

Introduction to Converters-types-Phase control technique – Single phase Line commutated converters – Midpoint and Bridge connections – Half controlled converters with Resistive, RL loads– Derivation of average load voltage and current -Active and Reactive power inputs to the converters without and with Freewheeling Diode –Numerical problems

UNIT – V

SINGLE PHASE FULLY CONTROLLED CONVERTERS: Fully controlled converters, Midpoint and Bridge connections with Resistive, RL loads - Derivation of average load voltage and current – Line commutated inverters -Active and Reactive power inputs to the converters without and with Freewheeling Diode, Effect of source inductance – Derivation of load voltage and current – Numerical problems

UNIT – VI

THREE PHASE LINE COMMUTATED CONVERTERS: Three phase converters – Three pulse and six pulse converters – Midpoint 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

TEXT BOOKS:

1. Power Electronics Handbook : Circuits, Devices and Applications – by M. H. Rashid, Prentice Hall of India, 2nd edition, 1998.
2. Power Electronics - by P.S. Bimbhra, Khanna Publications.

REFERENCE BOOKS:

1. Power Electronics – by M. D. Singh & K. B. Kanchandhani, Tata Mc Graw – Hill Publishing company, 1998.
2. Power Electronics - by V.R.Murthy , OXFORD University Press, 1st edition -2005.
3. Power Electronics-by P.C.Sen, Tata Mc Graw-Hill Publishing.
4. Power Electronics - Essentials & Applications by L. Umanand, Wiley India Pvt. Ltd.

III B.Tech I-Sem (EEE)

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(A0012105) MANAGEMENT SCIENCE

OBJECTIVES:

- Understand the concepts of management, administration and organization.
- To apply the concept of work study in the day to day life.
- To understand the concepts of corporate planning.
- To understand the importance of Human Resources, Marketing and Production managements
- To understand the concepts the strategic planning and techniques.

OUTCOMES:

- To inculcate entrepreneurship and management qualities

UNIT-I

INTRODUCTION TO MANAGEMENT: Concepts of Management – Nature, Importance and Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Mayo's Hawthorne Experiment, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation

UNIT-II

BASIC ISSUES IN ORGANIZATION: Designing Organic Structures of Organization (Line organization, Line and staff organization, Functional organization, Committee organization, Matrix organization, Virtual organization, Cellular organization, Team structure, Boundary less organization and Departmentation, Leadership Styles, Social responsibilities of Management

UNIT-III

OPERATIONS MANAGEMENT: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Materials Management: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records - Supply Chain Management, Marketing: Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle., Channels of distribution.

UNIT-IV

HUMAN RESOURCES MANAGEMENT: Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs. PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

UNIT-V

PROJECT MANAGEMENT (PERT/CPM): Network Analysis, Programme Evaluation 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-VI

WOMEN ENTREPRENEURSHIP: Scope of Entrepreneurship among women- Promotional efforts supporting Women Entrepreneurs in India – Opportunities for women entrepreneurs – Challenges/Problems of Women Entrepreneurs – Successful cases of Women Entrepreneurs.

TEXT BOOK:

1. Aryasri: Management Science, TMH, New Delhi.

REFERENCE BOOKS:

1. Kotler Philip & Keller Kevin Lane: Marketing Mangement 12/e, PHI, 2007.
2. Koontz & Weihrich: Essentials of Management, 6/e, TMH, 2007
3. Thomas N.Duening & John M.Ivancevich Management—Principles and Guidelines, Biztantra,2007.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2007.
5. Memoria & S.V.Ganker, Personnel Management, Himalaya, 25/e, 2007
6. Schermerhorn: Management, Wiley, 2007
7. Parnell: Strategic Management, Biztantra, 2007.
8. L.S.Srinath: PERT/CPM,Affiliated East-West Press, 2007.

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3 2

(A0214105) ELECTRICAL SYSTEMS SIMULATION-I
(PLECS)
(AUDIT COURSE)

OBJECTIVE OF PIECEWISE LINEAR ELECTRICAL CIRCUITS SIMULATION FOR SIMULINK:

- PLECS is a simulation package specifically designed for power electronics and motor control.
- With fast simulation and friendly user interface, PLECS provides a powerful simulation environment for Power Electronics, Transformation of two-to-three phase, Analog Motor Drive System Studies and their Analysis.
- It is a toolbox for the fast simulation of electrical circuits within the Simulink environment.

OUTCOMES:

- To improve analysis of power electronics & electrical circuits using PLECS

UNIT-I

INTRODUCTION TO PLECS: Brief introduction about the history of PLECS-Installing PLECS-Concepts of PLECS-integration into Simulink-ideal switches

UNIT-II

SIMPLE PASSIVE NETWORKS: Components-Connections-Component properties-units-signals-adding more measurements-Using Simulink models in PLECS

UNIT-III

WORKING WITH PLECS: Configuring PLECS-How to use component browser-Configuring components-Using of Libraries-Connections-Sub circuits-Controlling access to the circuits and sub circuitd-circuit simulation parameters

UNIT-IV

THERMAL MODELLING AND COMMAND LINE INTERFACE (CLI): Heat sink concept-Thermal loss dissipation –Heat sinks and Sub circuits-Reading and Setting parameters of components using CLI commands

UNIT-V

APPLICATIONS-I: Configuration of active elements- Configuration of Passive components- Configuration of Transformers

UNIT-VI

APPLICATIONS-II: Configuration of Non linear elements-Using of DC Machines from library-Equation analysis for the operation of DC motors-Speed controlling with variation in armature voltage and field variations

The following exercises are required to be demonstrated

1. Installation and interfacing with MATLAB/Simulink
2. Power circuit components in PSIM library.
3. Demos with three-phase induction motor.
4. Transformation of two-to-three phase and vice versa.

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(A0496105) IC AND PDC LAB

OBJECTIVES:

- To understand the working of clippers, clampers, logic gates
- To develop the knowledge on different multivibrators and different circuits using op-amps and makes use of simple models and equation to illustrate the concepts involved.

OUTCOMES:

- verification of theoretical concepts through experimentation

List of Experiments:

1. Linear wave shaping
2. Non Linear Wave Shaping – Clippers
3. Non Linear Wave Shaping – Clampers
4. Study of Logic Gates & Some Applications
5. Astable Multivibrator, Monostable Multivibrator using transistors
6. Bistable Multivibrator, Schmit Trigger using transistors
7. IC 741 OP AMP Applications – Adder, Integrator and Differentiator Circuits
8. Active Filters – LPF, HPF (first order)
9. Function Generator using 741 OP AMP
10. IC 555 Timer – Monostable Operation Circuits, Astable Operation Circuits
11. Schmitt Trigger Circuits – Using IC 741 and IC 555
12. Voltage Regulator using IC 723
13. 4 bit DAC using 741 OP AMP

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(A0297105) ELECTRICAL MACHINES-II LAB

OBJECTIVES:

- Verification of theoretical concepts through experimentation
- To study the behavior and characteristics of different machines

OUTCOMES:

- verification of theoretical concepts through experimentation

The following experiments are required to be conducted compulsorily

1. Scott connection of transformers
2. Parallel operation of single phase transformers
3. No-load & Blocked rotor tests on three phase Induction motor
4. Separation of core losses in a single phase transformer
5. Brake test on three phase Induction Motor
6. Regulation of three-phase alternator by a) Synchronous Impedance Method and b) MMF method
7. V and Inverted V curves of a 3 phase synchronous motor.
8. Equivalent Circuit of a single phase induction motor

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

1. Determination of X_d and X_q of a salient pole synchronous machine
2. Regulation of three-phase alternator by Z.P.F. method
3. Load test on three phase induction generator
4. Synchronization of three phase alternator by using Dark Lamp Method

TEXT BOOKS:

1. Electrical Machines Lab manual with MATLAB Programs by Dr. D. K. Chaturvedi, University Science Press.

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(A0298105) CONTROL SYSTEMS & SIMULATION LAB

OBJECTIVES:

- To study the behaviour and characteristics of different machines
- To plot the bode plot, root locus using MATLAB.

OUTCOMES:

- verification of theoretical concepts through experimentation

Note: The minimum of 10 experiments are to be performed from the following, out of which at least two should be software based.

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. Speed-torque characteristics of DC servo motor
5. Transfer function of DC motor
6. Effect of P, PD, PI, PID Controller on a second order systems
7. Transfer function of DC generator
8. Temperature controller using PID
9. Characteristics of magnetic amplifiers
10. Characteristics of AC servo motor
11. DC Position Control System

SOFTWARE BASED EXPERIMENTS

1. To plot root locus diagram of an open loop transfer function and determine range of gain 'k' for stability.
2. To plot a Bode diagram of an open loop transfer function and examine the stability of the system.
3. To draw a Nyquist plot of an open loop transfer function and examine the stability of the closed loop system.
4. To determine response of first order and second order systems for step input and compare theoretical and practical results.

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(A0215106) ELECTRICAL MACHINES-III

OBJECTIVES:

- This course is an extension of Electrical machines-I and Electrical machines- II courses.
- It deals with detailed analysis of synchronous generators and motors which are the prime source of electrical power generation and its utilities.
- It also concerns about the different types of single phase motors which are having significant applications in house hold applications and control systems.
- To provide basic laboratory exposure to AC machine principles and applications

OUTCOMES:

- To familiarize the working of AC machines and their performance behavior

UNIT – I

SYNCHRONOUS GENERATOR: Constructional Features of round rotor and salient pole machines –working principle- Armature windings – Short & Full pitch windings - Integral slot and fractional slot windings; Distributed and concentrated windings – distribution, pitch and winding factors – E.M.F Equation - armature reaction - leakage reactance – synchronous reactance and impedance - phasor diagram – load characteristics.

UNIT – II

REGULATION OF SYNCHRONOUS GENERATOR: Regulation by synchronous impedance method, M.M.F. method, Z.P.F. method and A.S.A. methods – salient pole alternators – two reaction analysis – experimental determination of X_d and X_q (Slip test)– Regulation of salient pole alternators.

UNIT – III

PARALLEL OPERATION OF SYNCHRONOUS GENERATORS: Synchronizing alternators with infinite bus bars – synchronizing power torque – parallel operation and load sharing - Effect of change of excitation and mechanical power input on no load & on load.

UNIT – IV

SYNCHRONOUS MOTORS: Construction- theory of operation – phasor diagram – methods of starting – using external drive-damper winding-slip ring induction motor -variation of current and power factor with excitation – V and Inverted V Curves - synchronous condenser.

UNIT-V

POWER CIRCLES: Excitation and power circles – hunting and its suppression – power angle charecterstics – Power flow - synchronous induction motor.

UNIT – VI

SPECIAL MOTORS: Construction –Principle and operation of Single phase AC series motor- Repulsion Motor- Scharge Motor – Hysterisis Motor –Reluctance motor-variable reluctance stepper motor and permanent magnet stepper motor

TEXT BOOKS:

1. Theory and Performance of Electrical machines- J.B.Gupta
2. Electrical Machinery by P.S.Bimbhra, Khanna Publishers

REFERENCE BOOKS:

1. Electric machinery - A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw Hill Companies, 5th edition
2. Electric Machines/2nd Edn by Husain Ashfaq, Dhanpat Rai & Co. (p) Ltd. (2011)
3. Electric Machines –by I.J.Nagrath & D.P.Kothari,Tata Mc Graw Hill, 7th Edition 2005.
4. Electrical Machines: Theory and Practice by Bandyopadhyay

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ELECTRICAL AND ELECTRONICS ENGINEERING

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(A0216106) ELECTRICAL MEASUREMENTS

OBJECTIVES:

- This course introduces the basic principles of all measuring instruments
- It also deals with the measurement of RLC parameters voltage, current, power factor, power, energy and magnetic measurements.
- To provide basic laboratory exposure to all electrical measuring instruments, their principles and applications.

OUTCOMES:

- Introduces the basic principles of all measuring instruments

UNIT-I

MEASURING INSTRUMENTS*:* Classification – deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, Moving iron type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of range using shunts and series resistance.

UNIT –II

INSTRUMENT TRANSFORMERS AND P.F METER: Current Transformers – Relationships – Ratio and phase angle errors – Causes of errors - Design features – Effect of Secondary open circuit - Potential Transformers – Relationships – errors and its reduction – Construction – Characteristics.

Types of P.F. Meters – dynamometer and moving iron type – 1-ph and 3-ph meters.

UNIT –III

MEASUREMENT OF POWER AND ENERGY: Single phase electrodynamometer wattmeter – Construction – Expression for deflection and control torques - LPF wattmeter – Measurement of power in 3-phase circuits with single, two and three wattmeters methods.

Single phase induction type energy meter – Construction – Operation - expression for deflecting and control torques – errors and compensations – Adjustments

UNIT –IV

POTENTIOMETERS: Basic Potentiometer circuit - Standardization - Principle and operation of D.C. Crompton's potentiometer — Applications of DC Potentiometers – Calibration of Ammeter, Voltmeter - Measurement of unknown resistance.

A.C. Potentiometers –standardization - Types: Polar and Coordinate type – Applications Calibration of Ammeter, Voltmeter - Measurement of unknown resistance.

UNIT – V

D.C BRIDGES: Method of measuring low, medium and high resistance – Wheat stone's bridge and sensitivity– Kelvin's double bridge for measuring low resistance, measurement of high resistance – loss of charge method and meggar.

UNIT – VI

A.C BRIDGES: Measurement of inductance - Maxwell's bridge, Anderson's bridge, Hay's Bridge and Owens Bridge. Measurement of capacitance and loss angle - Desauty Bridge, Wien's bridge – Schering Bridge.

TEXT BOOKS:

1. Electrical & Electronic Measurement & Instruments by A.K.Sawhney Dhanpat Rai & Co. Publications.
2. Electrical Measurements and measuring Instruments – by E.W. Golding and F.C. Widdis, 5th Edition, Reem Publications.

REFERENCE BOOKS:

1. Electrical & Electronic Measurement & Instrumentation by R. K. Rajput, 2nd Edition,S. Chand & Co.
2. Electrical Measurements: Fundamentals, Concepts, Applications – by Reissland, M.U, New Age International (P) Limited, Publishers.
3. Electrical Measurements – by Buckingham and Price, Prentice – Hall
4. Electrical Measurements By K.A.Bakshi, A.V.Bakshi, U.A.Bakshi.

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(A0413105) MICROPROCESSORS & MICROCONTROLLERS

OBJECTIVE:

- To understand the basic architecture of an 8085&8086, 8bit & 16-bit microprocessor respectively.
- By using assembly language for programming of the target microprocessor.
- To understand the correspondence between instruction execution and the timing signals on the microprocessor external buses and pins.
- To understand the interrupt structures and microprocessor interfacing to memory and simple I/O subsystems like USARTS, DMA, Programmable Input-Output, Programmable interrupt controller, DAC/ADC devices.
- To understand the Fundamental assembly language programming skills, functional hardware components of a microcontroller, and skills to interface a variety of external devices with microcontrollers

OUTCOMES:

- To give fundamentals of different processors and controllers and their programming

UNIT-I

Over view of 8085 & 8086 –Architecture, Pin Diagram and Timing Diagrams, Evaluation of microprocessors, Overview of 8085,register organization of 8086,architecture,signal description of 8086,physical memory organization, general bus operations, IO addressing capability, special processor activities, 8086-Minimum mode and maximum mode of operation, Timing diagram.

UNIT-II

8086 Instruction set and Assembler Directives, Addressing modes of 8086, Instruction set of 8086, Assembler Directives and operators

UNIT-III

Assembly Language Programming, 8086 Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation.

UNIT-IV

PROGRAMMABLE PERIPHERAL DEVICES AND THEIR INTERFACING: Memory interfacing to 8086 (static RAM and EPROM). 8255 PPI-various modes of operation and interfacing to 8086. D/A and A/D converter interfacing, Stepper motor interfacing. Interrupt structure of 8086, Vector interrupt table. Interrupt service routines.8259 PIC architecture and interfacing cascading of interrupt controller and its importance.

UNIT-V

8051 MICROCONTROLLER AND ITS PROGRAMMING: Architecture of 8051 microcontroller. Pin Diagram of 8051, and external memories, counters and timers, serial communication, interrupts.

UNIT-VI

8051 Instruction set & Assembly Language Programming, Instruction set of 8051, Addressing modes of 8051, Assembly Language Programming examples using 8051.

TEXT BOOKS:

1. Microprocessor Architecture, Programming and Applications with8085 By Ramesh S Gaonkar.
2. Advanced microprocessor and peripherals-A.K. Ray and K.M.Bhurchandi, 2nd edition, TMH, 2000.

REFERENCES:

1. 8051 microcontroller and embedded systems by mazidi and mazidi ,pearson education 2000.
2. Microprocessors Interfacing-Douglas V.Hall, Revised 2nd edition, 2007.
3. The 8088 and 8086 Microprocessors- Walter A. Triebel, Avtar Singh, PHI, 4th Edition, 2003.
4. 8051 Microcontroller-Internals, Instructions, Programming and Interfacing by Subrata Ghoshal, Pearson, 2010.

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3+1*	4

(A0217106) POWER SYSTEM ANALYSIS

OBJECTIVES:

- This course introduces formation of Z bus of a transmission line, power flow studies by various methods
- It also deals with short circuit analysis and analysis of power system for steady state and transient stability.

OUTCOMES:

- To introduce various power flow studies, analytical methods of power systems

UNIT -I

POWER SYSTEM NETWORK MATRICES-I: Graph Theory: Definitions, Bus Incidence Matrix, Y_{bus} formation by Direct and Singular Transformation Methods, Numerical Problems on Y_{bus} with mutual coupling(max size 3x3) and without mutual coupling.

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).

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 P-V 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 Polar Co-Ordinate Form: Load Flow Solution with or without PV Busses- Algorithm and Flowchart. Decoupled and Fast Decoupled Methods. Comparison of Different Methods

UNIT – V

SHORT CIRCUIT ANALYSIS: Per-Unit System of Representation. Per-Unit equivalent reactance network of a three phase Power System, Symmetrical Component Theory: Symmetrical Component Transformation, Positive, Negative and Zero sequence components: Voltages, Currents and Impedances. Sequence Networks: Positive, Negative and Zero sequence Networks, Numerical Problems. Unsymmetrical Fault Analysis: LG, LL, LLG faults with and without fault impedance, Symmetrical faults, Numerical Problems.

UNIT –VI

POWER SYSTEM 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. Derivation of Swing Equation. Determination of Transient Stability by Equal Area Criterion.

TEXT BOOKS:

1. Modern Power system Analysis – by I.J.Nagrath & D.P.Kothari: Tata McGraw-Hill Publishing Company, 2nd edition.
2. Power System Analysis by Nagsarkar and Sukhija, OXFORD University Press.

REFERENCE BOOKS:

1. Computer Methods in Power Systems, Stagg El – Abiad & Stags, Mc Graw-hill Edition.
2. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.
3. Computer Techniques in Power System Analysis by M A Pai, Second Edition, TMH.
4. Power System Analysis and Design by B.R.Gupta, S. Chand & Co, 6th Revised Edition, 2010.
5. Computer Modeling of Electrical Power Systems by J. Arrillaga and N. R. Watson, John Wiley Student Edition, 2/e.
6. Computer Techniques and Models in Power Systems by K. Uma Rao, I. K. International.
7. Electric Power Systems by S. A. Nasar, Schaum's Outline Series, Revised 1st Edition, TMH.
8. Power System Analysis by Glovar and Sarma, Thomson Publishers.

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(A0218106) POWER ELECTRONIC CONVERTERS-II

OBJECTIVES:

- This subject is an extension of previous power electronics course.
- This course introduces the basic concepts ac voltage controllers, cycloconverters, inverters, choppers and Modern Power Semi conductor devices

OUTCOMES:

- To Introduce Various power electronic circuits for different applications

UNIT – I

AC VOLTAGE CONTROLLERS: Single phase AC voltage controllers – half wave-Full wave-R load –RL load-Using TRIAC- RMS output voltage-Waveforms-Harmonics of output quantities and input current- power factor- Numerical problems.

UNIT – II

CYCLO CONVERTERS: Cyclo converters – Single phase mid point cyclo converters with Resistive and inductive load (Principle of operation only) – Bridge configuration of single phase cyclo converter (Principle of operation only) – Waveforms

UNIT – III

INVERTERS: Inverters – Single phase inverter – Basic series inverter – Basic parallel Capacitor inverter - bridge inverter – Waveforms – Simple forced commutation circuits for bridge inverters – Mc Murray and Mc Murray – Bedford inverters, Voltage control techniques for inverters Pulse width modulation techniques – Numerical problems

UNIT – IV

THREE PHASE INVERTERS: Voltage source inverters- three phase bridge inverters-180^0 mode-120^0 mode-waveforms-RMS voltage-current- expressions- Current source inverter-waveforms-Numerical problems

UNIT – V

CHOPPERS: Choppers – Time ratio control and Current limit control strategies – Step down choppers Derivation of load voltage and currents - Step up Chopper – load voltage and current expressions (with R, RL and RLE loads)-Two quadrant choppers- Four quadrant choppers-operation-waveforms-chopper commutation methods-Numerical problems

UNIT – VI

MODERN POWER SEMICONDUCTOR DEVICES: Modern power semiconductor devices – MOS Turn Off Thyristor (MTO)- Emitter Turn Off Thyristor (ETO) – Integrated Gate-Commutated thyristor (IGCTs)-MOS-controlled Thyristors(MCTs) – Static Induction Thyristors (SITHs) –Power integrated circuits (PICs)

TEXT BOOKS:

1. Power electronics: converters, applications, and design by Ned Mohan, Tore M. Undeland, by John Wiley & Sons.
2. Power Electronics : Circuits, Devices and Applications – by M. H. Rashid, Prentice Hall of India, 2nd edition, 1998.

REFERENCE BOOKS:

1. Power Electronics - by P.S. Bimbhra, Khanna Publications.
2. Power Electronics – by M. D. Singh & K. B. Kanchandhani, Tata Mc Graw – Hill Publishing company, 1998.
3. Power Electronics - by V.R.Murthy , OXFORD University Press, 1st edition -2005.
4. Power Electronics-by P.C.Sen, Tata Mc Graw-Hill Publishing.
5. Power Electronics - Essentials & Applications by L. Umanand, Wiley India Pvt. Ltd.

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3+1* 4

(A0013105) MANAGERIAL ECONOMICS & FINANCIAL ACCOUNTANCY

OBJECTIVES:

- To understand basic principles of managerial economics, accounting, and current business environment underlying business decision making

OUTCOMES:

- To inculcate accounting & decision making in business

UNIT I

Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics–Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

UNIT II

Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

UNIT III

Business & New Economic Environment: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

UNIT IV

Capital and Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance. Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

UNIT V

Introduction to Financial Accounting: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

UNIT VI

Financial Analysis through ratios: Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4th Ed.
3. Suma Damodaran, Managerial Economics, Oxford University Press.
4. Lipsey & Chrystel, Economics, Oxford University Press.
5. S. A. Siddiqui & A. S. Siddiqui, Managerial Economics & Financial Analysis, New age International Space Publications.
6. Domnick Salvatore: Managerial Economics In a Global Economy, 4th Edition, Thomson.
7. Narayanaswamy: Financial Accounting—A Managerial Perspective, PHI.
8. Raghunatha Reddy & Narasimhachary: Managerial Economics& Financial Analysis, Scitech.
9. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas.
10. Truet and Truet: Managerial Economics:Analysis, Problems and Cases, Wiley.
11. Dwivedi:Managerial Economics, 6th Ed., Vikas.

Codes/Tables: Present Value Tables need to be permitted into the examinations Hall.

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(A0219106) ELECTRICAL SYSTEMS SIMULATION-II
(PSIM)
(AUDIT COURSE)

OBJECTIVES OF POWER ELECTRONICS SIMULATOR:

- PSIM is a simulation package specifically designed for power electronics.
- PSIM provides a powerful simulation environment for power converter analysis, control loop design, and motor drive system studies

OUTCOMES:

- To analyse working of power electronic converters through simulation using PSIM

UNIT – I

PSIM INTRODUCTION: Introduction - Circuit Structure - Installing the Program - Simulating a Circuit - Component Parameter Specification and Format

UNIT – II

POWER CIRCUIT COMPONENTS-I: Passive Components: Resistor-Inductor-Capacitor Branches, Switches: Diode and Zener Diode

UNIT – III

POWER CIRCUIT COMPONENTS – II: Thyristor – GTO – Transistors – Bi-Directional Switch – Linear Switches – Examples

UNIT – IV

CONVERTER MODULES-I: Switch Gating Block – Single-Phase Switch Modules – Attributes – Examples

UNIT – V:

CONVERTER MODULES – II: Three-Phase Switch Modules – Attributes – Examples: Control of a Three-Phase VSI Module

UNIT – VI:

TRANSFORMERS: Coupled Inductors – Ideal Transformer – Single -Phase Transformers – Attributes – Examples

REFERENCES:

1. http://www.powersimtech.com

TEXT BOOKS:

1. PSIM User Manual
2. PSIM Version 5.0, May 2001, Copyright 2001 Powersim Inc.

The following exercises are required to be demonstrated

1. Introduction and Installation of PSIM
2. Power circuit components in PSIM library.
3. Single-phase Half-wave uncontrolled rectifier with R and RL loads.
4. Single-phase Full-wave uncontrolled rectifier with R and RL loads.
5. Single-phase Semi-converter with R and RL loads.
6. Single-phase Fully-controlled converter with R and RL loads.
7. Three-phase Half-wave uncontrolled rectifier with R and RL loads.
8. Three-phase Full-wave uncontrolled rectifier with R and RL loads.
9. Three-phase Semi-converter with R and RL loads.
10. Three-phase Fully-controlled converter with R and RL loads.
11. Single Phase AC Voltage Controller with R and RL Loads
12. Single Phase Cyclo converter with R and RL loads

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(A0299106) ELECTRICAL MEASUREMENTS LAB

OBJECTIVES:

- Verification of theoretical concepts through experimentation
- To study the behaviour and characteristics of different equipments

OUTCOMES:

- Verification of theoretical concepts through experimentation

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

1. Calibration and Testing of single phase energy Meter
2. Calibration of dynamometer power factor meter
3. Crompton D.C. Potentiometer – Calibration of PMMC ammeter and PMMC voltmeter
4. Kelvin's double Bridge – Measurement of resistance – Determination of Tolerance.
5. Measurement of 3-Phase power with Two watt meter method (Balanced & Unbalanced)
6. Schering bridge & Anderson bridge
7. Measurement of 3-Phase reactive power with single-phase wattmeter
8. A.C. Potentiometer – Calibration of AC Voltmeter, Parameters of Choke.
9. Measurement of % ratio error and phase angle of given C.T. by comparison.

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

1. Dielectric oil testing using H.T. testing Kit
2. Measurement of 3-Phase active power using 2-CTs and 1-Phase wattmeter
3. Optical bench – Determination of polar curve measurement of MHCP of filament lamps
4. Calibration LPF wattmeter – by Phantom testing
5. Transformer turns ratio measurement using AC bridge.

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3 2

(A0281106) POWER ELECTRONICS AND SIMULATION LAB

OBJECTIVES:

- To understand the performance characteristics of SCR MOSFET & IGBT.
- To generate gate pulses for the thyristors.
- To develop the knowledge on different power electronic circuits and their working practically.
- To design the circuits in a PC using PSIM and simulate them

OUTCOMES:

- Verification of theoretical concepts through experimentation

CHOOSE ANY EIGHT EXPERIMENTS FROM THE FOLLOWING LIST

1. Study of Static Characteristics of SCR, MOSFET & IGBT.
2. Gate firing circuits for SCR.
3. Forced Commutation circuits (Class A, Class B, Class C, and Class D).
4. Single Phase half wave converter with R and RL load.
5. Single Phase full wave mid point converter with R and RL load.
6. Single Phase fully controlled bridge converter with R and RL load.
7. Single Phase Half controlled converter with R and RL load.
8. Three Phase half controlled bridge converter with R and RL load.
9. Three Phase fully controlled bridge converter with R and RL load.
10. Single Phase dual converter with RL load.
11. Single Phase AC Voltage Controller with R and RL Load.
12. Single Phase Cyclo converter with R and RL Load.
13. DC Jones chopper with R and RL Load.
14. Single Phase Parallel inverter with R load.
15. Single Phase series inverter with R load.
16. Single phase full bridge inverter with R load.

CHOOSE ANY TWO SIMULATION EXPERIMENTS FROM THE FOLLOWING LIST

1. Simulation of step down and step up chopper.
2. Simulation of cyclo converter with R and RL load.
3. Three Phase half controlled bridge converter with R and RL load.
4. Three Phase fully controlled bridge converter with R and RL load
5. Simulation of single Phase dual converter with RL load.
6. Simulation of single phase full bridge inverter by using PWM control.

III B.Tech. II-Sem (EEE) P 3 C 2

(A0093105) PROFESSIONAL COMMUNICATION AND SOFT SKILLS LAB

(Common to All Branches)

OBJECTIVES:

- The lab intends to train students to use language effectively, to participate in group discussions, to help them face interviews, and sharpen public speaking skills.
- To enhance the confidence of the student by exposing him/her to various situations and contexts which he/she would face in his/her career

OUTCOMES:

- To introduce the students to improve the speaking skills, group discussions.

INTRODUCTION:

The **Professional Communication and Soft Skills Lab** has been introduced at the III B. Tech level to navigate the students towards the appropriate career orientation. At this stage it is imperative for the student to prepare for the ever growing competition in the job market. In this scenario, the student needs to improve his/her Communication and soft skills in an effective manner to cope up the global trends.

OBJECTIVE:

Keeping in mind the previous exposure of the student to English, this lab focuses on improving the student's proficiency in English at all levels. The lab intends to train students to use language effectively, to participate in group discussions, to help them face interviews, and sharpen public speaking skills and enhance the confidence of the student by exposing him/her to various situations and contexts which he/she would face in his/her career.

The following modules are prescribed for the Professional Communication and Soft skills Lab.

Week –I Professional Spirit

- Motivation & Self Esteem - Questionnaire on self analysis
- Activity- G.D on Personal goals and career objectives
- Case Study – Profile of a successful person

Week –II Concept of Communication -I

- Principles – barriers - Strategies -Analysis through video clipping
- Activity- Elevator pitch (Tell me about yourself)
- Reading Comprehension- 1
- Case study : news reviews

Week –III Concept of Communication -II

- Non verbal communication – kinesics – paralinguistic elements - Analysis through video clipping
- Activity- Elevator pitch (Tell me about yourself)
- Vocabulary: idioms & phrases

Week –IV Concept of Communication -III

- Listening Skills – ROAR Technique – Chinese Pictograph
- Activity- Debate with analysis on Non verbal cues, Gestures & postures
- Reading Comprehension-2
- Case study : TV Interviews/ Movie

Week –V Professional Communication -I

- Group Discussion- Modalities, Process and evaluation
- Activity- Group Discussion
- Vocabulary – Foreign –Derived words

Week –VI Professional Communication -II

- Writing Skills –Letters, Emails & Resume Writing
- Activity- Letter writing and Resume Writing practice
- Reading Comprehension-3
- Analysis of Sample Letters / Memos/ Resume s

Week –VII Job Skills I

- HR Interview Strategies, Questions with analysis - Analysis through video clippings(Typical HR interviews)
- Vocabulary: Technical Jargon
- Activity- Group Discussion / Debate

Week –VIII Job Skills II

- Telephone Interview Strategies - On line interview Tips -Activity- Mock Interview
- Reading Comprehension-4

Week –IX Job Skills III

- Technical Presentation skills
- Activity- Group Discussion Practice

Week –X Soft skills I

- Reading Skills – SQR3 technique – Bloom's Taxonomy
- Technical Presentation Practice - PPTs

Week –XI Soft skills II

- Job Etiquettes
- Communication Project Reviews
- Activity- Group Discussion Practice

Week –XII Soft skills III

- Team communication
- Mock CAT/ GRE Test
- Activity -Mock Interview

MINIMUM REQUIREMENTS:

The English Language Lab shall have two parts: The Computer aided Language lab for 60 students with 60 systems, one master console. LAN facility and English Language Skills Lab with movable Chairs and audio aids with a P.A system, a TV, A digital stereo-audio and video system, Camcorder etc.

PRESCRIBED SOFTWARE: Department in-built data, K-Van Solutions and Globarena Ltd.

BOOKS PRESCRIBED:

1. Cornerstone: Developing Soft Skills by Robert M. Sherfield, Rhonda J. Montgomery and Patricia G. Moody, published by Pearson Education.
2. Resume's and Interviews by M.Ashraf Rizvi, Tata Mc Graw- Hill, 2008

BOOKS SUGGESTED FOR REFERENCE:

1. The ACE of Soft Skills by Gopal Ramesh and Mahadevan REamesh, Pearson Education, 2010
2. How to Do Well in GDs and Interviews by Dorling Kindersdley (India) Pvt. Ltd., Licencees of Pearson Education in South Asia.
3. Technical Writing by Sharon J.Gerson and Steven M.Gerson , published by Pearson Education
4. Professesional Presentations by Malcolm Goodale , published by Cambridge University Press.

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(A0220107) RENEWABLE ENERGY SOURCES

OBJECTIVES:

- It introduces solar energy its radiation, collection, storage and application.
- It also introduces the Wind energy, Biomass energy, Geothermal energy and ocean energy as alternative energy sources.

OUTCOMES:

- It introduces various renewable energy sources, its collection, storage and usage

UNIT-I

SOLAR RADIATION AND ITS MEASUREMENT: Availability of energy sources- energy scenario in India -Solar Constant-Spectral distribution of extraterrestrial radiation-terrestrial solar radiation-solar radiation geometry-computation of cosθ for any location having any orientation- sunrise, sunset and day length- empirical equation for estimating the availability of solar radiation-solar radiation measurements-solar radiation data for India.

UNIT-II

SOLAR ENERGY COLLECTORS: Introduction-Flat Plate Collector-Effect of Design parameters on performance- laws of thermal radiation-radiation heat transfer between real bodies-transmissivity of cover system-performance analysis of a liquid flat plate collector- total loss coefficient and heat losses-concentrating collectors-types-thermodynamic limits to concentration-performance analysis of cylindrical parabolic collector-compound parabolic concentrator-tracking CPC and solar swing-performance analysis of CPC.

UNIT-III

SOLAR PHOTOVOLTAIC SYSTEM: Introduction-Semiconductor materials and doping- n-type and p-type semiconductors-photon energy-Fermi level- p-n junction-photovoltaic effect- PV cell characteristics- efficiency of solar cells-limits to cell efficiency-semi conductor materials for solar cells-stand alone applications-solar photovoltaic hybrid system-grid interactive solar PV system –solar photovoltaics in India

UNIT-IV

WIND ENERGY: Basic principles of wind energy conversion-site selection considerations-Basic components of wind energy conversion systems-classification of wind turbines-types of rotors (Horizontal & Vertical Axis) and design considerations-Aerodynamic operation of wind turbines-Wind Energy extraction- Extraction of wind turbine power- Wind characteristics- Advantages & Disadvantages of WECS

UNIT-V

FUEL CELLS: Introduction- Principle of operation of a acidic fuel cell- Methanol fuel cell-types of fuel cells-Energy output of fuel cell-efficiency & emf of fuel cell-Gibbs-Helmholtz equation- Characteristics of fuel cell-Thermal efficiency of fuel cell- Advantages & Disadvantages of fuel cells.

UNIT-VI

BIO-MASS & GEOTHERMAL: Bio- mass Resources-Bio-Mass Conversion Technologies-Bio-Chemical Conversion-Bio-mass Gasification Structure of Earth's Interior-Plate tectonic theory-Geothermal Field-Geo thermal Resources-geo thermal power generation-Geo thermal-Preheat hybrid with conventional plant-Utilization of geo thermal energy.

TEXT BOOKS:

1. "Renewable Energy Sources and emerging Technologies" by D.P Kothari, K.C Singhal and Rakesh Ranjan-Eastern Economy Edition-Prentice Hall of India.
2. "Renewable Energy Resources" by G N Tiwari and M K Ghosal- Narosa Publications

REFERENCES:

1. Renewable Energy Sources by John Twidell & Tony Weir.
2. Non-Conventional Energy Systems: Principles, Progress and Prospects by K.M.Mital, Wheeler Publishing
3. Non-Conventional Energy Sources by G.D. Rai, Khanna Publishers
4. Renewable energy sources and emerging technologies by D.P.Kothari, K.C.Singhal, PHI.

IV B.Tech. I-Sem (EEE)

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(A0221107) POWER SYSTEM OPERATION AND CONTROL

OBJECTIVES:

- This subject deals with Economic operation of Power Systems, Hydrothermal scheduling
- Modeling of turbines, generators and automatic controllers are presented.
- It emphasizes on single area and two area load frequency control and reactive power control

OUTCOMES:

- It introduces load scheduling, load frequency control & reactive power control

UNIT – I

ECONOMIC OPERATION OF POWER SYSTEMS: Optimal operation of Generators in Thermal Power Stations, - heat rate Curve – Cost Curve – Incremental fuel and Production costs, input-output characteristics, Optimum generation allocation with line losses neglected-Optimum generation allocation including the effect of transmission line losses – Loss Coefficients, General transmission line loss formula**.**

UNIT – II

HYDROTHERMAL SCHEDULING: Optimal scheduling of Hydrothermal System: Short term coordination-Kirchmayers method-Plant scheduling methods - Constraints in unit commitment - Hydro-Thermal scheduling (mathematical formulation and solution techniques)- Scheduling problems.

UNIT –III

MODELING OF TURBINE & GOVERNOR: Modelling of Turbine: First order Turbine model, Block Diagram representation of Steam Turbines and Approximate Linear Models.

Modelling of Governor: Mathematical Modelling of Speed Governing System – Derivation of small signal transfer function – Block Diagram.

Generator-Load Model.

UNIT –IV

LOAD FREQUENCY CONTROL – I: Necessity of keeping frequency constant-Definitions of Control area – Single area control – Block diagram representation of an isolated power system – Steady state analysis – Dynamic response – Uncontrolled case. Load frequency control of 2-area system – uncontrolled case and controlled case, tie-line bias control

UNIT-V

LOAD FREQUENCY CONTROL – II: Proportional plus Integral control of single area and its block diagram representation- steady state response – Load Frequency Control and Economic dispatch control.

UNIT – VI

REACTIVE POWER CONTROL: Overview of Reactive Power control – Reactive Power compensation in transmission systems – advantages and disadvantages of different types of compensating equipment for transmission systems; load compensation – Specifications of load compensator, Uncompensated and compensated transmission lines: shunt and Series Compensation.

TEXT BOOKS:

1. Modern Power System Analysis – by I.J.Nagrath & D.P.Kothari Tata M Graw – Hill Publishing Company Ltd, 2nd edition.
2. Power System Analysis Operation and Control – A. Chakravarthi and S. Halder, 3rd Edition, PHI.

REFERENCES:

1. Elements of power system analysis by William. D Stevenson Jr. McGraw Hill.
2. Power generation, operation, and control Allen J. Wood, Bruce F. Wollenberg
3. Electric Energy Systems by O I Elgerd, Mc Graw-hill Edition.
4. Electric Power Systems by S. A. Nasar, Schaum's Outline Series, Revised 1st Edition, TMH.
5. Electric power distribution system engineering by Turan Gonen McGraw Hill

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(A0222107) POWER SYSTEM PROTECTION

OBJECTIVES:

- This course introduces all varieties of circuit breakers and relays for protection of generators, transformers and feeder bus bars from over voltages and other hazards
- It also emphasizes on neutral grounding for over all protection

OUTCOMES:

- To introduce various circuit breakers and relays for protection of various equipment

UNIT – I

CIRCUIT BREAKERS-I: Circuit Breakers: Elementary principles of arc interruption, Recovery, Restriking Voltage and Recovery voltages.- Restriking Phenomenon, Average and Max. RRRV, Numerical Problems - Current Chopping and Resistance Switching - CB ratings and Specifications: Types and Numerical Problems. – Auto reclosures.

UNIT – II

CIRCUIT BREAKERS-II: Description and Operation of following types of circuit breakers: Minimum Oil Circuit breakers, Air Blast Circuit Breakers, Vacuum and SF6 circuit breakers.

UNIT – III

ELECTROMAGNETIC RELAYS: Basic Requirements of Relays – Primary and Backup protection - Construction details of – Attracted armature, balanced beam, inductor type and differential relays – Universal Torque equation –Over current, Direction and Distance relays.

UNIT – IV

GENERATOR & TRANSFORMER PROTECTION: Protection of generators against Stator faults, Rotor faults, and Abnormal Conditions. Restricted Earth fault and Inter-turn fault Protection. Numerical Problems on % Winding Unprotected

Protection of transformers: Percentage Differential Protection, Numerical Problem on Design of CT s Ratio, Buchholtz relay Protection

UNIT –V

PROTECTION OF FEEDERS,TRANSMISSION LINES & BUS-BARS: Protection of Feeder (Radial & Ring main) using over current Relays, Protection of Transmission line – 3 Zone protection using Distance Relays. Carrier current protection, Protection of Bus bars – Differential protection

UNIT – VI

NEUTRAL GROUNDING & PROTECTION AGAINST OVER VOLTAGES: Ungrounded & grounded neutral systems-merits of neutral grounded systems-methods of neutral grounding-Solid, Resistance, Reactance and Resonance Grounding-problems.

Generation of Over Voltages in Power Systems.-Protection against Lightning Over Voltages - Valve type and Zinc-Oxide Lighting Arresters

TEXT BOOKS:

1. Switchgear and Protection – by Sunil S Rao, Khanna Publlishers
2. Power System Protection and Switchgear by Badari Ram , D.N Viswakarma, TMH Publications.

REFERENCE BOOKS:

1. Electrical Power Systems – by C.L.Wadhwa, New Age international (P) Limited, Publishers, 3nd editon
2. Fundamentals of Power System Protection by Y. G. Paithankar and S. R. Bhide, 2nd Edition, PHI.
3. Electrical power System Protection by C. Christopoulos and A. Wright, 2nd Edition, Springer International Edition.
4. Power system protection and switch gear by Bhuvanesh Oza, TMH, 2010.

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(A0223107) POWER SEMICONDUCTOR DRIVES

OBJECTIVES:

- This course is an extension of Power Electronics applications to AC and DC drives.
- Control of DC motor drives with single phase and three phase converters and choppers are given in detail.
- The control of AC motor drives with variable frequency converters and variable voltage are presented

OUTCOMES:

- To introduce the speed control of motors using power electronic converters for different applications

UNIT – I

CONTROL OF DC MOTORS BY SINGLE PHASE CONVERTERS AND THREE PHASE CONVERTERS: Introduction to Thyristor controlled Drives, Single Phase Fully controlled converters connected to d.c separately excited and d.c series motors – continuous current operation – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque Characteristics- Problems on Converter fed d.c motors.

Three phase Fully controlled converters connected to d.c separately excited and d.c series motors – continuous current operation -output voltage and current waveforms – Speed and Torque expressions – Speed – Torque characteristics – Problems.

UNIT – II

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 D.C motors by dual converters – Closed loop operation of DC motor (Block Diagram Only)

UNIT-III

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 d.c Motors – Closed Loop operation (Block Diagram Only)

UNIT – IV

CONTROL OF INDUCTION MOTOR FROM STATOR SIDE: Variable voltage characteristics-Control of Induction Motor by Ac Voltage Controllers – Waveforms – speed torque characteristics. Variable frequency characteristics-Variable frequency control of induction motor by Voltage source and current source inverter and cyclo converters- PWM control – Comparison of VSI and CSI operations – Speed torque characteristics – numerical problems on induction motor drives – Closed loop operation of induction motor drives (Block Diagram Only)

UNIT –V

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

UNIT – VI

CONTROL OF SYNCHRONOUS MOTORS: Separate control & 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 – Applications – Advantages and Numerical Problems.

TEXT BOOKS:

1. Fundamentals of Electric Drives – by G K Dubey Narosa Publications
2. Power Electronic Circuits, Devices and applications -by M.H.Rashid, PHI.

REFERENCE BOOKS:

1. Power semiconductor controlled drives – by G K Dubey
2. Power semiconductor drives -by S.B.Dewan, Gordon R.Slemon, A.Straughen
3. Modern Power Electronics and AC Drives by B.K.Bose, PHI.
4. Principles Of Electric Machines And Power Electronics by P.C.Sen
5. Thyristor DC drives by P.C.Sen

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(A0224107) MACHINE DESIGN

(ELECTIVE-I)

OBJECTIVE:

- The objective of this course is to understand and estimate the design consideration issues of different machines like DC machines, transformers, synchronous and asynchronous machines

OUTCOMES:

- Helps in analyzing the design of different macines and their respective winding connections.

UNIT – I

PRINCIPLES OF ELECTRICAL MACHINE DESIGN: Introduction- considerations for the design of electrical machines-limitations- Different types of materials and insulators used in electrical machines.

UNIT – II

DESIGN OF DC MACHINES: Output equation, choice of specific loadings and choice of number of poles, design of Main dimensions of the DC machines, Design of armature slot dimensions, commutator and brushes, magnetic circuit - estimation of ampere turns, design of yoke and poles- main and inter poles, field windings – shunt, series and inter poles.

UNIT – III

DESIGN OF TRANSFORMERS (Single phase and three phase): Output equation for single phase and three phase transformers, choice of specific loadings, expression for volts/turn, determination of main dimensions of the core, types of windings and estimation of number of turns and conductor cross sectional area of Primary and secondary windings, estimation of no load current, expression for leakage reactance and voltage regulation. Design of tank and cooling tubes (round and rectangular)

UNIT – IV

DESIGN OF INDUCTION MOTORS: Output equation, Choice of specific loadings, main dimensions of three phase induction motor, Stator winding design, choice of length of the air gap, estimation of number of slots for the squirrel cage rotor,

UNIT – V

DESIGN OF ROTOR FOR INDUCTION MOTORS: Design of Rotor bars and end ring, design of Slip ring induction motor, estimation of No load current and leakage reactance, and circle diagram.

UNIT – VI

DESIGN OF SYNCHRONOUS MACHINES: Output equation, Choice of specific loadings, short circuit ratio, design of main dimensions, armature slots and windings, slot details for the stator of salient and non salient pole synchronous machines. Design of rotor of salient pole synchronous machines, magnetic circuits, dimensions of the pole body, design of the field winding, and design of rotor of non-salient pole machine .

TEXT BOOKS:

1. A Course In Electrical Machine Design, A.K.Sawhney,Dhanpatt Rai & Sons
2. Design Of Electrical Machines, V. N. Mittle, 4th edition

REFERENCE BOOKS:

1. Performance And Design Of AC Machines, M.G.Say,CBS Publishers and Distributors Pvt.Ltd.
2. Design Data Handbook, A.Shanmugasundarm, G,Gangadharan, R.Palani, Wiley Eastern Ltd.

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(A0225107) MODERN CONTROL THEORY

(ELECTIVE-I)

OBJECTIVE:

- This subject deals with state space, describing function, phase plane and stability analysis including controllability and observability.
- It also deals with modern control and optimal control systems

OUTCOMES:

- It deals with modern and optimal control systems

UNIT – I

STATE VARIABLE DESCRIPTION: Concept of State – State Equations for Linear Continuous time Models – Non uniqueness of state model – State diagrams for continuous time state models – Solution of state equations – State transmission matrix.

UNIT – II

CONTROLLABILITY AND OBSERVABILITY: Tests for controllability and observability for continuous time systems – Time varying case, minimum energy control, time invariant case, Principle of Duality, Controllability and observability of state models in Jordan canonical form and other canonical forms.

UNIT – III

DESCRIBING FUNCTION ANALYSIS: Introduction to nonlinear systems, Types of nonlinearities, Concepts of describing functions, Derivation of describing functions for Dead zone, Saturation, backlash, relay with dead zone and Hysteresis - Jump Resonance.

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.

UNIT-V

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-VI

STABILITY ANALYSIS: Stability in the sense of Lyapunov. Lyapunov's stability and Lypanov's instability theorems. Direct method of Lypanov for the Linear and Nonlinear continuous time autonomous systems.

TEXT BOOKS:

1. Modern Control System Theory – by M. Gopal, New Age International Publishers, 2nd edition, 1996.
2. Advanced Control Theory - by A.Nagoor Kani

REFERENCE BOOKS

1. Modern Control Engineering – by K. Ogata, Prentice Hall of India, 3rd edition, 1998.
2. Control Systems Engineering by I.J. Nagarath and M.Gopal, New Age International (P) Ltd.
3. Systems and Control by Stainslaw H. Zak , Oxford Press, 2003
4. Digital Control and State Variable Methods – by M. Gopal, Tata Mc Graw-Hill Companies, 1997.

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(A0226107) INSTRUMENTATION
(ELECTIVE-I)

OBJECTIVES:

- This course is essential in monitoring and analyzing any physical system and its control.
- It deals with different types of transducers, digital voltmeters, oscilloscopes and measurement of non electrical quantities.

OUTCOMES:

- Helps in monitoring and analyzing a physical system

UNIT-I

CHARACTERISTICS & ERRORS: Measuring Systems - Performance Characteristics - Static characteristics - Dynamic Characteristics; Errors in Measurement – Gross Errors, Systematic Errors, Statistical Analysis of Random Errors**.**

UNIT-II

OSCILLOSCOPE: Cathode ray oscilloscope - time base generator - horizontal and vertical amplifiers - CRO probes-applications of CRO - Measurement of phase and frequency - Lissajous patterns - Sampling oscilloscope - analog and digital type

UNIT-III

ELECTRONIC MEASUREMENTS: Digital voltmeters - Successive approximation, ramp, dual-Slope integration, continuous balance type - Micro processor based ramp type DVM, Digital Frequency meter-Digital Phase angle meter.

UNIT-IV

SIGNAL ANALYZERS: Wave Analysers- Frequency selective analyzers, Heterodyne, Application of Wave analyzers- Harmonic Analyzers, Total Harmonic distortion, spectrum analyzers, Basic spectrum analyzers, spectral displays, vector impedance meter, Q meter - Peak reading and RMS voltmeters

UNIT-V

TRANSDUCERS: Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers; Principle operation of resistor, inductor, capacitor transducers and LVDT, LVDT Applications, Strain gauge and its principle of operation, gauge factor, Thermistor, Thermocouples, Synchros, Piezo electric transducers, photovoltaic, photo conductive cells, photo diodes.

UNIT-VI

MEASUREMENT OF NON-ELECTRICAL QUANTITIES: Measurement of Displacement, Velocity, Angular Velocity, Acceleration, Force, Torque, Measurement of Temperature, Pressure, Vacuum, Flow, Liquid level.

TEXT BOOKS:

1. A course in Electrical and Electronic Measurements and Instrumentation, A.K. Sawhney, Dhanpatrai & Co.
2. Electronic Instrumentation-by H.S.Kalsi Tata MCGraw-Hill Edition, 1995.
3. Transducers and Instrumentation by D.V.S Murthy, Prentice Hall of India

REFERENCE BOOKS:

1. Measurements Systems, Applications and Design – by D O Doeblin
2. Principles of Measurement and Instrumentation – by A.S Morris, Pearson /Prentice Hall of India
3. Modern Electronic Instrumentation and Measurement techniques – by A.D Helfrick and W.D.Cooper, Pearson/Prentice Hall of India.
4. Transducers and Instrumentation by D.V.S Murthy, Prentice Hall of India

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(A1008107) PROGRAMMABLE LOGIC CONTROLLERS

(ELECTIVE-II)

OBJECTIVES:

- This course is essential in monitoring and analyzing the PLC
- In this course Theory and implementation about PLC is discussed in detail.

OUTCOMES:

- Helps in monitoring and analyzing a PLC

UNIT-I

PLC Basics: PLC system, I/O modules and interfacing, CPU processor, 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. Drill press operation.

UNIT-III

Digital logic gates, programming in the Boolean algebra system, conversion examples. Ladder Diagrams for process control: Ladder diagrams & sequence listings, ladder diagram construction and flowchart for spray process system.

UNIT-IV

PLC Registers: Characteristics of Registers, module addressing, holding registers, Input Registers, Output Registers.

UNIT-V

PLC Functions: Timer functions & Industrial applications, counter function & industrial applications, Arithmetic functions, Number comparison functions, number conversion functions

UNIT-VI

Data Handling functions: SKIP, Master control Relay, Jump, Move, FIFO, FAL, ONS, CLR & Sweep functions and their applications. Bit Pattern and changing a bit shift register, sequence functions and applications, controlling of two-axis & three axis Robots with PLC, Matrix functions.

TEXT BOOKS:

1. Programmable Logic Controllers- Principles and Applications by John W. Webb & Ronald A. Reiss, Fifth Edition, PHI
2. Programmable Logic Controllers by W. Bolton, 5th Edition, Elsevier, 2010

REFERENCE BOOKS:

1. Programmable Logic Controllers- Programming Method and Applications –JR. Hackworth &F.D Hackworth Jr. –Pearson, 2004.
2. Programmable controllers, Theory and Implementation –Second edition, E.A. Bryan, An industrial text company publication, USA.

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(A0422107) EMBEDDED SYSTEM CONCEPTS

(ELECTIVE-II)

OBJECTIVE:

- This course gives overview of different embedded systems their computing platform, software development tools.
- It also introduces arm processor, sharc processor with few design examples

OUTCOMES:

- To introduce concept of embedded systems and processors with some examples.

UNIT I

INTRODUCTION: Embedded system overview, embedded hardware units, embedded software in a system, embedded system on chip (SOC), design process, classification of embedded systems.

UNIT II

EMBEDDED COMPUTING PLATFORM: CPU Bus, memory devices, component interfacing, networks for embedded systems, communication interfacings: RS232/UART, RS422/RS485, IEEE 488 bus.

UNIT III

EMBEDDED SOFTWARE DEVELOPMENT TOOLS: Host and target machines, linkers, locations for embedded software, getting embedded software into target system, debugging technique.

UNIT IV

INSTRUCTION SETS: Introduction, preliminaries, ARM processor, SHARC processor.

UNIT V

SYSTEM DESIGN TECHNIQUES: Design methodologies, requirement analysis, specifications, system analysis and architecture design.

UNIT VI

DESIGN EXAMPLES: Telephone PBX, ink jet printer, water tank monitoring system, GPRS, Personal Digital Assistants, Set Top boxes, etc.

TEXT BOOKS:

1. Computers as a component: principles of embedded computing system design- wayne wolf
2. An embedded software premier: David E. Simon
3. Embedded / real time systems-KVKK Prasad, Dreamtech press, 2005

REFERENCES:

1. Embedded real time systems programming-Sri ram V Iyer, pankaj gupta, TMH, 2004.
2. Embedded system design- A unified hardware/software introduction- frank vahid, tony D. Givargis, John Willey, 2002.

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(A0417106) DIGITAL SIGNAL PROCESSING

(ELECTIVE-II)

OBJECTIVE:

- Program a DSP chip to filter signals using either assembly language or a C compiler for the chip. This filter could be a FIR or IIR filter. The student should understand how design algorithms for implementation.
- Understand how digital to analog (D/A) and analog to digital (A/D) converters operate on a signal and be able to model these operations mathematically.
- Use Z transforms and discrete time Fourier transforms to analyze a digital system.
- Design and understand simple finite impulse response filters

OUTCOMES:

- To introduce various filtering methods, processors, analyze time varying signals and applications

UNIT I

SIGNALS & SIGNAL PROCESSING: Characterization and classification of signals, Typical signal processing operation, Examples of Typical signals, Typical signal processing applications,

TIME DOMAIN REPRESENTATIONS OF SIGNALS AND SYSTEMS: Discrete-time signals, operations on sequences, the sampling process, discrete time systems, time domain characterization of LTI discrete time systems, state space representation of LTI discrete time systems, Random signals,

UNIT II

TRANSFORM DOMAIN REPRESENTATIONS OF SIGNALS: The discrete time fourier transform, Discrete fourier transform, Discrete fourier transform properties, Computation of the DFT of real sequences, Linear convolution using the DFT, The z-Transform, region of convergence of a rational z-transform, The inverse z-Transform, Properties of the z-Transform, Transform domain representations of random signals.

UNIT III

TRANSFORM DOMAIN REPRESENTATIONS OF LTI SYSTEMS: The frequency response, The transfer function, Types of transfer functions, Allpass transfer function, Minimum phase and maximum phase transfer functions, Complimentary transfer functions, Digital two pairs, Stability test, Discrete time processing of random signals.

UNIT IV

DIGITAL FILTER STRUCTURES: Block diagram representation, Signal flow graph representation, Equivalent structures, Basic FIR digital filter structures, Basic IIR filter structures, State space structures, Allpass filters, Tunable IIR digital filters, Cascaded lattice realization of IIR and FIR filters, Parallel allpass realization of IIR transfer functions, Digital sine-cosine generator, Computational complexity of digital filter structures, Review of sampling continues time signals.

UNIT V

DIGITAL FILTER DESIGN: Preliminary considerations, Impulse invariance method of IIR filter design, Bilinear transform method of IIR filter design, Design of digital IIR notch filters, Lowpass IIR digital filter design examples, Spectral transformations of IIR filters, FIR filter design based on truncated fourier series, FIR filter design based on frequency sampling approach, Computer aided design of digital filters.

UNIT VI

BASIC CONCEPTS OF MULTIRATE SIGNAL PROCESSING AND APPLICATIONS: Decimation, Interpolation, Implementation of Sampling rate conversion, DSP Applications: Dual tone multifrequency signal detection, Spectral analysis using DFT, Short term discrete fourier transform, musical sound processing.

TEXT BOOKS:

1. Digital Signal Processing A Computer based approach by Sanjit K.Mitra, Tata McGraw Hill, 1998.
2. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.
3. Discrete Time Signal Processing – A.V.Oppenheim and R.W. Schaffer, PHI
4. Digital Signal Processors – Architecture, Programming and Applications,, B.Venkataramani, M. Bhaskar, TATA McGraw Hill, 2002

REFERENCE BOOKS:

1. Digital Signal Processing: Andreas Antoniou, TATA McGraw Hill , 2006
2. Digital Signal Processing: MH Hayes, Schaum's Outlines, TATA Mc-Graw Hill, 2007.
3. DSP Primer - C. Britton Rorabaugh, Tata McGraw Hill, 2005.
4. Fundamentals of Digital Signal Processing using Matlab – Robert J. Schilling, Sandra L. Harris, Thomson, 2007.
5. Digital Signal Processing – Alan V. Oppenheim, Ronald W. Schafer, PHI Ed., 2006

IV B.Tech. I-Sem (EEE)

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(A0227107) ELECTRICAL SYSTEMS SIMULATION-III
(ETAP & POWER WORLD)
(AUDIT COURSE)

OBJECTIVES OF ETAP:

- The main objective of this software is to study and analyze any electrical device and combination of different electrical components and their performance and characteristics. Stability of the system can be determined at any instant and we can estimate the performance at any stage. More over this software is user friendly for both technical and non technical persons.

OBJECTIVES OF POWER WORLD:

- In this course Power World Simulator is used as a software tool, to assist in the analysis of power systems. This is a power system based software package, which makes it ideal for power system analysis problems. This software provides students with a working knowledge of power system problems and computer techniques used to solve some of these problems given below.

OUTCOMES:

- To introduce various factors that affects the power system network and analyse them through simulation.

UNIT-I

LOAD FLOW STUDIES: Calculation of magnitude of voltage and load angle at the PQ bus, calculation of reactive power and load angle at the PV bus and real and reactive power at the slack bus.

UNIT-II

SHORT CIRCUIT ANALYSIS: Calculation of fault current, fault MVA for different faults.

UNIT-III

ECONOMIC LOAD DISPATCH: Determination of active power generation of generators to reduce total the cost of generation.

UNIT-IV

V P-V & Q-V CURVES: These curves of a power system network are plotted to monitor system voltages, real power transfer is increased or reactive power is injected at selected buses.

UNIT-V

CONTINGENCY ANALYSIS: This provides the ability not only to analyze a power system in its base case topology, but also to analyze the system that results from any statistically likely dependent scenario.

UNIT-VI

SIMULATION USING ETAP & POWER WORLD:

The following tasks can be performed using ETAP & POWER WORLD easily:

- Calculation of magnitude of voltage and load angle at the PQ bus, calculation of reactive power and load angle at the PV bus and real and reactive power at the slack bus.
- Calculation of fault current, fault MVA for different faults.
- The behavior of the motor can be determined.
- Harmonic analysis can be determined for a given power system.
- Transient stability of the system can be analyzed.

IV B.Tech. I-Sem (EEE)

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(A0282107) POWER SYSTEMS LAB

OBJECTIVES:

- Verification of theoretical concepts through experimentation
- To study the behaviour and characteristics of different equipments

OUTCOMES:

- Verification of theoretical concepts through experimentation

1. Determination of +ve, -ve and zero sequence impedances of three phase alternator.
2. Determination of +ve, -ve and zero sequence impedances of three phase transformer.
3. Equivalent circuit of a three phase three winding transformer.
4. Fault Analysis(LG, LLG) on a three phase unloaded alternator
5. Fault Analysis(LL, LLLG) on a three phase unloaded alternator
6. IDMT over current relay
7. Directional over current relay
8. Inverse over current relay
9. % Differential relay
10. Solid and Liquid Insulation Tests
11. Earth resistance measurement
12. Capacitance grading method

IV B.Tech. I-Sem (EEE)

P	C
3	2

(A0498105) MICRO PROCESSOR & MICRO CONTROLLER LAB

OBJECTIVES:

- This lab helps in developing the skills in writing the programs for a microprocessors, TASM, microcontroller& interfacing

OUTCOMES:

- Verification of theoretical concepts through experimentation

EXPERIMENTS ON MICROPROCESSOR 8086 KITS:-

INTRODUCTION 8086

1. Arithmetic operations of 8-bit and 16-bit numbers
2. Finding of largest number in a given array
3. Finding of smallest number in a given array
4. Finding out of number of even and odd numbers
5. finding out of number of positive and negative numbers
6. Sum of square of N-numbers
7. Sorting of given numbers
8. Fibonacci series
9. Factorial of a given number
10. Decimal to Hex and Hex to decimal Conversion.

EXPERIMENTS ON COMPUTER SYSTEM:-

INTRODUCTION TO TASM

1. Arithmetic operations of 8-bit and numbers-
2. Finding of largest and smallest number in a given array
3. Finding of smallest number in a given array
4. Finding out number of even and odd numbers
5. Finding out number of positive and negative numbers
6. Sorting of given numbers.
7. Binary addition of given two numbers

EXPERIMENTS ON MICROCONTROLLER 8051 KITS:-

INTRODUCTION

1. Arithmetic operations of 8-bit and 16-bit numbers
2. Finding of largest number in a given array
3. Finding of smallest number in a given array
4. ASCII to Decimal conversion
5. Sorting of given numbers.

INTERFACING USING EITHER 8086 OR 8051

INTRODUCTION

1. Stepper motor interfacing-
2. Traffic light Controller –
3. ADC and DAC conversions-
4. Constant display and Rolling Display

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T	C
3+1*	4

(A0228108) UTILIZATION OF ELECTRICAL ENERGY

OBJECTIVE:

- This subject deals with the fundamentals of illumination and its classification and the electric heating and welding.
- It gives the detailed study of all varieties of Electric drives and their application to electrical traction systems

OUTCOMES:

- It deals with the detailed study of electrical efficacies

UNIT – I

ELECTRIC DRIVES: Advantages- Types of D. C and A. C Motors and their Characteristics – Electric Breaking. Speed Control of D. C and A. C Motors – Temperature Rise and Load Equalization – Selection of Motors for particular Drive.

UNIT – II

ILLUMINATION: Introduction, terms used in illumination, Laws of illumination, Polar curves, electrical Lamps: Incandescent lamp-carbon arc lamp- Fluorescent lamp-Sodium Vapour lamp-mercury vapour lamps-neon lamps and Compact florescent lamps (CFL), advantages of CFL, types of lighting schemes, Requirements of good lighting, Calculation of illumination at a point. Design of Street lighting and Factory lighting – Numerical Problems.

UNIT – III

ELECTRICAL HEATING: Introduction, Advantages with electrical heating, Methods of Electric heating – resistance heating, arc heating, Induction heating and dielectric heating-applications.

UNIT – IV

ELECTRICAL WELDING: Introduction, Methods of Electric welding – Resistance welding, arc welding, gas welding, Ultrasonic welding, Different welding electrodes-applications.

UNIT – V

ELECTRIC TRACTION – I: Introduction, advantages of electric traction, Systems of track electrification, Comparison between A. C and D. C Traction, Different drive systems of traction, general features of Traction Motors, braking system, advantages of electric breaking, Methods of Electric Braking – Plugging, Rheostatic and Regenerative braking.

UNIT – VI

ELECTRIC TRACTION – II: Mechanics of train movement, Speed-time curves of different services – simplified speed time curves (trapezoidal and quadrilateral)- Tractive effort, Calculations of tractive effort, output Power, energy output, determination of specific energy output, specific energy consumption, factors which effects specific energy consumption, Adhesive weight and coefficient of adhesion – Numerical Problems.

TEXT BOOKS:

1. Utilization of Electric Energy – by E. Openshaw Taylor and V. V. L. Rao, Universities Press.
2. Utilization of Electrical Power – by R. K. Rajput, Laxmi Publications.

REFERENCE BOOKS:

1. Utilization of Electrical Power including Electric drives and Electric traction – by N.V.Suryanarayana, New Age International (P) Limited, Publishers, 1996.
2. Utilization of Electric power and electric traction –by G.C.Garg, khanna Publishers
3. Generation, distribution and utilization of electrical energy- by C.L.Wadhwa, New Age International
4. Art & Science of Utilization of electrical Energy – by Partab, Dhanpat Rai & Co.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGG & TECHNOLOGY, NANDYAL

AUTONOMOUS

ELECTRICAL AND ELECTRONICS ENGINEERING

IV B.Tech. II-Sem (EEE)

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(A0506104) OBJECT ORIENTED PROGRAMMING

(ELECTIVE-III)

OBJECTIVES:

- This subject deals with the object oriented programming using java.
- This subjects contains Exception handling, multithreading, event handling and GUI programming with java

OUTCOMES:

- To introduce object oriented programming using java and interface with the real time applications

UNIT I

Java Basics - History of Java, Java buzzwords, comments, data types, variables, constants, scope and life time of variables, operators, expressions, type conversion and casting, enumerated types, control flow- conditional statements, break and continue, simple java program, arrays.

OOP concepts, parameter passing, static fields and methods, access control, this, overloading methods and constructors, recursion, garbage collection, Strings, string functions.

UNIT II

Inheritance – Inheritance concept, Super and Sub classes, Member access rules, types of Inheritance, super uses, final classes and methods, casting, polymorphism- dynamic binding, method overriding, abstract classes and methods, the Object class and its methods.

Interfaces – Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface.

UNIT III

Packages- Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

Files – streams, text Input/output, binary input/output, random access file operations, File management using File class, Using java.io.

Networking in Java – Introduction, Manipulating URLs, Ex. Client/Server Interaction with Stream Socket Connections, Connectionless Client/Server Interaction with Datagrams, Using java.net.

UNIT IV

Exception handling – benefits of exception handling, exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, rethrowing exceptions, built in exceptions, creating own exceptions.

Multithreading - Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, interthread communication, thread groups, daemon threads.

UNIT V

Event Handling - Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

UNIT VI

GUI Programming with Java - The AWT class hierarchy, Introduction to Swing, Swing vs. AWT,MVC architecture, Hierarchy for Swing components, Containers – Top-level containers – JFrame, JApplet, JWindow, JDialog, JPanel, A simple swing application, swing components- Jbutton, JToggleButton, JCheckBox, JRadioButton, JLabel, JTextField, JTextArea, JList, JComboBox, JMenu, capabilities –color control, Font control, Drawing lines, rectangles and ovals, Drawing arcs, Layout management - Layout manager types – border, grid, flow, box.

TEXT BOOKS :

1. Java; the complete reference, 7th editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearson eduction.

REFERENCES :

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley & sons.
2. An Introduction to OOP, second edition, T. Budd, pearson education.
3. Introduction to Java programming 6th edition, Y. Daniel Liang, pearson education.
4. An introduction to Java programming and object oriented application development, R.A. Johnson-Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, seventh Edition, Pearson Education.
6. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education

IV B.Tech. II-Sem (EEE)

T	C
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(A0229108) NEURAL NETWORKS & FUZZY SYSTEMS
(ELECTIVE-III)

OBJECTIVES:

- This course introduces the basics of neural networks and essentials of artificial neural networks with single layer and multilayer feed forward networks.
- It also deals with associative memories and introduces Fuzzy sets and Fuzzy logic system components
- The Neural network and Fuzzy network system application to electrical engineering is also presented.
- This subject is very important and useful for doing project work.

OUTCOMES:

- To introduce the basic concepts of neural networks, fuzzy systems and their applications

UNIT – I

ARTIFICIAL NEURAL NETWORKS: Introduction, Biological Neuron, Artificial Neuron, Basic concepts of Neural Networks, Basic Models of ANN Connections, McCulloch-Pitts Model, Characteristics of ANN, Applications of ANN.

UNIT- II

ESSENTIALS OF ARTIFICIAL NEURAL NETWORKS: Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN – Connectivity, Neural Dynamics (Activation and Synaptic), Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules, Types of Application

UNIT–III

SUPERVISED LEARNING NETWORKS*:* Perceptron Network, Perceptron Learning Rule, Architecture, Perceptron Training Algorithm, ADALINE, MADALINE, Back Propagation Network, BP Learning Rule, Input Layer Computation, Hidden Layer Computation, Output Layer Computation, Radial Basis Function.

UNIT IV

ASSOCIATIVE MEMORY NETWORK: Training Algorithms for Pattern Association, Auto Associative Memory Network, Hetero Associative Memory Network, BAM, Hopfield Networks, Application- ANN based Short term Load Forecasting

UNIT – V

CLASSICAL & FUZZY SETS : Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

UNIT VI

FUZZY LOGIC SYSTEM COMPONENTS: Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods, Application- Fuzzy logic based Unit Commitment .

TEXT BOOKS:

1. Neural Networks and Fuzzy Logic System by Bart Kosko, PHI Publications.
2. Fundamental of Artificial Neural Network and Fuzzy Logic-by Rajesh Kumar, Lakshmi publications

REFERENCE BOOKS:

1. Neural Networks – James A Freeman and Davis Skapura, Pearson Education, 2002.
2. Neural Networks – Simon Hakins , Pearson Education
3. Fuzzy Logic with Engineering Applications by T. J. Ross, 2nd Edition, Wiley India Edition.
4. Principles of – Soft Computing by S. N. Sivanandam and S. N. Deepa, Wiley India Edition.
5. Neural networks by Satish Kumar , TMH, 2004.
6. Neuro Fuzzy and Soft Computing by J. S. R. Jang, C. T. Sun and E. Mizutani, Pearson Education.
7. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by Rajasekharan and Pai – PHI Publications.

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3+1*	4

(A0540108) JAVA & WEB TECHNOLOGIES

(ELECTIVE-III)

OBJECTIVES:

- This subject deals with the basics of java, applets, java scripts,
- This subject deals with the web technologies HTML & XML

OUTCOMES:

- This subject gives knowledge regarding java and real time applications on web technologies

UNIT I

Java Basics - History of Java, Java buzzwords, comments, data types, variables, constants, scope and life time of variables, operators, expressions, control flow- conditional statements, break and continue, simple java program, arrays.

OOP concepts, parameter passing, static fields and methods, access control, this, overloading methods and constructors, recursion, garbage collection, Strings, string functions.

UNIT II

Inheritance – Inheritance concept, Super and Sub classes, Member access rules, types of Inheritance, super uses, final classes and methods, casting, polymorphism- dynamic binding, method overriding, abstract classes and methods, the Object class and its methods.

UNIT III

Interfaces – Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface.

Packages- Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

UNIT-IV

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

UNIT-V

HTML Common tags And JavaScript- List, Tables, images, forms, Frames; Cascading Style sheets; Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script

UNIT-VI

XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX.

TEXT BOOKS:

1. The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH (Chapters: 25) (UNIT 1,2, 3,4)
2. Web Programming, building internet applications, Chris Bates 2nd edition,WILEY Dreamtech (UNITs 5,6)

REFERENCE BOOKS:

1. Programming world wide web-Sebesta,Pearson
2. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education Asia.
3. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley &sons.
4. An Introduction to OOP, second edition, T. Budd, pearson education.
5. Introduction to Java programming 6th edition, Y. Daniel Liang, pearson education.
6. An introduction to Java programming and object oriented application development, R.A.Johnson-Thomson.

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T	C
3+1*	4

(A0230108) PRINCIPLES OF POWER QUALITY

(ELECTIVE-IV)

OBJECTIVES:

- This subject deals with the voltage sags and power interruptions
- It deals with the harmonics , devices used to reduce the harmonics

OUTCOMES:

- It introduces the factors which deteriorates the techniques to improve the power quality

UNIT-I

INTRODUCTION: Power quality, Voltage quality, Concern, power quality Evaluation procedure, Transients, Long-duration- short duration-voltage variations, voltage imbalance, wave form distortion, voltage fluctuation, power frequency variations, power quality terms, CBEMA and ITI curves

UNIT-II

VOLTAGE SAGS AND INTERRUPTIONS: Sources of sagas and interruptions, Estimating voltage sag performance, fundamental principles of protection, solutions at the end-user level, Motor-starting sags, and utility system fault-clearing issues.

UNIT-III

TRANSIENT OVER VOLTAGES: Sources of over voltages, principles of over voltage protection, devices for over voltage protection, utility capacitor-switching transients, utility system lightning protection, switching transient problems with loads

UNIT-IV

FUNDAMENTALS OF HARMONICS: Harmonic Distortion, voltage versus current distortion, harmonics versus transients, power system quantities under non sinusoidal conditions, Harmonic indices, Harmonic sources from commercial loads, Harmonic sources from Industrial loads, system response characteristics, effects of harmonic distortion

UNIT-V

EVALUATION OF HARMONICS: Harmonic distortion evaluations, Principles of Controlling Harmonics, Harmonic studies, Devices for Controlling Harmonic Distortion

UNIT-VI

LONG-DURATION VOLTAGE VARIATIONS: Principles of regulating the voltage, Devices for voltage regulation, utility voltage regulator Application, capacitors for voltage regulation flicker- power quality measuring equipment

TEXT BOOKS:

1. Electrical Power Systems Quality, Roger C. Dugan, Mark F. McGranaghan, Surya Santoso, H.Wayne Beaty, 2nd Edition, TMH Education Pvt. Ptd.
2. Power quality by C. Sankaran, CRC Press

REFERENCE BOOKS:

1. Electrical systems quality Assessment by J. Arrillaga, N.R. Watson, S. Chen, John Wiley & Sons
2. Understanding Power quality problems by Math H. J. Bollen IEEE Press
3. Power system harmonic analysis by J. Arrillaga, John Wiley & Sons
4. Power quality in electrical systems by Alexander Kusko, Marc T. Thompson

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T	C
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(A0231108) INTRODUCTION TO HVDC & FACTS DEVICES

(ELECTIVE-IV)

OBJECTIVES:

- This subject deals with the importance of HVDC transmission, analysis of HVDC converters, Faults and protections, Harmonics and Filters.
- It also deals with Reactive power control and Power factor improvements of the system.

OUTCOMES:

- It deals with the importance of HVDC transmission, control and protection and FACTS devices operation and control

UNIT-I

INTRODUCTION: Comparison of AC and DC Transmission systems, Application of D.C. Transmission, Types or DC links, typical layout of a HVDC converter station. HVDC converters, pulse number, Analysis of three phase Bridge circuit with and without overlap, converter Bridge characteristics, equivalent circuits of rectifier and inverter configurations Twelve pulse converters.

UNIT -II

CONVERTER AND HVDC SYSTEM CONTROL: Principles of DC links control, converter control characteristics, system control Hierarchy, Firing angle control, current and extinction Angle control starting and stopping of DC link.

UNIT –III

CONVERTER FAULT AND PROTECTION: Converter faults – protection against over current and overvoltage in converter station surge arresters – smoothing reactors – DC breakers – Audible noise – space charge field – corona effects on DC lines – Radio interference, Filters

UNIT – IV

FACTS CONCEPTS: Flow of power in AC parallel paths and Meshed systems, Basic types of FACTS controllers, Brief description and Definitions of FACTS controllers.

UNIT - V

STATIC SHUNT & SERIES COMPENSATORS: Objectives of shunt compensation, series compensation, Methods of controllable VAR generation, Static VAR compensators, SVC and STATCOM, comparison.

UNIT - VI

COMBINED COMPENSATORS: Introduction, unified power flow controller (UPFC), Basic operating principle, Independent real and reactive power flow controller, control structure. Static series synchronous compensator (SSSC) – power angle characteristics – Basic operating controls Schemes.

TEXT BOOKS:

1. HVDC power Transmission systems by K.R. Padiyar, Wiley Eastern Limited
2. Understanding of FACTS by N.G. Hingorani & L. Gyugyi, IEEE Press.
3. Facts controllers in power transmission and distribution – by K.R. Padiyar
4. Thyristor-based Facts controllers for electrical Transmission systems. R. Mohan Mathur Ontario Power Generation Toronto, ON, Canada Rajiv K. Varma Indian Institute of Technology Kanpur, India

REFERENCE BOOKS:

1. EHV - AC, HYDC Transmission & Distribution Engineering, S.Rao,Khanna publishers, 3rd edition 2003.
2. Power Electronic Control in Electrical Systems- E Acha. VG Agelidis & O Anaya-Lara. THE Miller – Elsevier, 2009.
3. An Introduction to: Reactive Power Control and Voltage Stability in Power Transmission Systems by Abhijit Chakrabarti, D. P. Kothari, A. K. Mukhopadhyay and Abhinandan De, Eastern Economy Edition, 2010.

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T	C
3+1*	4

(A0232108) SPECIAL MACHINES
(ELECTIVE-IV)

OBJECTIVES:

- This subject deals with the construction, working and characteristics of special machines

OUTCOMES:

- To introduce working of special machines for future applications

UNIT –I

SPECIAL TYPES OF D. C. MACHINES: Series booster–Shunt booster –Non –reversible booster – Reversible booster Armature excited machines–Rosenberg generator–Third-brush generator –Three–wire generator - Dynamometer.

UNIT –II

STEPPER MOTORS: Introduction –Construction, Principle of Operation, Energisation with two phase at a time, Essential conditions for the satisfactory Operation of a 2–Phase Hybrid Stepper Motor–Control Circuits for Stepping Motors – An Open – Loop Controller for a 2-Phase Stepping Motor.

UNIT – III

VARIABLE RELUCTANCE STEPPING MOTORS: Introduction-Construction, Operating Principle, Single–Stack VR step motors, Multiple-stack VR motors–Open Loop Control of 3-Phase VR Step Motor, Closed-Loop Control of Step Motor–Areas of Application of Stepping Motors–Torque developed in the Motor.

UNIT – IV

SWITCHED RELUCTANCE MOTOR: Introduction – Principle of Operation of SRM, Some Distinctive Differences between SR and Conventional Reluctance Motors –Design of stator and Rotor and pole Arcs in SR Motor – Power Converter for SR Motor – Derivation of Torque Expression.

UNIT –V

BRUSHLESS DC MOTOR: Types of Construction – Principle of Operation of BLDM – Sensing and Switching Logic Scheme–Theory of BLDM as Variable Speed Synchronous Motor (Assuming Sinusoidal Flux Distribution) – Methods of reducing Torque Pulsations, 180^0 Pole Arc and 120^0 current sheet.

UNIT –VI

PERMANENT MAGNET MATERIALS AND MOTORS: Introduction – Stator Frames (Pole – and Yoke – Part) of Conventional PM dc Motors, Equivalent circuit of a PM – Development of Electronically Commutated DC Motor from Conventional DC Motor.

Linear Induction Motor - Development of a Double sided LIM from Rotary type IM–A Schematic of LIM Drive for Electric Traction – Development of one sided LIM with back Iron.

TEXT BOOKS

1. K. Venkataratnam, Special Electrical Machines, University Press.
2. R. K. Raj put, Electrical machines, 4th Edition, Laxmi Publications. [For Chapter I refer Chapter VIII of this book]

REFERENCE BOOKS

1. M. G. Say & E. O. Taylor, D. C. Machines, 2nd Edition, ELBS.
2. V. V. Athani, Stepper Motors: Fundamentals, Applications and Design, New Age International Pub.

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3 2

(A0233108) ELECTRICAL SYSTEMS SIMULATION-IV (HOMER)

(AUDIT COURSE)

OBJECTIVES OF HOMER:

- The HOMER energy modeling software is a powerful tool for designing and analyzing hybrid power systems.
- For either grid-tied or off-grid environments, HOMER helps determine how variable resources such as wind and solar can be optimally integrated into hybrid systems.
- HOMER determines the economic feasibility of a hybrid energy system optimizes the system design and allows users to really understand how hybrid renewable systems work.

OUTCOMES:

- To introduce design of hybrid power systems and economic feasibity of this hybrid power systems.

UNIT-I

INTRODUCTION: Renewable Energy Sources – Energy parameters – cogeneration-energy efficiency and conservation – atmospheric pollution-hydro carbons – particulates- thermal pollution

UNIT-II

SOLAR PHOTOVOLTAIC SYSTEM : Solar constant – spectral distribution of extraterrestrial radiation-photo voltaic effect-PV cell equivalent circuit-characteristics

UNIT-III

FUEL CELLS: Principle of operation of fuel cell-types- dynamic model of fuel cell –characteristics –hydrogen as fuel

UNIT –IV

WIND ENERGY CONVERSION: Classification of WT's – HAWT-VAWT – Thrust principle-Aerodynamic principle –characteristics

UNIT-V

HOMER: Micropower system modeling with HOMER-simulation - Optimization - Sensitive Analysis- dealing with uncertainty – sensitive analyses on hourly data sets - Physical Modeling – Loads- primary loads – deferrable load – thermal load - Resources—solar -wind- hydro – biomass- fuel cell - Components- PV Array-wind turbine – hydro turbine-generators-battery bank—grid –boiler- converter- electrolyzer-hydrogen tank

UNIT VI

HOMER: System dispatch –operating reserve-control of dispatchable system components-dispatch strategy-load priority-economic modeling

The following queries can be implemented using HOMER

- Is it cost-effective to add a wind turbine to the diesel generator in my system?
- How much will the cost of diesel fuel need to increase to make photovoltaics cost effective?
- Will my design meet a growing electric demand?
- Is it cost-effective to install a microturbine to produce electricity and heat for my grid-connected facility?

TEXT BOOKS:

1. Renewable Energy Sources and Emerging Technologies-D.P.Kothari,K.C.Singal, Rakesh Ranjan, Prentice hall India.
2. Integration of Alternative Sources Of Energy-by Felix A. Farret, M.Godoy Simoes, IEEE press, John Wiley & Sons,Inc., Publications

REFERENCES

1. J. F. Manwell and J. G. McGowan, A combined probabilistic/time series model for wind diesel systems simulation, Solar Energy, Vol. 53, pp. 481–490, 1994.
2. Maui Solar Energy Software Corporation, PV-DesignPro, http://www.mauisolarsoftware.com, accessed February 2, 2005.
3. PV*SOL, http://www.valentin.de, accessed February 2, 2005.
4. RETScreen International http://www.retscreen.net, accessed February 2, 2005.
5. J. A. Duffie andW. A. Beckman, Solar Engineering of Thermal Processes 2nd ed.,Wiley, New York, 1991.
6. F. M. White, Fluid Mechanics, 2nd ed., McGraw-Hill, New York, 1986.
7. V. A. Graham and K. G. T. Hollands, A method to generate synthetic hourly solar radiation globally, Solar Energy, Vol. 44, No. 6, pp. 333–341, 1990.
8. J. F. Manwell and J. G. McGowan, Lead acid battery storage model for hybrid energy systems, Solar Energy, Vol. 50, pp. 399–405, 1993.
9. C. D. Barley and C. B.Winn, Optimal dispatch strategy in remote hybrid power systems, Solar Energy, Vol. 58, pp. 165–179, 1996.