RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

AUTONOMOUS

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

ELECTRONICS AND INSTRUMENTATION ENGINEERING

ESTD: 1995

II, III & IV B.Tech SYLLABUS

Applicable for students admitted into B.Tech (Regular) from 2012-13
&
B.Tech (Lateral Entry Scheme) from 2013-14

REGULATIONS, COURSE STRUCTURE & DETAILED SYLLABUS

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY,
NANDYAL-518501, KURNOOL (DIST), A.P., INDIA

AUTONOMOUS INSTITUTE

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

ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABI

B.Tech (Regular) from 2012-13 and B.Tech (Lateral Entry Scheme) from 2013-14

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 2012-13 onwards. Any reference to "Institute" or "College" in these rules and regulations shall stand for Rajeev Gandhi Memorial College of Engineering and Technology (Autonomous).

All the rules and regulations, specified hereafter 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 AP 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 is to be obtained.

ii) 20% of the sanctioned strength in each programme of study (of RGMCET) shall be filled by the Convener, ECET as lateral entry.

List of Programs offered

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

Academic Regulations for 2012 B. Tech (Regular)

(Effective for the students admitted into the I year from the Academic Year 2012-2013)

The B.Tech degree will be conferred by the Jawaharlal Nehru Technological University, Anantapur, to those 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

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

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

1.3 Registered for 196 credits and secured 190 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.	Skill Development Courses
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	02	30	70	04	03	30	70
	03	03	30	70				
	03+1*	03	30	70				
	03+1*	04 or 05	30	70				
Practical	03	03	25	50	03	02	25	50
Practical / Drawing	3+1*	02			06	03		
	06	04	30	70			30	70
Skill Development Courses	03					02**	100	
Mini Project						02	25	50
Seminar						02	50	
Comprehensive Viva-voce						03		50
Project						10	50	100

[*Tutorial

****Skill Development Courses 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 are to be answered. The duration of Internal test will be for 2hrs. First test to be conducted in 3 units and second test to be conducted in remaining 3 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. 2 Units Second Internal test. 2 Units Third Internal test.	3 Units First Internal test. 3 Units Second 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 Skill Development Coursestwo Internal examinations shall be conducted one in the middle of the semester and the other at the 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 assignment. No external exam for these courses.

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 year 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 the 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 the 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 Double Evaluation (Internal+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 Three/two assignments in a year/ semester 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 will be based on the performance of the student in the project reviews apart from attendance and regularity
7	Skill Development Courses	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 NO 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.6.0.

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 Skill Development Courses 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 46 out of 92 credits from all the exams conducted upto and including II year II semester regular examinations **(Two regular and one supplementary examinations of I year; one regular and one supplementary examinations of II year I semester; one regular examination of II year II 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 all the exams conducted upto and including III year II semester regular examinations ,whether the candidate takes the examinations or not. (**Three regular and two supplementary examinations of I year; Two regular and two supplementary examinations of II year I semester ; Two regular and one supplementary examinations of II year II semester ; One regular and one supplementary examination of III year I semester ; One regular examination of III year II semester)**

Table 5: Promotion rules

Promotion from	Total credits to register	Total credits to obtain for promotion
II yr to III yr	92	46
III yr to IV yr	144	72

7.4 The student shall register and put up minimum attendance in all 196 credits and earn the 190credits. Marks obtained in the best 178 credits (excluding the credits obtained in Skill Development Courses) shall be considered for the calculation of percentage of marks.

7.5 Students who fail to earn 190 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.

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 Skill Development Courses	Number of Labs	Total credits	
First year		O7 {ENG-3 EP-4, EC-4, M1-4, MM/EM-4, CP-5,ED-4}	00	04	1X3=03 4X5=20 5X1=05 4X3=12	40
Second year	First	06	01	03	6X3=18 1X2=02 3x2=06	26
	Second	06	01	03	6X3=18 1X2=02 3x2=06	26
Third year	First	06	01	03	6X3=18 1X2=02 3x2=06	26
	Second	06	01	03	6X3=18 1X2=02 3x2=06	26
Fourth year	First	06	01	02 Mini project	6X3=18 1X2=02 3x2=06	26
	Second	03	01	Subjects Open elective Seminar Comprehensive Viva Project Viva	3x3 =09 1X2=02 1X2=02 1X3=03 1X10=10	26
GRAND TOTAL						196

9.0 Transitory Regulations:

Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone this course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered subject to section 2.0 and they continues to be in the academic regulations they were first admitted.

10.0 With-holding of results:

If the candidate has any dues not paid to the Institute or if any case of indiscipline of malpractice is pending against him, the result of the candidate shall be withheld and he will not be allowed/promoted into the next higher semester. The issue of degree is liable to be withheld in such cases.

11.0 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 178 Credits (excluding Skill Development Courses)
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)

11.0 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.

12.0 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.

13.0 Rules of Discipline:

12.1 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.

12.2 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.

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

14.0 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.

15.0 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.

16.0 Transfers

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

17. 0 General:

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

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

16.3 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.

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

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGG.& TECH., NANDYAL-518 501

AUTONOMOUS

SCHOOL OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

Academic Regulations for B. Tech. (Lateral Entry Scheme)

(Effective for the students getting admitted into II year from the Academic Year 2013-2014 on wards)

1.0 The Students have to acquire 150 credits out of 156 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 52 out of 104 credits from all the exams conducted upto and including III year II semester regular examinations, whether the candidate takes the examinations or not. (**Two regular and Two supplementary examinations of II year I semester; Two regular and one supplementary examinations of II year II semester; One regular and one supplementary examination of III year I semester; One regular examination of III year II 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 138 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	
First Class with Distinction	70% and above	From the aggregate marks secured for best 138 Credits. (i.e. II year to IV year) excluding Skill Development Courses
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)

AUTONOMOUS

SCHOOL OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

I B.Tech

COURSE STRUCTURE

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

Code	Subject	Scheme of instruction periods/week		Credits	Scheme of Examination		
		Theory	Practical		Internal Marks	External Marks	Total Marks
Theory							
A0001121	Professional English	3+1*	-	3	30	70	100
A0002121	Engineering Physics	3+1*	-	4	30	70	100
A0003121	Engineering Chemistry	3+1*	-	4	30	70	100
A0004121	Mathematics – I	3+1*	-	4	30	70	100
A0005121	Mathematical Methods	3+1*	-	4	30	70	100
A0501121	Fundamentals of Computers & C Programming	3+1*	-	5	30	70	100
A0301121	Engineering Drawing	6	-	4	30	70	100
Practical							
A0591121	Computer Programming Lab	-	3	3	25	50	75
A0391121	Engineering and IT Workshop	-	3	3	25	50	75
A0091121	Engineering Physics Lab and Engineering Chemistry Lab	-	3	3	25	50	75
A0092121	English Language Communication Skills Lab	-	3	3	25	50	75
	Total	**30**	**12**	**40**	**310**	**690**	**1000**

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGG.& TECH., NANDYAL-518 501

AUTONOMOUS

SCHOOL OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

II B.TECH, I-SEMESTERCOURSE STRUCTURE

Code	Subject	Scheme of instruction periods/week		Credits	Scheme of Examination		
		Theory	Practical		Internal Marks	External Marks	Total Marks
Theory							
A0008123	Mathematics- III	3+1*	-	3	30	70	100
A0010123	Environmental Studies	3+1*	-	3	30	70	100
A0401123	Electronic Devices and Circuits	3+1*	-	3	30	70	100
A0402123	Signals and Systems	3+1*	-	3	30	70	100
A0207123	Electromagnetic Theory	3+1*	-	3	30	70	100
A0205123	Network Analysis	3+1*	-	3	30	70	100
Practical							
A0491123	Electronic Devices and Circuits Lab	-	3	2	25	50	75
A0492123	Signals &Systems Simulation Lab	-	3	2	25	50	75
A0293123	Network Analysis Lab	-	3	2	25	50	75
Skill Development Course							
A0007123	Aptitude Arithmetic Reasoning & Comprehensive	3	-	2	30+70	-	100
Total		**27**	**9**	**26**	**355**	**570**	**925**

II B.TECH, II-SEMESTERCOURSE STRUCTURE

Code	Subject	Scheme of instruction periods/week		Credits	Scheme of Examination		
		Theory	Practical		Internal Marks	External Marks	Total Marks
Theory							
A0210124	Control Systems	3+1*	-	3	30	70	100
A0212124	Electrical Technology	3+1*	-	3	30	70	100
A0407124	Electronic Circuit Analysis	3+1*	-	3	30	70	100
A0408124	Pulse & Digital Circuits	3+1*	-	3	30	70	100
A0404124	Switching Theory & Logic Design	3+1*	-	3	30	70	100
A1001124	Industrial Instrumentation	3+1*	-	3	30	70	100
Practical							
A0298124	Electrical Technology Lab	-	3	2	25	50	75
A0493124	Electronic Circuit Analysis Lab	-	3	2	25	50	75
A0494124	Pulse & Digital Circuits Lab	-	3	2	25	50	75
Skill Development Course							
A0009123	Corporate Management Skills	3	-	2	30+70	-	100
Total		**27**	**9**	**26**	**285**	**355**	**570**

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGG.& TECH., NANDYAL-518 501

AUTONOMOUS

SCHOOL OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

III B.TECH, I-SEMESTERCOURSE STRUCTURE

Code	Subject	Scheme of instruction periods/week		Credits	Scheme of Examination		
		Theory	Practical		Internal Marks	External Marks	Total Marks
Theory							
A0014125	Management Science	3+1*	-	3	30	70	100
A0413125	Analog IC Applications	3+1*	-	3	30	70	100
A0415125	Digital IC Applications through VHDL	3+1*	-	3	30	70	100
A1002125	Electrical and Electronic Measurements	3+1*	-	3	30	70	100
A1003125	Sensors and Signal Conditioning	3+1*	-	3	30	70	100
A1004125	Process Control Instrumentation	3+1*	-	3	30	70	100
Practical							
A0498125	Analog IC Applications Lab	-	3	2	25	50	75
A0499125	Digital IC Applications using VHDL LAB	-	3	2	25	50	75
A1091125	Sensors and Transducers Lab	-	3	2	25	50	75
Skill Development Course							
A0013125	Professional Ethics and Soft Skills	3	-	2	30+70	-	100
Total		**27**	**9**	**26**	**285**	**355**	**570**

III B.TECH, II-SEMESTERCOURSE STRUCTURE

Code	Subject	Scheme of instruction periods/week		Credits	Scheme of Examination		
		Theory	Practical		Internal Marks	External Marks	Total Marks
Theory							
A0011123	Managerial Economics and Financial Analysis	3+1*	-	3	30	70	100
A1210125	Computer Organization	3+1*	-	3	30	70	100
A0416126	Digital Signal Processing	3+1*	-	3	30	70	100
A1005126	Principles of Communication	3+1*	-	3	30	70	100
A1006126	Computer Aided Process Control	3+1*	-	3	30	70	100
A1007126	Bio Medical Instrumentation	3+1*	-	3	30	70	100
Practical							
A0484126	Digital Signal ProcessingLab	-	3	2	25	50	75
A1284127	Fundamentals of Java Programming Lab	-	3	2	25	50	75
A1092126	Process Control Instrumentation Lab	-	3	2	25	50	75
Skill Development Course							
A1241126	Fundamentals of Java Programming	3	-	2	30+70	-	100
Total		**27**	**9**	**26**	**285**	**355**	**570**

AUTONOMOUS

SCHOOL OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

IV B.TECH, I-SEMESTERCOURSE STRUCTURE

Code	Subject	Scheme of instruction periods/week		Credits	Scheme of Examination		
		Theory	Practical		Internal Marks	External Marks	Total Marks
Theory							
A1008127	Fiber Optics and laser Instrumentation	3+1*	-	3	30	70	100
A0428127	Microcontrollers and Interfacing	3+1*	-	3	30	70	100
A0429127	Digital Control System	3+1*	-	3	30	70	100
A1009127	Analytical Instrumentation	3+1*	-	3	30	70	100
	Elective-I	3+1*	-	3	30	70	100
	Elective-II	3+1*	-	3	30	70	100
Practical							
A0488127	Microcontrollers & interfacing lab	-	3	2	25	50	75
A1093127	Analytical & PC based instrumentation Lab	-	3	2	25	50	75
A1094127	Mini Project	-	3	2	25	50	75
Skill Development Course							
A0432126	Embedded 'C'	3	-	2	30+70	-	100
Total		**27**	**9**	**26**	**285**	**355**	**570**

IV B.TECH, II-SEMESTERCOURSE STRUCTURE

Code	Subject	Scheme of instruction periods/week		Credits	Scheme of Examination		
		Theory	Practical		Internal Marks	External Marks	Total Marks
Theory							
A1013128	Industrial Electronics	3+1*	-	3	30	70	100
	Elective-III	3+1*	-	3	30	70	100
	Elective-IV	3+1*	-	3	30	70	100
A1095128	Seminar	3	-	2	50	-	50
A1096128	Comprehensive Viva-Voce	-	-	3	-	50	50
A1097128	Project Work	-	-	10	50	100	150
Skill Development Course							
A1016128	Programmable Logic Controllers& SCADA	3	-	2	30+70	-	100
Total		**18**	**-**	**26**	**290**	**360**	**650**

ELECTIVES

Elective-I

1. A0417126 Microelectronics and VLSI Design
2. A0423127 Digital Image processing
3. A0431127 Embedded real time operating system

Elective-II

1. A1010127 Power plant Instrumentation
2. A1011127 Telemetry and Telecontrol
3. A1012127 Robotics and Automation

Elective-III

1. A0235128 Electrical Drives and Control
2. A0439128 Digital System Design
3. A0227127 Neural Networks and Fuzzy Systems

Elective-IV

1. A1014128 Distributed Control System – Networks and Protocols
2. A0434128 DSP Processor Architecture and Applications
3. A1015128 Introduction to Micro Electro Mechanical Systems

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AUTONOMOUS

SCHOOL OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

I B.Tech (EIE)

T	C
3+1*	3

(A0001121) PROFESSIONAL ENGLISH

(Common to all Branches)

For Branches: E.C.E, E.E.E, E.I.E, C.S.E, I.T, M.E, C.E.

OBJECTIVES:

The recent two decades have witnessed a great upsurge of job opportunities for student holding Engineering Graduate degree, in ever increasing number of Engineering and Management Colleges, in outsourcing sector, in Marketing jobs and of course, in the colleges and universities. A student, able to communicate in fluent English is liable to achieve success in every walk of life – be it professional, social or economical. The syllabus has been designed keeping in view of the track record, needs and goals of the generation next undergraduates. It comprises essentials of language development along with technical, social, environmental & spiritual aspects which in turn mould students as dynamic professionals. The course of Professional English has been designed with the following objectives.

- To ignite the spark of professionalism among students with the purpose to acquire success in every walk of life.
- To enable them to accomplish effective Technical writing
- To focus on complete language basics through LSRW skills
- To develop critical thinking skills and emotions of students through inspiring and literary texts.
- To eliminate the errors of language by practical English usage patterns and to improve the performance of students in English. This will facilitate students to be more articulate and confident. By this, new vistas of better job opportunities can be opened up for them.
- The greatest contribution of this course shall be to chisel Communicative skills of students at the global level.

OUTCOMES:

- Be able to acquire basic vocabulary.
- Be able to use mechanics of writing.
- Be able to develop language proficiency & Grammar usage.
- Considerable improvement in LSRW skills and communicative ability.
- Increase in motivational level and Professional attitudes.
- Be able to possess wide range of relevant knowledge.

UNIT I

A.Reading: i) Developing Personality - Principles & Strategies– by J.R.Bhatti
ii) Inspiring Lives – Mokshagundam Visvesvaraya

B.Writing: Mechanics of Writing- Paragraph writing

C.Vocabulary -synonyms and antonyms

D. Language Development - Basics of Grammar – Naming Words- Concord

Student Tasks: Self analysis through questionnaires - Case Study on Successful Profiles.

UNIT II

A. Reading: i) Heaven's Gate by Pico Iyer
ii) Fish Philosophy – Enjoy Your Work by Harry Paul

B. Language Development: Tenses – Question Tags

C. Soft skills 1: The Art of Time Management by Gopala Swamy Ramesh & Mahadevan Ramash

UNIT III

A. Reading: i) Sir C.V. Raman – A Biography
ii) Inspiring Lives – Mother Theresa - Case Study – Joy of Giving.com

B. Writing: Letter Writing – Sample Analysis

C. Language Development: Discourse Markers

UNIT IV

A. Reading: i)Disaster Management -The Cuddalore Experience –Case study: Disaster Management - Japan Tsunami 2011.
ii) Neil Chambers' Green Living.
iii) Immortal Speeches – Mahatma Gandhi by Harsha Vardhan Datta

B. Writing: Report Writing

C. Language Development: Active & Passive Voice

UNIT V

A. Reading: i) Inspiring Lives - Viswanath Anand.
ii) Human Interest - The Connoisseur

B. Vocabulary – Idioms

C. Language Development – Direct & Indirect Speech

UNIT VI

A. Reading: i) Corporate Woman
ii) The Law of Pure. Potentiality by Deepak Chopra

B. Writing – Instruction Manuals – Checklists – Preventive Measures

C. Soft skills 2: Cross Cultural Communication-Profile of an Interculturally Effective Person (IEP).

TEXT BOOKS PRESCRIBED:

1. Enjoying EveryDay English by A.Ramakrishna Rao published by Sangam Books
2. Inspiring Lives published by Maruthi Publications

SUGGESTED READING:

- Practical English Usage (New Edition) by Michael Swan Oxford University Press
- Murphy's English Grammar (Third Edition) by Raymond Murphy Cambridge University Press 2004
- Technical writing 3rd edition by Sharon J. Gerson & Steven M. Gerson Pearson Education 2001
- The Dynamics of Successful Personality and projection (Second Edition) by– J.R. Bhatti, Pearson 2011

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SCHOOL OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

I B.Tech (EIE)

T	C
3+1*	4

(A0002121) ENGINEERING PHYSICS

(Common to all Branches)

For Branches: E.C.E, E.E.E, E.I.E, C.S.E, I.T, M.E, C.E.

COURSE OBJECTIVES

- To understand fundamental principles of engineering physics specifically concern to optics, crystal structures, quantum mechanics & electron theory of metals, semiconductors, nano materials, magnetic materials, dielectric properties, superconductivity, Laser, and optical fiber.
- To provide problem solving experience and learning of concepts through it in engineering physics, in both the classroom and the laboratory learning environment.

OUTCOMES:

By the end of the course students will be able to

- Acquire fundamental understanding of concepts specifically concern to quantum physics, crystallography, superconductivity, lasers and optical fibers and their engineering applications.
- Develop the ability to recognize the appropriate physics that applies to experiments based on the Engineering Physics
- To develop a systematic, logical approach to problem-solving that can be applied to problems in physics and to problems in general.

UNIT- I

WAVE 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: Introduction -Space lattice - Basis - Unit cell - Lattice parameter - Bravais lattices - Crystal systems - Structure Simple cubic - Body Centered Cubic – Face Centered Cubic crystals- Crystal structure of diamond-Miller indices of planes and directions in crystals – Separation between successive (h k l) planes – X-ray diffraction technique – Powder method.

UNIT- III

PRINCIPLES OF QUANTUM MECHANICS & ELECTRON THEORY: Waves and Particles - de-Broglie's hypothesis – Heisenberg's uncertainty principle - Schroedinger's one dimensional time independent wave equation (qualitative treatment) - Particle in a one dimensional potential box – Energy levels - Fermi-Dirac distribution and effect of Temperature (qualitative treatment only) –Source of electrical resistance – Kronig-Penney model (qualitative treatment only - energy bands – metals, semi conductors & insulators.

UNIT- IV

PHYSICS OF SEMICONDUCTORS: Intrinsic and extrinsic semiconductors – Law of mass action –Drift & diffusion - Einstein's relation – Hall Effect – p-n junction - Band diagram of p-n junction diode – Diode Equation- Solar cell and its applications.

NANO MATERIALS: Introduction - Basic principles of nano materials – properties of nano materials – Synthesis of Nanomaterials by Ball Mill method and Sol-Gel method - carbon nanotubes – properties and applications of carbon nano tubes - Applications of nano materials.

UNIT- V

MAGNETIC MATERIALS: Introduction - Origin of magnetic moment – Classification of magnetic materials - Dia, Para , Ferro, anti-Ferro and Ferri magnetism - Hysteresis - Soft and hard magnetic materials

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).

SUPERCONDUCTIVITY: General properties - Meissner effect - Penetration depth- Type I and Type II superconductors– Flux quantization- Josephson effects – Applications of superconductors.

UNIT- VI

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.

FIBER OPTICS: Introduction - Principle of optical fiber - Acceptance angle and Acceptance cone - Numerical aperture – Types of Optical fibers and refractive index profiles – Attenuation in optical fibers – Applications of optical fibers.

TEXT BOOKS:

1. Avadhanulu M N and Kshirsagar P G, "A Textbook of Engineering Physics", S. Chand & Company Ltd, New Delhi, 2005 (Unit – I, IV, VI).
2. S.P. Basavaraju, "Applied Physics", Subhas Stores, Books Corner, Bengaluru, 2008 (Unit II-VI).

REFERENCES:

1. R. K. Gaur and S.C. Gupta, 'Engineering Physics' Dhanpat Rai Publications, New Delhi (2003).
2. A Text Book of Optics by S.L. Kakani and K.C. Bhandari, Sultan Chand & Sons, Educational Publishers, New Delhi.
3. Physics Volume 2, by Halliday, Resnick and Krane; John Wiley India
4. Solid State Physics by C.Kittel, Wiley India
5. Introduction to Nanoscience & Nano Technology by K.K Chattopadhyay & A.N. Banarjee, Prentice – Hall of India Pvt. Ltd.

I B.Tech (EIE)

T	C
3+1*	4

(A0003121) ENGINEERING CHEMISTRY

(Common to all Branches)

For Branches: E.C.E, E.E.E, E.I.E, C.S.E, I.T, M.E, C.E.

OBJECTIVES:

Chemistry is concerned with the changes of matter with its environment. The introduction of Engineering Chemistry to I B.Tech students to know the basic principles, concepts and familiarize the materials used in industries and software technologies .This will help the students to cope up with the continuous flow of new technology.

The importance of water and sustainable utilization of water resources and alternative methods for freshwaters like Reverse osmosis and the problems raised in the production of steam by using the boilers are included in Water technology.

The present syllabus aims to impart in-depth knowledge of the subject and highlight the role of chemistry in the field of engineering. The lucid explanation of the topics will help students understand the fundamental concepts and apply them to design engineering materials and solve problems related to them. An attempt has been made to logically correlate the topic with its application. The extension of fundamentals of electrochemistry to energy storage devices such as commercial batteries and fuel cells is one such example. The also include a comprehensive coverage of topics of applied chemistry including polymers, engineering materials, corrosion its control.

UNIT I:

Water Chemistry: Introduction- Impurities in Water, Water Quality Parameters and Standards, Water Analysis-Determination of different Constituents in water – Hardness, Alkalinity, Dissolved Oxygen, TDS. Numerical Problems on hardnes, Boiler Troubles-Scales and Sludges, Carry over, Boiler Corrosion, Caustic Embrittlement.

Water Treatment: Municipal Water treatment for domestical purpose, Desalination of Water –Reverse Osmosis.

UNIT II:

Electrochemistry: Conductance - Specific Conductance, Equivalent Conductance Molar Conductance - Effect of Dilution.

Electrochemical Cells: Reference Electrodes–Standard Hydrogen Electrode, Calomel electrode, Measurement of EMF, Standard electrode potential, Galvanic cells, concentration cells.

Ion Selective Electrodes-Principle, Chemistry and working of Electrodes - Applications for the determination of Fluorides, Chloride and nitrate.

Batteries: definition, Classification**, Examples:** Ni–Cd cell, Lithium Ion batteries.

Surface Chemistry: Adsorption-Definition, types, Langmuir Adsorption theorem, applications of adsorption.

Fuel cells: hydrogen oxygen fuel cell and methanol-Oxygen fuel cell.

UNIT III :

Chemistry of Corrosion and its Control: Definition, Types of corrosion: Dry Corrosion, (Direct Chemical attack type of Corrosion), Wet Corrosion, Mechanisms, Galvanic Series, Galvanic Corrosion, Concentration Cell Corrosion, Pitting Corrosion.

Corrosion Control: Cathodic and Anodic Protection Methods, Electroplating-Principles and Mechanism, Electro plating of Chromium, Electro less plating of Copper and Nickel.

UNIT IV:

Polymers and Ceramics:

Polymers-Definitions of the terms involved, Types and mechanisms of Polymerization, Physical, mechanical and electrical properties of polymers. Preparation, properties and applications of Commercially important polymers Poly ethelene, PVC, Poly esters, Teflon, Bakelite and Nylon.

Natural Rubber – Processing of Natural Rubber and Vulcanization process.

Liquid Crystal polymers: Definition, Synthesis and applications of Kevlar, Electro Optic effect in Liquid Crystals, applications of Liquid Crystals.

Electro Ceramics: Introduction, Fabrication of ceramics, types of electro ceramics like conductors, dielectrics, and Insulators, non linear dielectrics, electro optic magnetic ceramics, properties and applications.

UNIT V:

Chemical Fuels & Lubricants: Introduction, Classification of chemical fuels Calorific value - High and Low calorific values, Determination of calorific value - solid or liquid fuel using Bomb calorimeter - numerical problems, Flue gas analysis by Orsat's analysis apparatus and Combustion Calculations.

Petroleum – Refining, Cracking, Knocking, Octane and Cetane numbers, synthesis of Unleaded petrol, Power alcohol and Biodiesel,

Lubricants: Definition, Lubrication mechanisms, Properties of Lubricants.

UNIT VI:

Modern Engineering materials :

Storage devices: materials used and working of Solid state drives, CD's ,pen drive

Photo &light responsive compounds: Sensors, biosensors-principle-few applications

Refractories: definition, classification with examples; criteria of a good refractory material; Properties, causes for the failure of a refractory material .

TEXT BOOKS:

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

REFERENCES:

1. Chemistry of Engineering Materials by C.V. Agarwal, Tara Publication, Varanasi.2008
2. Physical Chemistry - Glasston & Lewis.
3. Principles of Physical chemistry by B.R.Puri, L.R.Sharma and M.S.Pathania, S.Nagin, Chand and co.
4. Engineering Chemistry Dr. K. B. Chandrasekhar, Dr. U.N. Dash, Dr. Sujatha Mishra, Scitech Publications(India) Pvt. Limted, Hyderabad. 2009.

AUTONOMOUS

SCHOOL OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

I B.Tech (EIE)

T	C
3+1*	4

(A0004121) MATHEMATICS – I

(Common to all Branches)

For Branches: E.C.E, E.E.E, E.I.E, C.S.E, I.T, M.E, C.E.

COURSE OBJECTIVES:

- To make aware students about the importance and symbiosis between mathematics and engineering. Achieve confidence with mathematical tools which an essential weapon in modern Graduate Engineer's Armory. Balance between the development of understanding and mastering of solution techniques with emphasis being on the development of student's ability to use Mathematics with understanding to solve engineering problems by retaining the philosophy learning by doing.

OUTCOMES:

- By the end of module students will be expected to demonstrate. The knowledge of Differential equations, Laplace Transformations, Real analysis, Curve tracing, Curvature, Multiple integrals and Vector calculus. By using the concept curve tracing we can draw the graph of any type of curves in Cartesian and Polar coordinates. The concept vector calculus has applications in fluid dynamics, heat flow in stars, study of satellites and Design of underwater transmission cables.

UNIT – I

Differential equations of first order and first degree – Exact, linear and Bernoulli equations. Applications L-C-R circuits, 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.

Raidus of Curvature – Curve tracing – Cartesian, polar and parametric curves.

UNIT – IV

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 – V

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

UNIT – VI

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

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

I B.Tech (EIE)

T	C
3+1*	4

(A0005121) MATHEMATICAL METHODS

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

COURSE OBJECTIVES:

- To make aware students about the importance and symbiosis between mathematics and engineering. Achieve confidence with mathematical tools which an essential weapon in modern Graduate Engineer's Armory. Balance between the development of understanding and mastering of solution techniques with emphasis being on the development of student's ability to use Mathematics with understanding to solve engineering problems by retaining the philosophy learning by doing.

OUTCOMES:

- By the end of module students will be expected to demonstrate The concept Matrices can be used to solve system of linear equations and also used in Spectral Expansion, Finite Element analysis etc. The concept numerical analysis is used in computing system and in all simulation research work. Fourier series and Fourier Transforms can be used to solve partial differential equations and they have lot of applications in circuit analysis. Z-Transforms are used to study the analysis of the waves in communication systems which deals discrete.

UNIT – I

Matrices: Elementary row transformations – Rank – Echelon form, normal form – Solution of Linear System of Homogenous and Non Homogeneous equations.
Eigen Values, Eigen vectors – Properties. Cayley – Hamilton Theorem – Inverse and powers of a matrix by Cayley–Hamilton theorem – Diagonolization of matrix.

UNIT – II

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

UNIT – III

Solution of Algebraic and Transcendental Equations: Introduction — The Method of False Position – 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. Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Method.

UNIT – V

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 .

UNIT – VI

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.
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.

I B.Tech (EIE)

T	C
3+1*	5

(A0501121) FUNDAMENTALS OF COMPUTERS & C PROGRAMMING

(Common to all Branches)

For Branches: E.C.E, E.E.E, E.I.E, C.S.E, I.T, M.E, C.E.

OBJECTIVES:

- To make students aware about fundamentals of computer programming.
- To provide exposure on C programming language.
- To provide exposure on various C programming concepts like arrays, functions, pointers, structures, etc.
- To develop solutions for various problems by using C Programming Language by students.
- To provide exposure on various sorting and searching techniques

OUTCOMES:

By the end of this course, students should be able

- To understand about the various techniques for problem solving**.**
- To understand the fundamental concepts of C language like data types, keywords, operators, Input/Output functions and control statements.
- To understand how to develop C programs to solve various kinds of problems by using different C programming concepts like arrays, functions, pointers and structures.
- To develop programs by performing I/O operations through Files.
- To implement various searching and sorting techniques.

UNIT I:

Overview of Computer Programming: Fundamentals of computers - Evolution of computer systems, Basic anatomy of computer system, Components of computer. Introduction to Computer Programming languages. Problem solving techniques - Algorithms and Flowcharts. How to trace an algorithm. Simple examples on how to write and trace an effective algorithms and how to draw an effective flow charts. Program control structures – sequence, selection and iteration. Software Development Method.

UNIT II:

Introduction to C Language: History of C language, Importance of C language, Definition of a C Program, General Form of a C Program, Steps to execute C program. Various Data Types supported by the C language. C tokens – Identifiers, Key words, Variables, Constants, Operators. Operator precedence and Associativity. Expressions and their evaluation process. Type Conversions- Automatic and type casting. Managing Input/Output operations. Control Statements- Non iterative statement- if, if else, Nested if else, lf else ladder and switch statements. Loop Constructs - while, for, do-while. break, continue, return and go to statements. Example Programs on the topics covered in this unit.

UNIT III:

Arrays and Functions:

Arrays – Definition, Need of arrays while writing C programs. Types of arrays- One dimensional, Two dimensional, Multi-dimensional arrays. Declaration of One dimensional array, initialization of one dimensional array, storing and accessing the elements from a one dimensional array. Two-dimensional Arrays and their declaration, initialization, storing & accessing elements from it. Declaration of multi-dimensional array, initialization of multi-dimensional arrays, storing and accessing the elements from a multi-dimensional array. . Example Programs on the topics mentioned above.

Functions: Introduction, Library Functions and User defined functions. Need for user-defined functions. General form of declaring a function, Elements of an user defined functions- Function definition Function call, Function declaration, Function name, return type, parameters, return statements. Categorization of functions with respect to parameters and return values. Definition of Scope of a variable with suitable examples. Storage Classes - Automatic, External, Static, and Register. Arrays and functions - Passing an entire array as an Argument to a function. Recursion – Need of recursive functions, Solving Towers of Hanoi Problem using recursive function and its trace out. Preprocessor Commands. Example Programs on the topics mentioned above.

UNIT IV:

Strings and Pointers:

Strings - Definition, Declaring and initializing strings, Basic Operations on strings, String handling Functions, Table of strings. Example Programs on the topics mentioned above.

Pointers - Introduction, Need of using pointer variables, Pointer variable declaration, initialization of pointer variables, how to access a value from a memory location through it's pointer variable. Arithmetic operations on pointer variables, Scale factor length. Pointers and functions - pointers as function arguments (i.e., call-by-reference), Pointers and Arrays, Pointers and Strings, Array of Pointers, Pointers to Pointers, Generic Pointers, Pointer to Functions. Example Programs on the topics mentioned above.

UNIT V:

Structure and File Input/Output:

Structures – Introduction, Features of Structures. Declaration and Initialization of Structures, Accessing structure members, structure initialization. Nested Structures, Array of Structures, Arrays within structures and Pointers to Structures, Structures and Functions, Bit Fields, Unions, Union of Structures. Dynamic Memory Allocation Functions. Example Programs on the topics mentioned above.

File Input/Output: Introduction, Types of Files, File I/O Operations- High level I/O functions- Open & Close a file, Read and Write data into a file, Searching data in the file, Error handling during I/O operations on files. Command Line Arguments, Applications of Command Line Arguments. Example Programs on the topics covered in this unit.

UNIT VI:

Searchingand Sorting Techniques:

Searching Techniques- Linear search and Binary Search.

Sorting techniques- Bubble Sort, Selection Sort, Quick Sort, Insertion Sort, and Merge Sort.

Implementation of all the above mentioned techniques in C language and trace them by giving different test data.

TEXT BOOKS:

1. Computer programming and Data Structures, E.Balaguruswamy, Tata Mc Graw Hill. 2009 revised edition.
2. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education
3. The C Programming Language, Brian W.Kerninghan, Dennis M.Ritchie.

REFERENCES:

1. Let us C – Yeshwanth kanetkar, 8th Edition.BPB Publications
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press
3. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI, Eighth Edition.
5. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

AUTONOMOUS

SCHOOL OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

I B.Tech (EIE) D 6 C 4

(A0301121) ENGINEERING DRAWING

(Common to all Branches)

For Branches: E.C.E, E.E.E, E.I.E, C.S.E, I.T, M.E, C.E.

COURSE OBJECTIVES

At the end of this course the student should able to:

- Apply engineering graphics as a communications tool.
- Able to describe the skills required to develop engineering working drawings, sketch three-dimensional objects.
- Able to create orthographic projections.
- Able to create auxiliary views, to create sectional views.
- Able to dimension properly and also develop skill in using free hand sketches.
- The student should able to apply the knowledge of Engineering drawing for Architectural and engineering designs, Mechanical and Automobile engineering designs, design of communication equipment etc.

COURSE OUTCOMES:

- Draw different engineering curves and know their applications.
- Draw orthographic projections of different objects.
- Visualize three dimensional objects and draw isometric projections.
- Use in techniques and able to interpret the drawing in engineering field.

UNIT – I

INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Graphics and their Significance – Drawing Instruments and their Use – Conventions in Drawing – Lettering – BIS Conventions of Engineering materials (Ferrous, Non ferrous metals, wood, plastic, glass and rubber).

Curves used in Engineering Practice:

a) Conic Sections including the Rectangular Hyperbola.
b) Cycloid, Epicycloid and Hypocycloid.
c) Involutes.
d) Helices.

UNIT – II

PROJECTION OF POINTS AND LINES: Principles of Orthographic Projection – Conventions –Projections of Points, Lines, Line inclined to one and both planes, Problems on projections (First Angle Projections only).

UNIT – III

PROJECTIONS OF PLANES & SOLIDS: Projections of regular Plane surfaces Viz., Triangle, Rectangle, square, pentagon and hexagon in simple position - inclined to one plane and inclined to both the planes (First Angle Projections only).

Projections of Regular Solids inclined to one and both planes (First Angle Projections only).

UNIT – IV

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

UNIT – V

DEVELOPMENT OF SURFACES: Development of surfaces of right regular solids – Prisms, pyramids, cylinder, cone and their sectional parts. Parallel line and Radial line methods.

UNIT – VI

ISOMETRIC AND ORTHOGRAPHIC VIEWS: Types of Pictorial projections - Isometric View and Isometric projections of simple solids -solid objects (combination of two solids) – Conversion of Isometric Views to orthographic Views - Conversion of orthographic views to isometric views.

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhat / Charotar, Charotar Publishers.
2. Engineering Drawing & Graphics, Venu Gopal, New Age Publications.
3. Engineering Drawing, K.L. Narayana, P. Khanniah, Scitech Publications.

REFERENCES:

1. Engineering Drawing, B.V.R. Guptha, J.K. Publishesrs.
2. Engineering Drawing, Shah and Rana, 2/e Pearson Education.

3. Engineering Drawing, Venkata Reddy, B.S.Publishers.

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(A0591121) COMPUTER PROGRAMMING LAB

(Common to all Branches)

For Branches: E.C.E, E.E.E, E.I.E, C.S.E, I.T, M.E, C.E.

RECOMMENDED SYSTEMS /SOFTWARE REQUREMENTS:

Intel based desktop PC with ANSI C Compiler and Supporting Editors

COURSE OBJECTIVES:

1. To make the student to learn how to write programs in **C** language.
2. To introduce different constructs of **C** language to the students to solve various kinds of problems.
3. To make the students to implement different kinds of sorting algorithms like selection sort, bubble sort, insertion sort, quick sort and merge sort etc.
4. To make the students to implement different kinds of searching algorithms like linear search and binary search etc.

OUTCOMES:

By the end of this course, students should be able

1. To understand about the fundamentals of Computer programming**.**
2. To understand the fundamental concepts of C language like data types, keywords, operators, Input/Output functions and control statements.
3. To understand how to develop C programs to solve various kinds of problems by using different C programming concepts like arrays, functions, pointers and structures.
4. To develop programs by performing I/O operations through Files.
5. To implement various searching and sorting techniques.

Exercise l:

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

b) Write a C program to calculate the following Sum:
Sum=$1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$

Exercise 2:

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

b) The total distance travelled by vehicle in'**t'** seconds is given by distance $\boldsymbol{S = ut+1/2at^2}$ 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**'.

Exercise 3:

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

b) Write a C program to generate the first 'n' terms of the Fibonacci sequence.
Note: 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.

c) Write a C program to generate all the prime numbers between 1 and n, where 'n' value is given by the user.
Note: Develop each of the above programs by using different loop constructs supported by C language. (i.e., while, do while and for Loops).

Exercise 4:

a) Write a C Program to mask the most significant digit of the given number.

b) Given an integer number, write a C program, that displays the number as follows:

First line: all digits
Second line : all except first digit
Third line : all except first two digits
------ ---- ----------
Last line : last digit

For ex:
1234
234
34
4

Exercise 5:

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

Exercise 6:

a) Write a C program to find all the even numbers in the given one dimensional array.
b) Write a C program to print the elements of an array in reverse order.
c) Write a C program to perform the following operations:
i) Addition of Two Matrices ii) Multiplication of Two Matrices

[Note: Use functions to implement the above specified operations]

Exercise 7:

a) Write C programs that use both recursive and non-recursive functions
i) To find the factorial of a given integer.
ii) To find the GCD (greatest common divisor) of two given integers.
iii) To reverse a given positive integer.

Exercise 8:

a) Write a C Program to solve the Towers of Hanoi problem by using recursive function.
b) Writea C Program to demonstrate the various storage classes, which are supported by the C language. [i.e., automatic, external, static and register]

Exercise 9:

a) Write a C Program to demonstrate that, how to pass an entire array as an argument to a function with a suitable example.
b) Write a C Program to perform various operations on given two strings using string handling functions.

Exercise 10:

a) Write a C Program to perform various arithmetic operations on pointer variables.
b) Write a C Program to demonstrate the following parameter passing mechanisms:
i) call-by-value ii) call-by-reference

Exercise 11:

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 the specified 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 12:

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 13:

a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
b) Write a C program to convert the given Roman numeral to its decimal equivalent value.

Exercise 14:

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 the complex number using a structure.)

Exercise 15:

a) Write a C program which copies contents of one file to another file.
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 16:

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

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

Exercise 17:

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 iii) Insertion sort

Exercise 18:

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

Exercise 19:

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

Exercise 20:

Write C program to implement linear search method to search an element in a given list of integers. [**Note:** Use both recursive and non recursive functions]

Exercise 21:

Write C program to implement Binary search method to search an element in a given list of integers. [**Note:** Use both recursive and non recursive functions]

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. Raja Raman, PHI Publications.

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I B.Tech (EIE) P C
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(A0391121) ENGINEERING AND IT WORKSHOP

(Common to all Branches)

For Branches: E.C.E, E.E.E, E.I.E, C.S.E, I.T, M.E, C.E.

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 labor 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.

OUTCOMES:

At the end of the Engineering Work Shop: A Student involved in acquiring manufacturing skills must have balanced knowledge of theory as well as practice. The First students of all engineering branches should know the basic knowledge of various tools and their use in different sections of manufacturing such as fitting, carpentry, smithy, tin smithy, foundry, welding etc. and basic engineering practices such as plumbing, electrical wiring, electronic circuits, machine shop practice.

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 gauge 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 two lamps controlled by one switch in series.
   e) **Welding** – Preparation of two welds (exercises): single V butt joint, lap joint, double V butt joint or T fillet joint.
   f) **Soldering–** Test procedure for soldering & Series and parallel connection.
   g) **Black smithy –** Two Jobs (exercises)To make square cross section bar from a given round bar & To make an eye bolt from a given square bar.

2. **TRADES FOR DEMONSTRATION:**
   a) Plumbing
   b) Machine Shop
   c) Metal Cutting

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.

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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.

OUTCOMES:

At the end of the course, students should be able

- To work with few of the Microsoft office tools like word, excel etc.
- Should identify the fundamental ports of the computer.
- Should be able to Assemble and dissemble the computer (Desktop system).
- Gain knowledge about Web browsers, search engines & about basic network settings.

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 2007in 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.

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 Ken Quamme. – CISCO Press, Pearson Education.

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I B.Tech (EIE) P C
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(A0091121) ENGINEERING PHYSICS & ENGINEERING CHEMISTRY LAB

(Common to all Branches)

For Branches: E.C.E, E.E.E, E.I.E, C.S.E, I.T, M.E, C.E.

OBJECTIVES:

1. Providing an opportunity to develop and hone experimental skills, particularly as they pertain to scientific and technical knowledge
2. Providing a solid grounding in the methods of scientific and research inquiry,
3. Apply the scientific method to experiments in the laboratory.
4. To create curiosity in research methods by the experiments Hall effect, four pobe conductivity, laser diffraction etc.

OUTCOMES:

1. Develop procedures and observational skills as data is taken and gain a fundamental understanding of simple and complex apparatus used in the experiment.
2. Apply analytical techniques, statistical analysis, graphical analysis, spread sheet data/recording to the experiments.
3. Verify the theoretical ideas and concepts covered in lecture by completing a host of experiments.
4. Take the time to discuss the procedure, the data, and the results of the experiment with the lab partner.

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

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 Semiconducting Material
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. Study of bending loss in optical fiber

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.

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ENGINEERING CHEMISTRY LAB

OBJECTIVES:

Chemistry is one subject which gives adequate knowledge about the applications involved in the aerospace, mechanical, environmental and other engineering fields. Knowledge of chemistry plays a vital role in engineering profession enabling the potential engineers to understand and to perform successfully while working on multidisciplinary tasks.

The main objective of the department is to develop the necessary theoretical and practical aspects required for understanding intricacies of the subject and also give adequate exposure to the applied chemistry aspects in different disciplines of engineering. To educate the engineering students with all necessary concepts and to develop a scientific attitude by means of distinguishing, analyzing and solving various engineering problems. It develops their experimental skills and important practical knowledge in engineering by providing necessary facilities in chemistry laboratory.

Experiments:

1) Preparation of Standard Potassium Dichromate and Estimation of Ferrous Iron.
2) Preparation of Standard EDTA solution and Estimation of Hardness of Water.
3) Preparation of Standard EDTA and Estimation of Copper.
4) Verification of Beer-Lambert's Law.
5) Determination of strength of the given Hydrochloric acid against standard sodium hydroxide solution by Conducto metric titration.
6) Determination of strength of the given Acetic 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) Preparation of Phenol-formaldehyde Resin.
11) Preparation of Ester.

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)

1) Analytical balance (keroy) (15 Nos)
2) Calorimeter
3) Bomb Calorimeter
4) Redwood viscometer No.1& No.2
5) Conductometer/ Conductivity bridge
6) Wash bottles, test tube stands, burette stands
7) Gas cylinders with Bunsen burners
8) 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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(A0092121) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

(Common to all Branches)

For Branches: E.C.E, E.E.E, E.I.E, C.S.E, I.T, M.E, C.E

OBJECTIVES:

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.

- 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
- To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning
- To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm
- To initiate them into greater use of the computer in writing, format-making etc.
- 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.

OUTCOMES:

- Be able to improve social interactive skills.
- Be able to acquire standard pronunciation.
- Be able to develop language skills – LSRW Skills.
- Be able to enhance communication skills.

Syllabus

Part 1 – **Language Development** through Four Skills from Multimedia

Part II - Phonetics & Pronunciation Strategies: Vowels, Diphthongs, Consonants, Word Accent and Intonation

Part III – a. **Communication & Social Interactive Skills**:

- Ice Breaking Activities
- JAM
- Describing Objects
- Situational Dialogues & Role-Play (Group Task)
- Story Narration (Group Task)
- Information Transfer
- Debate (Group Task)

b. Writing Tasks

- Personal Experiences
- Current Affairs
- Technology Trends
- Book Reviews

c. Project / Creative Task (Team Task)

Evaluation:

English Language Laboratory Practical Paper:

- The Practical Examinations for the English Language Laboratory shall be conducted as per the 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 marks for External Examination. 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 and External Examiner from other Institution.

Software Prescribed:

- Alania Series for Four Skills
- Cambridge Advanced Learners' English Dictionary with CD (Accent)
- The Rosetta Stone English Library (Four Skills)
- EL-Client (Phonetics)
- CL-Client (Communication skills)
- Department Built-In Software/Data

Suggested Reading:

- Longman Dictionary of Contemporary English for Advanced Learners, Pearson
- Education Ltd.
- Better English Pronunciation (Second Edition) by D. O' Connor,Cambridge University Press 1967, 1980
- Communication Skills for Engineers(Second Edition) by C. Muralikrishna & Sunita Mishra Pearson Education Ltd, 2011
- Better English pronunciation by Thakur K B P Sinha , Vijay Nicole, 2005
- Practical English Usage (New Edition) by Michael Swan, Oxford University Press.

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II B.Tech, I-Sem (EIE) T C
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(A0008123) MATHEMATICS – III

(Common to ECE, EEE, EIE)

OBJECTIVES:

- 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.

OUTCOMES:

- Students will able to use Beta And Gamma functions to solve some special integrals that are not able to by using general methods.
- Students will able to use of the concept complex analysis is to find the solution of the equations which does not have solution in real plane.
- Students will able to use the concept of complex analysis is widely used in space study, aero system, potential functions, fluid mechanics etc.

UNIT - I

Functions of 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) $\int_0^{2\pi} f(cos\theta, sin\theta)\,d\theta$

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- III by E. Rukmangadachari, E. Keshava Reddy, Pearson education.

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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(A0010123) ENVIRONMENTAL STUDIES

(Common to all branches: E.C.E, E.E.E, E.I.E, C.S.E, I.T, M.E, C.E**)**

OBJECTIVES :

- To create a awareness about environment among the students.
- To develop an understanding of ecosystem and their interrelations.
- To develop an awareness about the utilization, over exploitation of natural resources.
- To recognize the need for keeping pollution under control in order to maintain the quality of life.
- To acquire skills to analyze and interpret information relating to environmental problems.
- To develop the ability to identify, analyze and reflect upon different environmental Concerns.
- To develop skills for effectively tackling problems related to the local environment.
- To adopt practices that help in promoting balance in nature by making judicious utilization of resources and materials.
- To develop love, affection, sensitivity and sense of responsibility towards all living beings.
- To appreciate and respect legal provisions for protection of animals and plants.
- To imbibe the essence of environmental values and ethics in order to live in harmony with nature.

UNIT I

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES: Environment -Definition, scope and importance, Segments of Environment-Importance, Productivity, Austhetical & Optional values of nature, need for public awareness.

UNIT II

HARNESSING RESOURCES

a) Sources of Energy:- Renewable and non renewable resources.
b) Natural Resources: soil, water sources-Hydro power project-problems, forest, minerals -Utilization-problems.
c) Solar Energy and its applications - Photo Voltaic Cells, Solar water heating, solar pond, Solar Cooker. Non-conventional sources of energy.
d) Chemical fertilizers and pesticides-problems. Green Revolution-white revolution- blue revolution.
e) Depletion of Resources-Over utilization and consumption, non –equitable distribution of resources, Technological and Industrial developmental activities.

UNIT III

CONCEPTS OF ECO-SYSTEM : Structure of ecosystem: Trophic structure, producers, consumers, and decomposers; Interaction between biotic and abiotic factors in an ecosystem; Energy flow and its importance; Trophic levels, food chain, Food web, Food Pyramid;

TYPES OF ECOSYSTEM: Understanding the types of ecosystem

i Terrestrial (forest, grassland and desert) and
ii Aquatic (fresh water - River, pond and salt water-Marine) with an example of each.

UNIT IV

ENVIRONMENTAL FACTORS

a) Disasters:- Natural and man-made Nuclear Disasters, major types and their causes, impact on environment and human life and remedies.
b) Impact of environment degradation on: - Natural habitats, living forms (endangered and Extinct species).
c) Pollution:- Definition, types (soil, water, air and noise), sources , impact on physical environment control and preventive measures of pollution.

UNIT V

ENVIRONMENTAL VALUES:

a) Population and Environment:- Definition of species, community, population; Population growth rate curves, Sex ratio, From unsustainable to sustainable development, Diseases-HIV, Malaria, Diaharia, Cancer.
b) Human rights, fundamental duties and value education.
c) Women and child welfare & Family welfare programs.

UNIT VI

ISSUES OF THE ENVIRONMENT

a) Resettlement and rehabilitation of people.
b) Energy Crisis – urban and rural sectors.
c) Climatic changes Greenhouse effect and global warming..
d) Acid rain& Ozone layer depletion.
e) Wild-life management - National parks, sanctuaries and bio-reserves, poaching, hunting and bio-piracy.
f) E Waste Management

REFERENCES:

1. Environmental Studies by ERACH BHARUCHA for UG courses by UGC.
2. Environmental Science by Anubha Koushik & C.P Koushik, New Age International Publishers.
3. Environmental Engineering & Management by Dr.Suresh K.Dhameja, Katson books.
4. Environmental Studies by Rajagopalan, Oxford University press.
5. Environmental Studies by Manoj Tiwari &Archana Tiwari , J.K.International Publishers.
6. Environmental Studies by Benny joseph.
7. Environmental Science & Technology by M.Anji Reddy ,BS Publications.

II B.Tech, I-Sem (EIE) T C
3+1* 3

(A0401123) ELECTRONIC DEVICES AND CIRCUITS

(Common to ECE, EEE & EIE)

OBJECTIVES:

- To understand the basic materials used for fabrication of different semiconductor devices.
- To understand construction details, principle of operation and equivalent electrical model of each device.
- Evolution of different diodes based on doping levels.

OUTCOMES:

- Students are capable of identifying a particular device for different applications.
- Students are able to understand that all the devices are basically two state devices (Switches).
- Students are capable of using two junction device as an amplifying device.

UNIT- I

ELECTRONICS DYNAMICS AND CRO: Motion of charged particles in electric and magnetic fields. Simple problems involving electric and magnetic fields only. Electrostatic and magnetic focusing. Principles of CRT, deflection sensitivity (Electrostatic and magnetic deflection).Application of CRO, Voltage, Current and Frequency Measurements.

UNIT- II

SEMICONDUCTOR DIODE CHARACTERISTICS: Review of PN Junction Diode. V-I characteristics of PN diode, Static and Dynamic resistances, Temperature dependence of parameters(Derivation not necessary)Diode equivalent circuits, Diode capacitances, Breakdown Mechanisms in Semiconductor Diodes, Zener diode characteristics, Principle of operation and Characteristics of Tunnel Diode with the help of energy band diagrams, Schottky Barrier Diode, Thermistor, avalanche photo diode, small signal equivalent circuit of PN diode, Specifications of PN diode, tunnel diode, zener diode, Thermistor and avalanche photo diode.

UNIT- III

RECTIFIERS, FILTERS AND REGULATORS: PN junction as a Rectifier, Half wave rectifier, ripple factor, Efficiency, regulation and Transformer utilization factor (TUF). Full wave rectifier, Bridge rectifier. **Filters:** Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L-Section filter, Π- Section filter, comparison of various filter circuits, Simple circuit of a regulator using Zener diode.

UNIT-IV

BIPOLAR JUNCTION TRANSISTORS (BJT): Study of operation of BJT, 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. Principle of operation and characteristics of SCR. small signal equivalent circuit of BJT, Specifications of BJT and SCR.

UNIT- V

TRANSISTOR BIASING AND STABILISATION: Importance of Biasing, Operating point, Load line(DC and AC) Types 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, Transistor as an amplifying device.

UNIT-VI

JUNCTION FIELD EFFECT TRANSISTORS (JFET): Construction, operation and transfer and output characteristics, Pinch-Off voltage, Small signal equivalent model of JFET, construction of MOSFET and its characteristics (Enhancement and depletion mode), Comparison of Transistors (BJT, FET, and MOSFET). Principle of operation and characteristics of UJT. Specifications of JFET, MOSFET and UJT.

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, Oxford University Press, 5th Edition, 2008.

REFERENCES :

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

II B.Tech, I-Sem (EIE) T C
3+1* 3

(A0402123)SIGNALS AND SYSTEMS

(Common to ECE & EIE)

OBJECTIVES:

- Study of signals and systems.
- Analysis of signals & systems and frequency transform methods.
- To understand the concepts of convolution and correlation.

OUTCOMES:

- For integro differential equations, the students will have the knowledge to make use of Laplace transforms.
- For continuous time signals the students will make use of Fourier transform and Fourier series.
- For discrete time signals the students will make use of Z transforms.
- The concept of convolution is useful for analysis in the areas of linear systems and communication theory.

UNIT-I

INTRODUCTION TO SIGNALS: Definition of signals, classification of signals and systems, 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-II

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 unit step function.

UNIT-III

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS: Linear system, Impulse 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 physical realization-The poly-wiener criterion, Relationship between bandwidth and rise time.

UNIT-IV

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

UNIT-V

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. and F.T. of a signal.

UNIT-VI

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 discrete time signals. Fundamental difference between continuous and discrete time signals, discrete time signal representation using complex exponential and sinusoidal components, 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 WillskyWith S HamidNawab, Publisher: Prentice Hall;2nd Edition, 2011.

REFERENCES:

1. Signals & Systems - Simon Haykin, BarryVan Veen, Signals and Systems, 2nd edition, JohnWiley& Sons, 2003.
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.

II B.Tech, I-Sem (EIE) T C
3+1* 3

(A0207123) ELECTROMAGNETIC THEORY

OBJECTIVES:

- The objective of this course is to introduce the concepts of electric field and magnetic fields and their applications which will be utilized in the development of the theory for power transmission lines and electrical machines.

EXPECTED OUTCOMES:

- Brief review of vector analysis: scalars, vectors, coordinate systems, vector operations, and functions.

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-I

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.

UNIT-IV: Magneto statics-II

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-V: 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-VI: Electro Dynamic Fields

Faraday's laws and its integral and point forms, induced 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

REFERENCE BOOKS:

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

II B.Tech, I-Sem (EIE)

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(A0205123) NETWORK ANALYSIS

(Common to ECE &EIE)

OBJECTIVE:

- This course introduces the basic concepts of circuit which is the foundation for all subjects related to Electrical & Electronics Engineering discipline. The emphasis of this course is laid on the basic analysis of circuits which includes Single phase circuits, Theorems, Steady state & Transient analysis and Network topology.

UNIT – I

Basic Electrical Components-Sources: Circuit Concept – R-L-C components – Voltage and Current sources – specifications of components, sources- Independent and dependent 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-Introduction to magnetically coupled circuits.

UNIT – II

Single Phase A.C Circuits: R.M.S and Average values and form factor for 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 – Resonance – series, parallel circuits, concept of band width and Q factor.

UNIT – III

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

UNIT – IV

Network theorems (without proofs): Tellegen's, Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Millman's and Compensation theorems for d.c. and a.c. excitations

UNIT – V

Transient Analysis: Transient response of R-L, R-C, R-L-C circuits (Series combinations only) for d.c. and sinusoidal excitations only – Initial conditions - Solution using differential equation approach and Laplace transform methods of solutions.

UNIT – VI

Network Parameters: Two port network parameters – Z, Y, ABCD and hybrid parameters and their relations– – concept of transformed network – 2-port network parameters using transformed variables.

TEXTBOOKS:

1. Engineering Circuit Analysis by W.H. Hayt, Jr., J.E. Kemmerly, and S.M. Durbin, Tata McGraw hill, 6th Edition 2002.
2. Network Analysis byM.E Van Valkenberg, Prentice Hall (India), 3rd edition, 2011.
3. Circuit Theory (Analysis & Synthesis) – A.Chakrabarthi, Dhanpat Rai & Co,2000.

REFERENCES:

1. Electric Circuits - J. Edminister & M. Nahvi, - Schaum's Outlines, Tata Mc Graw-Hill Publishing Company Ltd., 1999.
2. Network Theory – Sudhakar and Shymmohan, TMH Publications.

II B.Tech, I-Sem (EIE)

T	C
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(A0007123)APTITUDE ARITHMETIC REASONING AND COMPREHENSION

(Common to All Branches)

(Skill Development Course)

OBJECTIVES:

- To make the students ready to the recruitment drives.
- To raise the confidence of the students to face the written test of any Company.
- To train the students regarding employability skills.

OUTCOMES:

- Students becomes well trained for recruitment drives.
- Student become well trained to face the written test of any company.
- Students become well trained in employability skills

UNIT I

Numbers, Number Systems Simple Equations, Ratio, Proportion, Variation Quadratic Equations, Progressions Percentages.

UNIT II

Profit, Loss, Partnerships Averages, Mixtures & Allegations, Simple Interest, Compound Interest, Time and Work-Pipes, indices, surds, inequalities ,Cisterns Time and Distance Geometry and Menstruation.

UNIT III

Permutations & Combinations and Probability Data Interpretation & Data Sufficiency.

UNIT IV

Number & Letter Series, Analogies, Coding Decoding, Odd Man Out Blood Relations.

UNIT V

Direction Sense, Symbols and Notations Deductions & Connectives Clocks, Calendars Analytical

UNIT VI

Reasoning (Distribution+ Binary Logic + Puzzles) Cubes, Venn Diagrams Analytical Puzzles (Linear + Circular +Selections + Sequencing + Routes & Networks + Comparisons) and Non Verbal Reasoning

REFERENCES:

1. R.S.Agarwal " Quantitative Techniques" S.Chand Series
2. Shankuntala Devi " Techniques of Reasoning" S.Chand Series

II B.Tech I-Sem (EIE) P 3 C 2

(A0491123)ELECTRONIC DEVICES AND CIRCUITS LAB

(Common to ECE, EEE& EIE)

OBJECTIVES:

- This Lab provides the students to get an electrical model for various semiconductor devices. Students can find and plot V_I characteristics of all semiconductor devices. Student learns the practical applications of the devices. They can learn and implement the concept of the feedback and frequency response of the small signal amplifier

OUTCOMES:

- Students able to learn electrical model for various semiconductor devices and learns the practical applications of the semiconductor devices

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

(For Laboratory examination – Minimum of 8 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)

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AUTONOMOUS

SCHOOL OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

II B.Tech I-Sem (EIE) P 3 C 2

(A0492123)SIGNALS AND SYSTEMS SIMULATION LAB

(Common to ECE& EIE)

OBJECTIVES:

- The main objective of the Lab is to give the introduction about all signals with the help of their characteristics using matlab. This lab also deals with signal processing operation to understand various systems and simulate them using Matlab.

OUTCOMES:

- Students can perform various signal processing operation on Matlab.

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

II B.Tech I-Sem (EIE) P 3 C 2

(A0293123) NETWORK ANALYSIS LAB

(Common to ECE& EIE)

OBJECTIVES:

- To understand various electrical circuit concepts..
- To understand the Network Topology & coupled circuits.
- To learn and analyze network theorem practically.
- To learn the synthesis of various networks.

OUTCOMES:

- Students become skilled in analysing various electrical circuits.
- Students can analyze various Network Topologies & coupled circuits and networks.

PART-A

1. Determine the total current for the Series and parallel resistive circuits using Pspice.
2. Calculate node voltages and branch currents for the given circuits.
3. For the series and parallel circuits determine the total impedance, phase angle, voltage across the parallel branches for the AC circuits.
4. Using Pspice determine the frequency at which the circuits resonance, also fine the voltage across the inductor, capacitor and Q factor of the given circuits.
5. Using Pspice calculates the effective inductance of the series and parallel coupled circuits.
6. Using Pspice find the complete expression the circuit when the switch is closed at t=0.
7. A series RLC circuits comprising R=10 Ω, L=0.5 H and C=1 μf is excited by a constant voltage source of 100 volts using Pspice obtain the expression for current.
8. Using Pspice find the Z, Y, transmission parameters for the given circuits.

PART-B

9. Verification of superposition & Reciprocity theorems.
10. Verification of maximum power transfer theorem. Verification on DC, Verification on AC with resistive and reactive loads.
11. Experimental determination of Thevenin's and Norton's equivalent circuits and verification by direct test.
12. Determination of two port network parameters – Z, Y parameters of the given network.

Note: Total 8experimentshas to be conducted. Choosing 4 from Part-A & all in Part-B.

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II B.Tech II-Sem (EIE) T C
3+1* 3

(A0210124) CONTROL SYSTEMS

(Common to ECE, EIE & EEE)

COURSE 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

COURSE OUTCOMES

- To know various applications and analytical methods of control systems

UNIT-I

INTRODUCTION: Concepts of control systems – Open loop and closed loop control systems and their differences, examples – Types of feedback control systems

Mathematical modeling 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 REDUCTION & 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- Polar plots - Nyquist plots- Stability analysis

UNIT – VI

STATE SPACE ANALYSIS: Concept of state, state variables and state model, derivation of state models from block diagrams- solving time invariant state equations –state transition matrix and its properties.

TEXT BOOKS:

1) Control System Engineering – I.J. Nagarath and M.Gopal, New age international (P) limited, 2^{nd} edition.
2) Automatic control systems – B.C. Kuo, Jhon wiley and son's 2003

REFERENCE BOOKS:

1) Modern control engineering – Katsuhiko Ogata, PHI, 3^{rd} edition1998
2) Control Systems Engineering- NISE, 3^{rd} Edition-John Wiley
3) Control systems – U A Bakshi & V U Bakshi, Technical Publications, Pune.

II B.Tech II-Sem (EIE) T C
3+1* 3

(A0212124) ELECTRICAL TECHNOLOGY

(Common to ECE & EIE)

OBJECTIVE:

- This course introduces the working principles of different types of AC and DC motors, Generators and Transformers.
- This course introduces different types of AC and DC machines, Transformers
- It also helps to understand the construction and working of single phase motors and some special machines
- To provide theoretical prerequisites necessary to do lab work on DC machines and AC machines

OUTCOMES:

- The student will understand the electromagnetic principles involved in electrical machines
- The student can differentiate the performance characteristics of different machine including special machines

UNIT –I

DC Generator: Principle of operation of DC Generator, Construction details of DC Generator - EMF Equation, simple numerical problems on E.M.F equation. Types of Generators-series shunt& compound Generator. Magnetization Characteristics of Separately excited Generators-Numerical problems on types of Generators.

UNIT –II

DC Motors: Principle of operation of DC Motor- Significance of Back E.M.F-Types of DC Motors-Applications of dc motors – 3 point starters for dc shunt motor-losses and efficiency-Swinburne's test, load test-speed control of DC shunt motor-Numerical problems on E.M.F equation and types of motors.

UNIT –III

Transformers: Principle of operation of Transformer-constructional features- Phasor Diagram on no load and load – equivalent circuit-losses, efficiency and regulation of a transformer, OC & SC tests on transformer-Numerical problems on E.M.F equation, Voltage Regulation and Efficiency.

UNIT –IV

Three phase Induction motor: Principle of operation of 3-phase Induction motor-slip ring and squirrel cage motors- slip torque characteristics-efficiency calculation-starting methods-Auto Transformer & DOL starter. Numerical problems on Torque, slip & efficiency.

UNIT –V

Alternators: Constructional features- Principle of operation-types-EMF equation- distribution and coil span factors- pre determination of regulation by synchronous impedance method – OC & SC test- Numerical problems

UNIT –VI

Single phase motors: Principle of operation of 1-phase Induction motor- constructional features-split phase motors,

Special machines: Construction and principle of operation of DC, AC Servomotors- AC tachometers- Stepper Motors - variable reluctance, permanent magnet and hybrid types(Two-Phase ON-Mode) – Synchros Transmitter & Receiver , Switched reluctance motor- universal motor- Applications.

TEXT BOOKS:

1. Principle of Electrical Engineering by V.K.Mehta, Rohith Mehta, S.Chand publications.
2. Electrical Technology-volume II – B L Theraja- S. Chand.

REFERENCE BOOKS:

1. Electrical Machinery- J B Guptha- katsonbooks.
2. Electrical Machines – I J Nagrath and D P Kothari- PHI Publications.
3. Generalized Theory of Electrical Machines by P.S.Bimbra, Khanna publication

II B.Tech, II-Sem (EIE) T 3+1* C 3

(A0407124) ELECTRONIC CIRCUITS ANALYSIS

(Common to ECE & EIE)

OBJECTIVES:

- To study the analysis and design of single stage and multistage amplify at low and high frequencies.
- Electrical equivalent model of transistor at low and high frequencies.
- Study of small signal and large signal amplifiers and their area of applications.
- To understand the concepts of feedback and their applications (Voltage feedback amplifiers and oscillators)

OUTCOMES:

- Depending upon requirement the student able to understand the concept of analysis of small signal and large signal amplifiers, feedback amplifiers.
- Student able to design the regulators using transistor.

UNIT-I

SINGLE STAGE AMPLIFIERS: Review of **s**mall signal equivalent model of BJT and JFET, Analysis of single stage transistor amplifier (CE, CB, and CC) using h-parameters: Input impedance, Output impedance voltage gain and current gain, Comparison of transistor configurations in terms of A_I , R_i , A_v , R_o, Analysis of single stage JFET amplifiers (CS, CG, and CD) using h-parameters, design consideration of small signal amplifiers, Illustrative problems.

UNIT-II

MULTI STAGE AMPLIFIERS: Millers Theorem, Different Coupling Methods used in Amplifiers-RC, Direct, Transformer coupled Amplifiers. Analysis of two stage (Cascaded) RC Coupled amplifiers (CE configuration). High input Resistance Transistor Circuits. Cascode Transistor Configuration, CE-CC Amplifiers. Two Stage RC Coupled JFET amplifier (in Common Source (CS) configuration, Illustrative problems).

UNIT-III

HIGH FREQUENCY TRANSISTOR CIRCUTS: Transistor at High Frequencies, Hybrid-□π Common Emitter Transistor Model, Determination of Hybrid- π Parameters, Variation of Hybrid Parameters with $|I_C|$, $|V_{CE}|$ and Temperature. The Hybrid-π CE Short Circuit Current Gain, CE Current Gain with Resistance Load, Gain Band width product, Design of High frequency Amplifier. Frequency Effects, Amplifier Analysis, Illustrative problems.

UNIT-IV

FEEDBACK AMPLIFIERS: Concept of feedback, Classification of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on Amplifier characteristics, Voltage series, voltage shunt, current series, and current shunt feedback amplifiers with discrete components and their analysis, series and shunt regulators using transistor, Illustrative problems.

UNIT-V

OSCILLATORS: Condition for Oscillations. RC and LC type Phase Shift oscillators. Hartley and Colpitts oscillators, Wein bridge oscillator, Crystal oscillators, Frequency and amplitude stability of Oscillators, Illustrative problems.

UNIT-VI

LARGE SIGNAL AMPLIFIERS: Importance of Power Amplifiers, Types of Power amplifiers, Class A Power Amplifier, Maximum Efficiency of Class A amplifier, Transformer Coupled Audio amplifier, Types of Distortions in amplifiers, Push Pull amplifier (Class A, Class B), Complimentary Symmetry , Phase Inverters, Class C, D and S operations, Heat Sinks, Introduction to tuned amplifiers, Illustrative problems.

TEXT BOOKS :

1. Integrated Electronics – J. Millman and C.C. Halkias, Mc Graw-Hill, 1972.
2. Electronic Circuit Analysis and Design – Donald A. Neaman, Mc Graw Hill.

REFERENCES :

1. Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall,9th Edition,2006.
2. Micro Electronic Circuits – Sedra A.S. and K.C. Smith, Oxford University Press, 5th ed.
3. Principles of Electronic Circuits – S.G.Burns and P.R.Bond, Galgotia Publications, 2nd Edn.., 1998.
4. Electronic Devices and Circuits, Theodore F. Bogart Jr., J.S. Beasley and G. Rico, Pearson Edition, 6th Edition, 2004.

II B.Tech, II-Sem (EIE) T C
3+1* 3

(A0408124)PULSE AND DIGITAL CIRCUITS

(Common to ECE & EIE)

OBJECTIVES:-

- To study various wave shaping circuits and their applications.
- To study different circuits that produce non-sinusoidal waveforms (multivibrators) and their applications
- To study various voltage time base generators and their applications.
- To study different logic families and their comparison.

OUTCOMES:

- Students will be able to design different pulse circuits based on the above concepts.

UNIT I:

LINEAR WAVE SHAPING: Introduction to Linear wave shaping, Applications of Linear wave shaping circuits, High-pass and Low-pass RC circuits and their response for sinusoidal and different non-sinusoidal inputs like step, pulse, square wave, Exponential and ramp waveforms, High Pass RC circuit as differentiator and Low Pass RC circuit as an integrator; Introduction to attenuators, applications of attenuators; RL and RLC circuits and their response for step input.

UNIT II:

SWITCHING CHARACTERISTICS OF DEVICES:- Diode as a switch, diode switching times: diode forward recovery time, diode reverse recovery time; Transistor as a switch, conditions for a transistor to act as a switch, Transistor switching times: delay time, rise time, transistor on-time, storage time, fall time, transistor off-time, improving transistor switching times, Design of a transistor switch.

UNIT III:

NON-LINEAR WAVE SHAPING : Introduction to non-linear wave shaping, Applications of non linear wave shaping circuits, Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper; Comparators, applications of voltage comparators; Introduction to clamping circuits, Clamping operation, Different clamping Circuits, Clamping circuit theorem.

UNIT IV:

MULTI VIBRATOR CIRCUITS: Introduction to multivibrators, Bistable Multivibrator: Analysis and design of Fixed-bias Binary, Symmetrical and unsymmetrical triggering of the Binary, working principle of emitter-coupled binary, Analysis and design of a Schmitt trigger circuit ; working principle and design of a collector-coupled n-p-n transistor monostable multi; Working principle and design of a collector-coupled astable multivibrator.

UNIT V:

VOLTAGE TIME BASE GENERATORS : Introduction to voltage time base generators, General features of a time base signal, methods of generating time base waveform, exponential sweep circuit, sweep circuit using UJT for the switch; Miller and Bootstrap time base generators – basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator.

UNIT VI:

REALIZATION OF LOGIC GATES USING DIODES & TRANSISTORS: Diode AND gate, Diode OR Gate & Transistor NOT gate, Diode-Transistor Logic (DTL), Resistor-Transistor Logic (RTL), Resistor-Capacitor-Transistor Logic (RCTL), Direct-Connected Transistor Logic (DCTL), Emitter-Coupled Logic (ECL) and Transistor-Transistor Logic (TTL) Families, and comparison among the logic families.

TEXT BOOKS:

1. Pulse, Digital and Switching Waveforms – Jacob Millman and Herbert Taub, McGraw-Hill, 1991.
2. Solid State Pulse circuits - David A. Bell, PHI, 4th Edn., 2002.

REFERENCES:

1. Pulse and Digital Circuits – A.Anand Kumar, PHI, 2005.
2. Wave Generation and Shaping - L. Strauss.
3. Pulse, Digital Circuits and Computer Fundamentals - R.Venkataraman.
4. Pulse and Digital Electronics – G.K.Mithal.
5. Semiconductor Pulse Circuits With Experiments by Brinton B. Mitchell,Holt Rinehart & Winston; 1970 Edition.

II B.Tech, II-Sem (EIE) T C
3+1* 3

(A0404124)SWITCHING THEORY AND LOGIC DESIGN

(Common to ECE, EEE& EIE)

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 design of logic functions using PLDs (ROM, RAM, PAL, PLA).

OUTCOMES:

- Ability to differentiate between analog and digital representations.
- Ability to convert a number from one number system to its equivalent in of the other number system.
- Cite the advantages of the octal and hexa decimal number systems and to understand the difference between BCD and straight binary.
- Ability to perform the three basic logic operations and construct the truth tables for the different types of gates. And Implement logic circuits using basic AND, OR and NOT gates.
- Ability to Use De-Morgan's theorem to simplify logic expressions and describe the concept of active LOW and active HIGH logic signals and Use Boolean algebra and K-map as tool to simplify and design logic circuits and Design simple logic circuits without the help of truth tables.
- Ability to Construct and analyse the operation of flip-flop and troubleshoot various types of flip-flop circuits.

UNIT-I

NUMBER SYSTEMS, CODES AND BOOLEAN ALGEBRA: Philosophy of number systems – complement representation of Negative numbers, Binary arithmetic, Binary codes, Error Detecting &Error Correcting codes, Hamming codes. Fundamental postulates of Boolean algebra, Basic theorems and properties.

UNIT-II

SWITCHING FUNCTIONS AND IT'S MINIMIZATION: Switching functions, Canonical and standard forms, Algebraic simplification Digital Logic Gates, properties of XOR gates, Universal Gates ,Multilevel NAND/NOR realizations. K-map method, Prime Implicants, Don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime - Implicant chart, simplification rules.

UNIT-III

COMBINATIONAL LOGIC DESIGN: Half adder, Full adder, Ripple carry adder, Carry look ahead generator, BCD adder, Half substractor, Full substractor, Encoder, Decoder, Multiplexer, De-Multiplexer, MUX realization of Switching functions, Parity bit generator, Code-converters, multiplier.

UNIT-IV

PROGRAMABLE LOGIC DEVICES, THRESHOLD LOGIC: Basic PLD's-ROM, PROM, PLA, PAL Realization of switching function using PLD's. Capabilities and limitations of Threshold gate, realization basic logic gates and universal logic gates using threshold gates, analysis of simple threshold gates.

UNIT-V

SEQUENTIAL CIRCUITS: Classification of sequential circuits, Basic Flip-Flops, Excitation and Characteristic Tables. Steps in Synchronous Sequential circuit design. Design of modulo-N counters, Ring and Johnson counters, Universal shift register, Serial Binary adder, Sequence Detector. FSM-capabilities and Limitations, Mealy and Moore models, Minimization of completely specified Sequential Machines using partition method.

UNIT-VI

ASM CHARTS: Salient features of the ASM chart, components ASM charts, difference between ASM chart and conventional flow chart, difference between ASM chart and state diagram, system design using control logic, examples sequence detector, MOD-N counter, binary multiplier.

TEXTBOOKS:

1. Switching & Finite Automata theory- Zvi Kohavi, TMH,2nd Edition.
2. Digital Design-Morries Mano, PHI, 3rd Edition,2006.
3. Switching Theory and Logic design-A. Anand Kumar,2008.

REFERENCES:

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

II B.Tech, II-Sem (EIE) T C
3+1* 3

(A1001124) INDUSTRIAL INSTRUMENTATION

OBJECTIVES:

- Metrology, Velocity and acceleration measurement, Force and torque measurement, Pressure, Flow, Density and radiation measurements.

EXPECTED OUTCOMES:

- Ability to design and implement different industrial measurements like velocity, acceleration, force, torque, pressure, flow ,density and radiation measurements using different methods

UNIT-I

PRESSURE MEASUREMENT: Basics of Pressure measurement – Deadweight Gages and Manometers types – Force-Balance and Vibrating Cylinder Transducers – High and Low Pressure measurement – McLeod Gage, Knudsen Gage, Momentum Transfer Gages, Thermal Conductivity Gages, Ionization Gazes, Dual Gage Techniques.

UNIT–II

FLOW MEASUREMENT: Head type, Area type (Rota meter), electromagnetic type, Positive displacement type, mass flow meter, ultrasonic type, vertex shedding type, Hotwire anemometer type, Laser Doppler Velocity-meter.

UNIT – III

TEMPERATURE MEASUREMENT: Temperature standards - fixed points -filled-system thermometers - Bimetallic thermometer- Thermocouple - Laws of thermocouple - Cold junction compensation- Measuring circuits - Speed of response -linearization - Resistance thermometer- 3 lead and 4 lead connections - thermistors - IC temperature sensors - Radiation pyrometer- Optical Pyrometer-Installation, maintenance and calibration of thermometers and thermocouples.

UNIT –IV

LEVEL MEASUREMENT: Visual techniques - Float operated devices - Displacer devices - Pressure gauge method - Diaphragm box-Air purge system-Differential pressure method – Hydro-step for boiler drum Level measurement - Electrical methods - Conductive sensors - capacitive sensors –Ultrasonic Method - Point level sensors-Solid level measurement.

UNIT –V

VELOCITY, ACCELERATION, FORCE AND TORQUE MEASUREMENT: Linear and angular velocity measurement – Revolution counters and Timers - Magnetic and Photoelectric pulse counting stroboscopic methods - Accelerometers of different types - Gyroscopes.

Force measurement – Different methods –Torque measurement – Dynamometers- Gyroscopic Force and Torque Measurement – Vibrating wire Force transducer.

UNIT – VI

MISCELLANEOUS MEASUREMENTS: Measurement of density, viscosity, humidity, sound and nuclear radiation detectors.

TEXT BOOKS:

1. Measurement Systems – Applications and Design – by Doeblin E.O., 4/e, McGraw Hill International, 1990.
2. Mechanical measurements by – A.K Shawney, Khanna publishers
3. Instrumentation by Rangan, Mani, sharma.

REFERENCES:

1. Process Instruments and Control Handbook – by Considine D.M., 4/e, McGraw Hill International, 1993.
2. Mechanical and Industrial Measurements – by Jain R.K., Khanna Publishers, 1986.
3. Instrument Technology, vol. I – by Jones E.B., Butterworths, 1981.

II B.Tech, II-Sem (EIE) T C
3 2

(A0009123) CORPORATE MANAGEMENT SKILLS

(Skill Development Course)

(Common to all branches)

OBJECTIVES:

- To improve the communication skills of the students.
- To raise the confidence of the students with respect to the inter-personal communication.
- To make them to habituate to the Team culture and Team Work.
- To ensure the students to take up the challenges of Group Discussion and Personal Interview.
- To improve the overall personality of the students.

OUTCOMES:

- Able to improve the communication skills.
- Able to obtain the confidence of students with respect to the inter-personal communication.
- Able to cultivate the Team culture and Team Work.
- Able to take the challenges of Group Discussion and Personal Interview.

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

II B.Tech, II-Sem (EIE) P C
3 2

(A0298124) ELECTRICAL TECHNOLOGY LAB

(Common to ECE & EIE)

OBJECTIVES:

- To provide practical experience in observing the performance of DC and AC machines, Transformers
- To study the behavior and characteristics of different machines

OUTCOMES:

- The student will have clear understanding on the working of different types AC and DC machines and their performance characteristics

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

1. OCC test on dc generator.
2. Load Test on DC shunt motor.
3. Load test on DC series motor.
4. Swinburne's test on DC Shunt motor.\
5. Speed control of DC Shunt motor by Armature control method.
6. Speed control of DC Shunt motor by Field control method.
7. OC & SC test on 1 phase Transformer (Efficiency)
8. OC & SC test on of 1 phase Transformer (regulation)
9. Load test on 3-phase Induction motor
10. Regulation of Alternator by using Synchronous Impedance methods.
11. Characteristics of Synchro.

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II B.Tech, II-Sem (EIE) P C
3 2

(A0493124) ELECTRONIC CIRCUIT ANALYSIS LAB

(Common to ECE & EIE)

OBJECTIVES

- Help students make transition from analysis of electronic circuits to design of electronic circuits.
- To understand the Analysis of transistor at high frequencies.
- To understand the concept of designing of tuned amplifier.
- The student will construct and analyze voltage regulator circuits.
- To understand the circuit configuration and the principle operation of converters, including diode rectifiers, controlled AC-DC converters and DC choppers

OUTCOMES:

- The ability to analyze and design single and multistage amplifiers at low, mid and high frequencies.
- Designing and analyzing the transistor at high frequencies.
- Determine the efficiencies of power amplifiers.
- Determine Frequency response and design of tuned amplifiers.
- Able to Analyze all the circuits using simulation software and Hardware.

I) Design and Simulation in Simulation Laboratory using Multisim OR Pspice OR Equivalent Simulation Software.

1. Common Emitter and Common Source amplifier
2. Two Stage RC Coupled Amplifier
3. Current shunt Feedback Amplifier
4. Cascade Amplifier
5. Wien Bridge Oscillator using Transistors
6. RC Phase Shift Oscillator using Transistors
7. Class A Power Amplifier (Transformer less)
8. Class B Complementary Symmetry Amplifier
9. High Frequency Common base (BJT) / Common gate (JFET) Amplifier.

II) Testing in the Hardware Laboratory

A) Any Three circuits simulated in Simulation laboratory

B) Any Three of the following

1. Class A Power Amplifier (with transformer load)
2. Class B Power Amplifier
3. Single Tuned Voltage Amplifier
4. RC Phase Shift Oscillator
5. Wien Bridge Oscillator
6. Crystal Oscillator

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SCHOOL OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

II B.Tech, II-Sem (EIE) P C
3 2

(A0494124) PULSE AND DIGITAL CIRCUITS LAB

(Common to ECE & EIE)

OBJECTIVES:

- To generate Different types of non-sinusoidal signals.
- To generate and processing of non-sinusoidal signals.
- To learn about Limiting and storage circuits and their applications.
- To learn about Different synchronization techniques, basics of different sampling gates and their uses.
- To obtain Basics of digital logic families.

OUTCOMES:

- Student understands the various design and analysis to generate various types of signals.
- Student can design various digital circuits based on the application and specifications.

Minimum Ten experiments to be conducted:

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clampers.
4. Transistor as a switch.
5. Study of Logic Gates & Some applications.
6. Study of Flip-Flops & some applications.
7. Sampling Gates.
8. Astable Multivibrator.
9. Monostable Multivibrator.
10. Bistable Multivibrator.
11. Schmitt Trigger.
12. UJT Relaxation Oscillator.
13. Bootstrap sweep circuit.

III B.Tech, I-Sem (EIE)

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(A0014125) MANAGEMENT SCIENCE

(Common to ECE, CSE, EEE, EIE, IT & CE)

OUTCOMES:

- Students will able to know how to design the plant layout and location.
- Students will able to know importance of human resource department in organization.
- Students will able to know how the SWOT analysis helps to generate alternative corporate strategies.
- Students will able by using the contemporary practices how to survive in competitive global market.

OUTCOMES:

- Students will able to know how to design the plant layout and location.
- Students will able to know importance of human resource department in organization.
- Students will able to know how the SWOT analysis helps to generate alternative corporate strategies.
- Students will able by using the contemporary practices how to survive in competitive global market

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, batchand 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 Management 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.

III B.Tech, I-Sem (EIE) T C
3+1* 3

(A0413125) ANALOG IC APPLICATIONS

(Common to ECE & EIE)

OBJECTIVES:

- Study of OPAMPS, Classification of OPAMPs.
- To study and design various linear applications of OPAMPs.
- To study and design various nonlinear applications of OPAMPs.
- Study of Analog filters.
- Study of Timers and Phase Locked Loops.
- Study of D/A AND A/D converters.

OUTCOMES:

- Able to design OPAMPS and analyse different OPAMP circuits.
- Able to analyse and design various linear applications of OPAMPs.
- Able to analyse and design various nonlinear applications of OPAMPs.
- Able to analyse and design of Analog filters, Timers and Phase Locked Loops. And D/A AND A/D converters using OPAMP.

UNIT-I

INTRODUCTION TO OP-AMPS: Integrated circuits-types, classification, temperature ranges, power supplies, OP-Amp Block diagram, Differential amplifier circuit configurations, Characteristics of OP-Amps, ideal and practical OP-Amp specifications, DC and AC characteristics, 741 OP-Amp and its features, OP-Amp parameters, input and output offset voltages and currents, slew rate, CMRR, PSRR.

UNIT-II

LINEAR APPLICATIONS OF OP-AMPS: Inverting and non-inverting amplifier, adder, subtractor, integrator and differentiator, difference amplifier, instrumentation amplifier, AC amplifier, Voltage to Current, Current to Voltage converters, Buffers.

UNIT-III

NON LINEAR APPLICATIONS OF OP-AMPS: Non-linear function generation, comparators, Multivibrators, Triangular and square wave generators, Log and antilog amplifiers, precision rectifiers, IC 723 voltage regulators, fixed 3-terminal regulators.

UNIT-IV

ANALOG FILTERS: Introduction, Butterworth filters-first order, second order LPF, HPF filters. Band pass, Band reject and all pass filters, notch filters.

UNIT-V

TIMERS AND PHASE LOCKED LOOPS: Introduction to 555 Timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger, PLL-Introduction, Block schematic, principles and description of individual blocks, Introduction to IC 566, VCO applications and details, study of IC 1596 and its applications (balanced modulator only).

UNIT–VI

D/A AND A/D CONVERTERS: Introduction, Basic DAC techniques, weighted resistor DAC, R-2R Ladder DAC, Inverted R-2R DAC and different types of ADCs-parallel comparator type ADC, counter type ADC, successive approximation ADC and Dual slope ADC.DAC and ADC specifications

TEXT BOOKS:

1. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, 4th edition, PHI, 1987.
2. Operational Amplifiers & Linear ICs by David A. Bell, 2nd edition, Oxford University Press, 2010.

REFERENCES:

1. Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition, 2003.
2. Design with Operational Amplifiers & Analog Integrated Circuits - Sergio Franco, McGraw Hill, 1988.

III B.Tech, I-Sem (EIE) T C
3+1* 3

(A0415125) DIGITAL IC APPLICATIONS THROUGH VHDL

(Common to ECE & EIE)

OBJECTIVES:

- To be able to use computer-aided design tools for development of complex digital logic circuits
- To be able to model, simulate, verify, analyze, and synthesize with hardware description languages
- To be able to design and prototype with standard cell technology and programmable logic
- To be able to design tests for digital logic circuits, and design for testability

OUTCOMES:

- Able to use computer-aided design tools for development of complex digital logic circuits.
- Able to model, simulate, verify, analyze, and synthesize with hardware description languages.
- Able to design and prototype with standard cell technology and programmable logic.
- Able to design tests for digital logic circuits, and design for testability.

UNIT I

CMOS LOGIC: Introduction to logic families, CMOS logic, CMOS steady state electrical behavioral, CMOS dynamic electrical behavior, CMOS logic families.

UNIT II

THE VHDL HARDWARE DESCRIPTION LANGUAGE: Design flow, program structure, types and constants, functions and procedures, libraries and packages.

THE VHDL DESIGN ELEMENTS: Structural design elements, data flow design elements, behavioral design elements, and time dimension and simulation synthesis.

UNIT III

COMBINATIONAL LOGIC DESIGN: Decoders, encoders, three state devices, multiplexers and demultiplexers, EX-OR gates and parity circuits, comparators, adders & subtractors, ALUs, VHDL modes for the above ICs.

UNIT IV

DESIGN EXAMPLES (USING VHDL): Barrel shifter, comparators, floating-point encoder, dual parity encoder

UNIT V

SEQUENTIAL LOGIC DESIGN: Latches and flip-flops, counters, shift register, and their VHDL models.

UNIT VI

MEMORIES:

ROMs:Internal structure, 2D-decoding commercial types, timing and applications. Static RAM: Internal structure, SRAM timing, standard SRAMS, synchronous SRAMS. Dynamic RAM:Internal structure, timing, synchronous DRAMs.

TEXT BOOKS:

1. Digital Design Principles & Practices – John F. Wakerly, PHI/ Pearson Education Asia, 3rd Ed., 2005.
2. Fundamentals of Digital Logic with VHDL Design – Stephen Brown and Zvonko Vramesic, McGraw Hill, 2nd Edition., 2005.

REFERENCES:

1. Digital System Design Using VHDL – Charles H. Roth Jr., PWS Publications, 2nd edition, 2008.
2. A VHDL Primer – J. Bhasker, Pearson Education/ PHI, 3rd Edition.

III B.Tech, I-Sem (EIE) T C
3+1* 3

(A1002125) ELECTRICAL AND ELECTRONIC MEASUREMENTS

OBJECTIVE:

At the end of the course the student is expected to understand

- Electrical measurements
- Electronic measurements
- Oscilloscopes, signal generators and frequency measurements

EXPECTED OUTCOMES:

- Ability to understand electrical and electronic measurements and understanding the working of various instruments.

UNIT-1: ELECRICAL MEASUREMENTS

Electrical standards**:** ampere, voltage, resistance, capacitance & inductance standards-Suspension Galvanometer-Torque & deflection of the galvanometer-PMMC mechanism-DC Ammeters-DC voltmeters-Voltmeter sensitivity-Series and Shunt type ohm meters-Multimeters-Alternating current indicating instruments**:** electrodynamometer, rectifier type-Thermo instruments-Electrodynamometers in power measurements-Watt hour meter-Power factor meter.

UNIT-II: BRIDGE MEASUREMENTS

Resistance Measurement**:** Wheat stone bridge, Kelvin bridge- AC bridges**:** Condition for bridge balance-Inductance measurement**:** Maxwell Bridge, Hay Bridge- Capacitance measurement: Schering Bridge- Frequency measurement**:** Wein Bridge- Problems of shielding and grounding.

UNIT-III: ELECTRONIC MEASUREMENTS

FET input electronic volt-ohm-ammeters- AC voltmeters: rectifier type, true RMS type- Digital voltmeters: Ramp, Dual slope integration & SAR types – Q meter- Vector impedance meter-Vector volt meter- RF power and voltage measurement.

UNIT-IV: OSCILLOSCOPES

Oscilloscope block diagram- Vertical deflection system-Delay line-Horizontal deflection system-Vertical I/p and sweep generator signal synchronization-Oscilloscope probes**:** 1:1 probes, attenuator probes, active probes, current probes- Oscilloscope controls-Measurement of voltage, frequency, phase and pulse- Multi I/p oscilloscopes: dual beam, dual trace- Sampling oscilloscopes- Digital storage oscilloscopes.

UNIT-V: SIGNAL GENERATORS AND ANALYZERS

Low-frequency signal generators- Function generators- Pulse generators- RF signal generators- Frequency synthesized signal generator- Heterodyne wave analyzer- Harmonic distortion analyzers- Spectrum analyzer (Basics only).

UNIT-VI: FREQUENCY AND TIME MEASUREMENTS

Time & frequency standards- Frequency measurement- time base - Period measurement- Measurement errors.

TEXT BOOKS:

1. Modern Electronic Instrumentation and Measurement Techniques- Albert D. Helfrick, Willium D. Cooper- PHI-2002
2. Electronic Instrumentation and Measurements- David A. Bell-PHI-2nd edition-2003.

REFERENCES:

1. A course in Electrical and Electronic Mesurements and Instrumentation- A.K. Sawhney- Dhanpati Rai&CO-7th edition-2005
2. Electronic Instrumentation- H Kalsi- TMH-3rd edition
3. Electronic Measurements and Instrumentation- Oliver and Cage- TMH

III B.Tech I-Sem (EIE) T C
3+1* 3

(A1003125)SENSORS AND SIGNAL CONDITIONING

OBJECTIVE

At the end of the course the student is expected to understand

- General terminology of sensors
- Resistive sensors and their signal conditioning
- Reactance variation and electromagnetic sensors and their signal conditioning
- Self-generating sensors and their signal conditioning

EXPECTED OUTCOMES:

- Ability to understand and designing of resistive, reactance variation , self generating sensors and their signal conditioning.

UNIT I: INTRODUCTION TO SENSOR-BASED MEASUREMENT SYSTEMS

General concepts and terminology - Sensor classification- Static characteristics of measurement systems**:** accuracy, precision, sensitivity, linearity, threshold, resolution-Systematic errors-Random errors-Dynamic characteristics of measurement systems: zero-order, first-order, and second-order measurement systems and response to step, ramp and sinusoidal inputs.

UNIT II: RESISTIVE SENSORS

Potentiometers - Strain gages and types - Resistive temperature detectors (RTDs), - Thermistors - Magneto resistors - Light-dependent resistors (LDRs).

UNIT III: SIGNAL CONDITIONING FOR RESISTIVE SENSORS

Measurement of resistance - Voltage dividers - Wheatstone bridge: Balance and deflection measurements - Sensor bridge calibration, balance and compensation - Instrumentation amplifiers.

UNIT IV: REACTANCE VARIATION AND ELECTROMAGNETIC SENSORS

Capacitive sensors**:** variable & differential - Inductive sensors**:** Variable reluctance and eddy current sensors, LVDTs, Variable transformers (synchros and resolvers), Magneto elastic and magnetostrictive sensors - Electromagnetic sensors: Sensors based on faraday's law, Hall Effect sensors.

UNIT V: SIGNAL CONDITIONING FOR REACTANCE VARIATION SENSORS

Problems and alternatives- AC bridges- Carrier amplifiers, Detection & application to LVDTs

UNIT VI: SELF-GENERATING SENSORS

Thermoelectric sensors**:** Thermocouples, Piezoelectric and Pyroelectric sensors- Photovoltaic sensors- Electrochemical sensors.

SIGNAL CONDITIONING FOR SELF-GENERATING SENSORS: Offset and drifts in OP amps-Chopper and Auto zero amplifiers- Electrometer- Transimpedemce amplifiers-Charge amplifiers- Noise in amplifiers.

TEXT BOOK:

1) Sensors and Signal Conditioning: Ramon Pallás Areny, John G. Webster, 2nd edition, John Wiley and Sons, 2000.

REFERENCES:

1) Sensor Technology Hand Book-Jon Wilson ,Newne 2004
2) Instrument Transducers – An Introduction to Their Performance and Design – by Herman K.P. Neubrat, Oxford University Press.
3) Measurement System: Applications and Design – by E.O. Doeblin, McGraw Hill Publications.
4) Instrumentation Devices and Systems – by C.S.Rangan ,G.R.Sarma,V.S.V.Mani Tata McGraw Hill Publications.
5) A Course in Electrical and Electronic Measurements and Instrumentation –by A.K.Sawhney, Puneet Sawhney Dhanpat Rai & Co (P) Ltd.
6) Industrial instrumentation, principles and design- by Tattamanglam R. Padmanabhan- springer india-2005.

III B.Tech, I-Sem (EIE) T C
3+1* 3

(A1004125) PROCESS CONTROL INSTRUMENTATION

UNIT-I

PROCESS CHARACTERISTICS: Process variables- Process degrees of freedom- Characteristics of physical systems**:** Electric systems**,** liquid systems, gas systems, thermal systems- Elements of process dynamics- Mathematical modeling of liquid process, gas process, flow process, thermal process.

UNIT-II

CONTROLLER PRINCIPLES: Basic concepts of process control: SP, PV, and CV - Control system parameters- Controller Modes- Discontinuous Controller Modes– Continuous Controller Modes- Composite Control Modes- Problems.

UNIT- III:

REALIZATION OF CONTROLLERS: Electronic controllers to realize various control actions: ON/OFF, P, I, D, PI, PD, and PID- Problems.

UNIT- IV

OPTIMUM CONTROLLER SETTINGS: Evaluation criteria- $1/4^{th}$ decay ratio- Time integral performance criteria**:** IEA, ISE, ITAE- Tuning of controllers by process reaction curve method- Continuous cyclic method.

UNIT- V

FINAL CONTROL ELEMENTS: Actuators: Pneumatic**,** Electro pneumatic, electric types - Control valve Principle- Control valve types and their characteristics - Control valve sizing**.**

UNIT-VI

MULTILOOP PROCESS CONTROL: Feed forward control- Ratio control- Cascade control – Multivariable control examples: distillation column and boiler operation.

PRESCRIBED TEXT BOOKS:

1. Automatic process control- By Donald P. Eckman- Wiley Eastern-1985 **(for units 1 & 5)**
2. Process control Instrumentation Technology- by Curtis D Johnson- PHI-1996 **(for units 2 & 3)**
3. Chemical process control - by Stephanopoulos –PHI-2001 **(for units 4 & 6)**

REFERENCES:

1. Peter Harriot, " process control"- TMH- 1991
2. Patranabis. D, " principles of process control", TMH, 1981
3. Coughnaoner and Koppel, "Process systems analysis and control"- TMH, 1991.
4. B. Liptak, Instrument Engineers hand book Process control**.(for unit 5)**
5. Programmable logic controllers (section- 4)- by L.A Bryan and E.A. Brayan-2^{nd} edition-Industrial text company publication, Atlanta, Georgia, USA. (**for 2^{nd} unit**)
6. Lessons In Industrial Instrumentation - By Tony R. Kuphaldt-Version 0.4 – Released January 11, 2009-http://creativecommons.org/licenses/by/3.0/us/ - Creative Commons, 171-Second Street, Suite 300, San Francisco, California, 94105,USA. (**for units 2 & 5)**

III B.Tech, I-Sem (EIE) T C
3+1* 3

(A0013125) PROFESSIONAL ETHICS AND SOFT SKILLS

(Soft Skill Development Course)
(Common to all branches)

OBJECTIVES

The recent past decades have witnessed a dilemma of performance on ethical grounds. A professional be able to carry out tasks and achieve success at societal level. The syllabus has been designed keeping in view of the needs and goals of the generation next undergraduates. It comprises essentials of professional ethics embedded with soft skills which in turn mould students as dynamic professionals. The course of **Professional Ethics and Soft Skills** has been designed with the following objectives.

- To ignite the spark of professionalism among students with the purpose to acquire success at societal level.
- To enable them to accomplish tasks balancing hard skills and soft skills.
- To develop critical thinking skills and emotions of students through recent research theories.
- The greatest contribution of this course shall be to shape human skills of students at the global level.

OUTCOMES

- Be able to acquire professional ethics & Job Etiquettes
- Be able to balance hard skills and soft skills.
- Considerable improvement in communicative ability.
- Increase in motivational level and Professional attitudes.
- Be able to possess wide range of relevant knowledge.

UNIT I

NATURE AND SCOPE OF ENGINEERING ETHICS: Definition, Nature, Scope – Moral Dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory, the characteristic traits of real professional, Moral Reasoning and Ethical theories – Theories of Right Action, Self – interest- Use of ethical Theories- case study.

UNIT II

PROFESSIONAL ETIQUETTES: Professional Etiquettes **–** Mobile Etiquettes – Email Etiquettes -Kinesics – Proxemics - Chronemics – Chromatics – Olfacts - Haptics – Case Study.

UNIT III

CORPORATE COMMUNICATION: Communication models- Types of Communication – downward and upward communication Business Deliberations – Meetings – Negotiation Skills - Case Study.

UNIT IV

SOFT SKILLS: Interpersonal Communication – Johari Window – Interpersonal conflict resolutions- Daniel Goleman's Emotional Intelligence.

UNIT V

GLOBAL ISSUES: Multinational corporations – cross-cultural communication-Environmental ethics – Computer – ethics –Terrel Ward Bynum's concept of computer ethics - Weapons developments- case study.

UNIT VI

INTRODUCTION TO INTELLECTUAL PROPERTY: Meaning and Types of Intellectual Property – recent developments of the copy right act – plagiarism – trademark protection – patent law.

TEXT BOOKS:

1. Charles D.Fleddermann [1999], *Engineering Ethics*, Prentice Hall Publishers, New Mexico.
2. Business Communication , P.D. Chaturvedi, Mukesh Chaturvedi

REFERENCES :

1. The ACE of Soft Skills(Attitude, Communication and Etiquette for success) by – Gopalaswamy Ramesh & Mahadevan Ramesh, Pearson 2010.
2. Essentials of Business Communication, Rajendra Pal, JS.Korlahhi, S.Chand
3. Intellectual Property Right , Deborah E. BouchouxS, Cengage, 2005
4. Business Ethics and Professional Values, A.B. Rao, Excel,2009
5. M.P. Raghavan [2006], Professional Ethics And Human Values, Scitech Publications, Chennai.

III B.Tech, I-Sem (EIE) P C
3 2

(A0498125) ANALOG IC APPLICATIONS LAB

(Common to ECE & EIE)

List of Experiments:- (Minimum Ten Experiments should be conducted)

1. OP AMP Applications – Adder, Subtractor, Comparator Circuits.
2. Integrator and Differentiator Circuits using IC 741.
3. Active Filter Applications – LPF, HPF (first order)
4. Active Filter Applications – BPF, Band Reject (Wideband) and Notch Filters.
5. IC 741 Oscillator Circuits – Phase Shift and Wien Bridge Oscillators.
6. Function Generator using OP AMPs.
7. IC 555 Timer – Monostable Operation Circuit.
8. IC 555 Timer – Astable Operation Circuit.
9. Schmitt Trigger Circuits – using IC 741 and IC 555.
10. IC 565 – PLL Applications.
11. IC 566 – VCO Applications.
12. 4 bit DAC using OP AMP.

III B.Tech, I-Sem (EIE) P 3 C 2

(A0499125) DIGITAL IC APPLICATIONS USING VHDL LAB

Simulate the internal structure of the following Digital IC's using VHDL and verify the operations of the Digital IC's (Hardware) in the Laboratory

Minimum 10 experiments

1) Logic Gates- 74XX
2) Half Adder, Full Adder
3) Half Subtractor, , Full Subtractor
4) Ripple Carry Adder
5) 3-8 Decoder -74138
6) 8-3 Encoder- 74X148
7) 8 x 1 Multiplexer -74X151

   1bit Comparator-74X85
8) D Flip-Flop 74X74
9) JK Flip-Flop 74X109
10) Decade counter-74X160
11) Universal shift register -74X194

Note: Use VHDL/VERILOG to design the above experiments.

III B.Tech, I-Sem (EIE) P 3 C 2

(A1091125) SENSORS AND TRANSDUCERS LAB

List of experiments: (Minimum of 10 Experiments to be conducted, Optionally LabVIEW may be used for implementing the experiments)

1. Measurement of Physical variables based on change in resistance.
    a) Strain (Strain Gauge)
    b) Temperature (RTD, Thermistor)
2. Measurement of Physical variables based on induced emf - LVDT
3. Measurement of Physical variables based on change in dielectric - Capacitive pick up.
4. Measurement of Pressure using Bourdon tube
5. Measurement of Vibration using Acceleration transducer.
6. pH Measurement.
7. Measurement of Speed using Digital Stroboscope.
8. Conversion of D'Arsonal Galvanometer into DC meter (Voltage & Current).
9. Measurement of R, L, C and Q using Q meter.
10. Measurement of R, L and C using Bridge circuits.
11. Conversion of D'Arsonal galvanometer into Ohm Meter.
12. Conversion of D'Arsonal galvanometer into AC meter (Current & Voltage).

III B.Tech, II-Sem (EIE) T C
3+1* 3

(A0011123) MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

(Common to all Branches)

OBJECTIVES

- To understand the principles of and techniques of managerial economics.
- To understand the business organizations.
- To understand the financial accounting and analysis.
- To understand maintain a particular product at the lowest cost while meeting the specifications of the customer

OUTCOMES:

- Students will able to analyse the demand in the present market.
- Students will able to how to precise the production cost.
- Students will able to know the price output decisions are made in markets.
- Students will able to maintain the books by using the financial accounting

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.Dwivedi:Managerial Economics, 6th Ed., Vikas.

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

III B.Tech, II-Sem (EIE) T C
3+1* 3

(A1210125) COMPUTER ORGANIZATION

(Common to ECE, EEE& EIE)

OBJECTIVES:

- To understand the structure, function, characteristics and performance issues of computer systems.
- To understand the design of the various functional units of digital computers
- To understand I/O transfer mechanism, design of I/O circuit interfaces and example bus standards (like PCI, SCSI, USB)
- To understand the basic processing unit and how they are connected and how it generates control signals (using hardwired and microprogrammed approaches)
- To understand the different types of memory and how they are related.
- To learn basics of Parallel Computing and Pipelining.

OUTCOMES:

- Students will learn about computer performance, computer design, and trade-offs between cost andperformance as well as between hardware and software
- Students will formulate and solve problems, understand the performance requirements of systems
- Students will learn to communicate effectively and learn to think creatively and critically, both independently and with others.
- Students will learn about all the detailed design issues and circuits of each unit.

UNIT I:

BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional unit, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers. **DATA REPRESENTATION:** Fixed Point Representation, Floating Point Representation. Error Detection codes.

UNIT II:

REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations **BASIC COMPUTER ORGANIZATION AND DESIGN**: Instruction codes, Computer Registers, Computer instructions, Instruction cycle, Memory- reference instructions, Input – Output and Interrupt.

UNIT III:

CENTRAL PROCESSING UNIT: Stack organization, Instruction formats, Addressing modes, Data transferand manipulation, Program control **COMPUTER ARITHMETIC:** Fixed point operations - Addition and subtraction, multiplication, Division Algorithms

UNIT IV:

THE MEMORY SYSTEM: Basic concepts, semiconductor RAM memories, Read-only memories, Cache memories, performance considerations, Virtual memories, secondary storage, Introduction to RAID.

UNIT-V:

PIPELINE AND VECTOR PROCESSING: Parallel processing, Arithmetic pipeline, Instruction Pipeline, RISC Pipeline, Vector processing, Array Processors.

UNIT VI:

MULTI PROCESSORS: Characteristics of Multi Processors, Inter Connection Structures, Inter Processor Arbitration, Inter Processor Communication & Synchronization, Cache Coherence

TEXT BOOKS:

1. Computer Systems Architecture – M. Moris Mano, III Edition, Pearson/PHI (Units1,2,3,5,6)

REFERENCES:

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, V Edition, McGraw Hill. (Unit 1 & 4)

III B.Tech, II-Sem (EIE) T C
3+1* 3

(A0416126) DIGITAL SIGNAL PROCESSING

(Common to ECE, EEE & EIE)

OBJECTIVES:

- At the end of the course, the student should be able to:
- 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 analyse a digital system.
- Design and understand simple finite impulse response filters
- Understand stability of FIR filters
- Quantization of different types of FIR filters (FIR)
- Choose the best filter effects and noise
- Pole-zero design of simple filters using real data
- Window method design structure for implementation

OUTCOMES:

- Ability to describe the Sampling Theorem and how this relates to Aliasing and Folding.
- Ability to determine if a system is a Linear Time-Invariant (LTI) System and Take the Z-transform of a LTI system.
- Ability to determine the frequency response of FIR and IIR filters.
- Ability to understand the relationship between poles, zeros, and stability and determine the spectrum of a signal using the DFT, FFT, and spectrogram.
- Ability to Design, analyze, and implement digital filters in Mat lab.

UNIT-I

INTRODUCTION: Review of Discrete time signals and sequences, Frequency domain representation of discrete time signals and systems, DTFT.

Discrete Fourier series: Properties of discrete Fourier series, DFS representation of periodic sequences, **Discrete Fourier transforms:** properties of DFT, linear convolution of sequences using DFT, computation of DFT. Relation between Z-Transform and DFS.

UNIT-II

FAST FOURIER TRANSFORMS: Radix-2 Fast Fourier transforms (FFT), decimation in time and decimation in frequency FFT algorithms, inverse FFT and FFT for composite N.

UNIT-III

REALIZATION OF DIGITAL FILTERS: Review of Z-transforms, applications of Z-Transforms, solution of difference equations of digital filters, block diagram representation of linear constant-coefficient difference equations, basic structures of IIR systems, basic structures of FIR systems, Lattice structures of IIR systems, Lattice structures of FIR systems. Conversion from Lattice structure to direct form, Conversion from direct from to Lattice structure, Lattice – ladder structure.

UNIT-IV

IIR DIGITAL FILTERS: Analog filter approximations-Butterworth and chebyshev, design of IIR digital filters from analog filters, Design examples, Frequency transformations in analog domain and Frequency transformations in digital domain, Illustrative Problems.

UNIT-V

FIR DIGITAL FILTERS: Characteristics of FIR digital filters, frequency response. Design of FIR digital filters using window techniques, frequency sampling technique, comparison of IIR and FIR filters, illustrative Problems.

UNIT-VI

MULTIRATE DIGITAL SIGNAL PROCESSING FUNDAMENTALS: Basic sample rate alteration devices, Multirate Structures for sampling rate Converters, Multistage design of decimator and Interpolator, Polyphase Decomposition, Nyquist filters, Applications of DSP.

TEXT BOOKS:

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

REFERENCES:

1. Digital signal processing: Andreas Antoniou, TATA McGraw Hill, 2006.
2. A Text book on Digital Signal processing – R S Kaler, M Kulkarni,, Umesh Gupta, I K International Publishing House Pvt. Ltd.
3. Digital signal processing: M H Hayes, Schaum's outlines, TATA Mc-Graw Hill, 2007.

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AUTONOMOUS

SCHOOL OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

III B.Tech, II-Sem (EIE) T C
3+1* 3

(A1005126) PRINCIPLES OF COMMUNUCATIONS

OBJECTIVES:

At the end of the course the student is expected to understand

- Types of communication
- Fourier transform for various signals
- Need for modulation and different types modulation techniques.
- Different types of digital communication
- Different types of digital modulation techniques.
- Information and error control coding.

EXPECTED OUTCOMES:

On successful completion of this module students will be able to

- Differentiate between analogue and digital communications systems
- List key milestones in the history of communications and assess both their social and technological
- implications.
- Explain the basic structure of modern communication systems and distinguish between the various systems.
- Describe the characteristics of signals commonly encountered in communications systems

UNIT I

Introduction: Block diagram of Electrical communication system, Radio communication: Types of Communications, Types of signals: Analog, pulse and digital.

Amplitude Modulation: Need for modulation, Types of Amplitude modulation, AM, DSB SC, SSB SC, Power and BW requirements, generation of AM, DSB SC, SSB SC, Demodulation of AM: Diode detector, Product demodulation for DSB SC & SSB SC.

UNIT II

Angle Modulation: Frequency & Phase modulations, advantages of FM over AM, Bandwidth consideration, Comparison of FM & PM.

UNIT III

Pulse Modulations: Overview of Sampling theorem, PAM, regeneration of base band signal, PWM and PPM, Time Division Multiplexing, Frequency Division Multiplexing, Asynchronous Multiplexing.

UNIT IV

Digital Communication: Advantages, Block diagram of PCM, Quantization, effect of quantization, quantization error, Base band digital signal, DM.

UNIT V

Digital Modulation: ASK, FSK, PSK, DPSK, QPSK demodulation, coherent and incoherent reception, Modems.

UNIT VI

Information Theory: Concept of information, rate of information and entropy, Source coding for optimum rate of information, coding efficiency, Shanon-Fano and Huffman coding.

Error control coding: Introduction, Error detection and correction code.

TEXT BOOKS:

1. Communication Systems Analog and Digital – R.P. Singh and SD Sapre, TMH, 20th reprint, 2004.
2. Principles of Communications – H. Taub and D. Schilling, TMH, 2003.

REFERENCES

1. Electronic Communication Systems – Kennedy and Davis, TMH, 4th edition, 2004.
2. Communication Systems Engineering – John. G. Proakis and Masoud Salehi, PHI, 2nd Ed. 2004

III B.Tech, II-Sem (EIE) T 3+1* C 3

(A1006126) COMPUTER AIDED PROCESS CONTROL

OBJECTIVES:

At the end of the course the student is expected to learn the

- The internal structure of Personal computer in terms of its peripherals
- Data acquisition using standard cards
- PC programming considerations using command line

EXPECTED OUTCOMES:

The students will be able to

- Decide which resources of PC suits a application
- Configure PC for interfacing with external environment
- Program PC for the application

UNIT-I

INTRODUCTION TO COMPUTERS (Elementary level treatment): Personal computer, operating system, I/O ports, plug-in-slots, PCI bus, operator interface- Computer interfacing for data acquisition and control- Interfacing input signals, output system with continuous actuators-Back plane bus, VME, VXI.

UNIT-II

INTRODUCTION TO COMPUTER CONTROL: Role of computers in the control of industrial processes (plants) - Elements of computer controlled plant- classification**:** Batch, continuous, supervisory and direct digital controls- Architecture**:** Centralized, Distributed and Hierarchical systems- Man machine or Human computer interface (HCI).

UNIT- III

BUILDING BLOCKS OF COMPUTER CONTROL LOOP: Process related variables- Computer networks- Topologies- Communication in Distributed control systems- Smart sensors- Field bus.

UNIT-IV

CONTROL SYSTEM DESIGN: Heuristics-Structural controllability and Relative gain array- Controller tuning**:** P, PI, PID and Ziegler- Nicholas method- Controller design**:** Regulator design and other design considerations.

UNIT-V

DESIGN OF DIGITAL CONTROLLERS: Computer control loop- Zero-order hold equivalence (ZOH) - First order system with time delay- Converting continuous time controller to discrete time domain- Dead beat and Dahlin's algorithms.

UNIT-VI

DESIGN OF ADVANCED CONTROLLER: Feed forward controller**:** Block diagram, Static and dynamic FFC- Predictive control**:** model based and multi variable systems- Adaptive control**:** Adjustment, schemes and techniques

TEXT BOOKS:

1. Computer aided process control- S.K. Singh, PHI 2004
2. Computer control processes- M. Chindambaram, Narosa pub 2003

REFERENCES:

1. Computer based industrial control- Krishnakant, PHI 1997
2. Computer process control- Deshpande P.B and Ash R.H – ISA pub-1995
3. Chemical process control: An introduction to theory and practice- Stephanopulos, PHI, New Delhi, 1999.
4. Real time control: An introduction- S.Bennett- Pearson education, India.

III B.Tech, II-Sem (EIE) T C
3+1* 3

(A1007126) BIO-MEDICAL INSTRUMENTATION

UNIT – I

INTRODUCTION: Components of Medical Instrumentation System- Problems encountered with measurements from human beings - levels of structural organization of the human body- Physiological systems of the body- Organization of cell- Resting membrane potential-Generation of Action Potential and conduction through nerve cell.

UNIT – II

BIO ELECTRODES: Electrode theory-Electrode characteristics- Bio potential Electrodes**:** micro, skin surface and needle electrodes - Biochemical electrodes**:** reference electrodes, ph electrode, blood gas electrodes.

UNIT – III

CARDIAC INSTRUMENTATION- I: Cardiovascular system- Electrical Conduction system of the heart- Cardiac cycle- The ECG**:** Einthoven triangle, Standard 12-lead configurations- Interpretation of ECG waveforms with respect to electro mechanical activity of the heart- ECG recorder principles.

UNIT – IV

CARDIAC INSTRUMENTATION- II: Blood flow measurements- Blood pressure measurements- Pace maker- Defibrillators- Hemo dialysis.

UNIT – V

NEURO- MUSCULAR INSTRUMENTATION: Nervous system**:** anatomy, structure, functions, organization - Neuronal Communication- Brain**:** anatomy, organization - EEG**:** electrode placement, recorder principles, interpretation of waveforms- Neuromuscular junction and EMG.

UNIT – VI

RESPIRATORY INSTRUMENTATION: The Physiology of the Respiratory system- lung volumes and capacities - Spirometers- Body Plethysmograph- Respiratory Therapy Equipment**:** Inhalators, Ventilators/Respirators, Humidifiers, Nebulizers, Aspirators.

TEXT BOOK:

1. Biomedical Instrumentation and Measurements – by Leslie Cromwell, F.J.Weibell, E.A. Pfeiffer, PHI.

REFERENCES:

1. Human physiology: from cells to system- by Lauralee Sherwood, 6th edition, Thomson Brooks/Cole.
2. Medical Instrumentation, Application and Design – by John G. Webster, John Wiley.
3. Principles of Applied Biomedical Instrumentation – by L.A. Geoddes and L.E.Baker, John Wiley and Sons.
4. Introduction to Biomedical Equipment Technology, Joseph J Carr, John M.Brown, 4th Edition Pearson Education, Singapore, 2001.

III B.Tech, II-Sem (EIE) T C
3 2

(A1241126) FUNDAMENTALS OF JAVA PROGRAMMING

(SKILL DEVELOPMENT COURSE)

OBJECTIVE:

At the end of the course the student is expected to understand

- It provides the students with an excellent choice for beginning to learn programming using the java programming language.
- The courses teach the significance of object-oriented programming language and the steps required to create simple java technology programs.
- It allows the users to build graphical user interfaces and handle various events.

EXPECTED OUTCOMES:

- Use the java programming language to build object-oriented programs and applications.
- Design, code, compile, run and debug the computer programs using object oriented programming language.
- Understand and use the core concepts of an object-oriented language.
- After completing this course, participants should be able to: Understand OOPS Concepts.. Data Types and Operators in Java Thread concepts Packages & Interfaces Develop GUI using Java. Understanding the packages present and Java applications.

UNIT-I

Introduction: What is a Computer?, Programs, Operating Systems, Java WWW and Beyond, The Java Language Specification, API, JDK and IDE, A Simple Java Program , Creating Compiling and Executing a Java Program.

Elementary Programming: Writing simple programs, Identifiers, Variables, Assignment Statements and Assignment Expressions, Constants, Numeric Data Types and Operations, Numeric Type conversions, Character Data Type and Operations, String Type

UNIT-II

Selections: Boolean Data Type and Operations, if statements, switch statements, conditional expressions, operator precedence and associativity

Loops: while, do-while, for, nested

Methods: defining a method, calling a method, void method, passing parameters by values, modularizing code, overloading methods, scope of variables, Math class

UNIT-III

Arrays: Basics, Copying arrays, passing arrays to methods, returning an array from a method, variable-length argument lists, searching and sorting arrays, Arrays class, Two-Dimensional Arrays, Multidimensional Arrays

Objects and Classes: Defining classes for Objects, Constructors, Accessing objects via Reference Variables, Class usage from the Java library, Static Variables, Constants and Methods, Visibility Modifiers, Encapsulation, Passing Objects to Methods, Array of Objects

UNIT-IV

Strings and Text I/O: String class, Character class, String Builder/String Buffer class, Command-line Arguments, File class, File Input and Output

Thinking in Objects: Immutable Objects and classes, Scope of Variables, this reference, class abstraction and Encapsulation

UNIT-V

Inheritance and Polymorphism: Superclasses and Subclasses, Extending JFrame class, super keyword, Overriding Methods, Overriding vs Overloading, Object class and its methods, Polymorphism, dynamic binding, and generic programming, protected data and methods

UNIT-IV

Applets: Applet class, JApplet class, HTML File and the <applet> tag, Enabling Applets to Run as Applications.

Exception Handling: Overview, Advantages, Exception types, Understanding Exception Handling, finally clause, usage of exceptions, rethrowing exceptions

TEXT BOOK:

1. Introduction to Java Programming, 7th edition, By Y Daniel Liang, Pearson Education.

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

(A0484126) DIGITAL SIGNAL PROCESSING LAB

OBJECTIVES:

- To design real time DSP systems and real world applications.
- To implement DSP algorithms using both fixed and floating point processors.
- To generate the basis function of different transforms.

OUTCOMES:

- Able to design real time DSP systems and real world applications.
- Able to implement DSP algorithms using both fixed and floating point processors.

1) Simulation of discrete time systems.
2) Verification of DTFT properties.
3) Stability test.
4) Effect of sampling in frequency and time domain.
5) Design of analog filters.
6) Realization of IIR and FIR transfer functions.
7) Design of IIR Filters.
8) Design of FIR filters.
9) Design of tunable digital filters.
10) Multirate signal processing techniques: Decimation and interpolation.

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

(A1284127) FUNDAMENTALS OF JAVA PROGRAMMING LAB

S.No	Programs
	Introduction to Java Programming – Simple Java programs – Saving the program – Compiling and Executing Java programs in command prompt
1	Write a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c = 0$. Read in a, b, c and use the quadratic formula. If the discriminant b^2-4ac is negative, display a message stating that there are no real solutions.
2	Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer.
3	Write a Java program that uses both recursive and non-recursive functions to print the n th value of the Fibonacci sequence.
4	Write a Java program to calculate the area of rectangle using parameterized constructor.
5	Write a Java program for the method overloading.
6	Write a Java program that displays the number of characters, lines and words in a text file.
7	Write a Java program that checks whether a given string is a palindrome or not.
8	Write a Java program that reads a line of integers and then displays each integer and the sum of all integers.
9	Write a Java program for sorting a given list of names in ascending order.
10	Write a Java program to multiply two given matrices.
11	Write a Java program for method overriding.
12	Write a java program to create an abstract class named shape that contains an empty method named number of sides (). Provide three classes named trapezoid, triangle and Hexagon such that each one of the classes extends the class shape. Each one of the class contains only the method number of sides () that shows the number of sides in the given geometrical figures.
13	Write an Applet that displays a simple message.
14	Write a program to print JAVA IS SIMPLE in different styles and fonts.
15	Write a java program to implement the APPLET PACKAGES,draw Lines, Rectangles, Rounded Rectangles, filled Polygons programs.
16	Develop an applet that receives an integer in one text field, and computes its factorial value and returns it in another text field, when the button named “compute” is clicked
17	Introducing Java Programming in Eclipse / NetBeansIDE.
18	Practicing Java Programs on Eclipse / NetBeansIDE (without Applet Programming).
19	Practicing Java Programs on Eclipse / NetBeansIDE (without Applet Programming).
20	Practicing Java Programs on Eclipse / NetBeansIDE (includes Applet Programming).

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

(A1092126) PROCESS CONTROL INSTRUMENTATION LAB

List of Experiments: (Minimum 10 experiments should be conducted)

1. Measurement and control of Flow.
2. Measurement and control of Level.
3. Measurement and control of Temperature.
4. Servo and regulator operation- Speed and Position control of DC servo motor.
5. Realization of control actions: Pneumatic controllers, Hydraulic controllers.
6. Realization of Electronic controller-ON/OFF, PI, PD, PID.
7. Process tuning – Process reaction curve method.
8. Process tuning – continuous and damped oscillation method.
9. Electro pneumatic converter- I/P, P/I
10. Control valve characteristics (ON-OFF, Linear and Equal Percentage).
11. Multi loop control systems – Ratio Control.
12. Multi loop control systems – Cascade Control.

IV B.Tech, I-Sem (EIE) T C
3+1* 3

(A1008127) FIBER OPTICS AND LASER INSTRUMENTATION

OBJECTIVES:

At the end of the course the student is expected to understand

- Optical fibers and their properties, sources and detectors
- Fiber optic sensors
- Laser fundamentals, instrumentation ,applications and holography.

EXPECTED OUTCOMES:

- Ability to understand the properties of optical fibers and the sensors and laser fundamentals, applications, measurements and holography.

UNIT-I

OPTICAL FIBERS AND THEIR PROPERTIES: Principles of light propagation through a fiber - Different types of fibers and their properties – Numerical aperture-Transmission characteristics of optical fiber- signal distortion – transmission losses- absorption- scattering.

UNIT-II

FIBER OPTIC SOURCES AND DETECTORS: Introduction to Optical sources - LED, Injection laser diode (ILD)**:** structures, types, characteristics, Applications –Detectors- p-i-n diode, APD**:** structures, types, characteristics, applications.

UNIT-III

FIBER OPTIC SENSORS: Fiber optic instrumentation system – classification of fiber-optic sensors- Interferometer method of measurement of length – Moire fringes – Measurement of pressure, Temperature, Current, Voltage, Liquid level and strain - fiber optic Gyroscope.

UNIT-IV

LASER FUNDAMENTALS: Fundamental characteristics of laser-Optical resonator- Threshold condition- PI-condition for oscillation- cavity configurations-Laser modes- -Q-switching and mode locking.

UNIT-V

LASER INSTRUMENTATION: Laser for measurement of distance, length, velocity, acceleration, current and voltage – Industrial applications of lasers - Medical application of lasers – laser and tissue interaction**.**

UNIT-VI

HOLOGRAPHY: Principle of Holography--Holographic interferometer and applications –Holography for non destructive testing.

TEXT BOOKS:

1. An Introduction to Optical fibers. - Allen H.C. McGraw Hill, Singapore, 1993
2. Lasers- by M.N Avadhanulu, S. Chand publishers

REFERENCES:

1. Fiber optics and optoelectronics- by R.P Khare, oxford.
2. Lasers and their applications- by M.J. Beesly, Taylor and Fransis
3. Lasers: Theory and Applications – by Thyagarajan K. and Ghatak A.K.,Plenum Press, New York.
4. Lasers and Optical Engineering – by Das P., Springers International Students Edition, 1991.
5. Optical Electronics – by Ghatak A.K. and Thyagarajan K., Foundation Books, 1991.
6. Laser and Applications – by Guimarass W.O.N. and Mooradian A., Springer Verilag, 1981.

IV B.Tech, I-Sem (EIE) T C
3+1* 3

(A0428127) MICROCONTROLLERS&INTERFACING

OBJECTIVES:

At the end of the course the student is expected to understand

- Introduction to embedded systems
- 8051 instruction set, counters, timers and interfacing
- Introduction to 16- bit microcontrollers

EXPECTED OUTCOMES:

- Ability to understand the 8051 and interfacing.

UNIT-I

INTRODUCTION TO EMBEDDED SYSTEMS: Introduction, embedded controller, concept of microcontroller, comparison of microprocessor and microcontroller, Intel 8051 microcontroller architecture, pin diagram, special function registers, external memory interface with 8051, operation of I/O ports.

UNIT-II

INSTRUCTION SET OF 8051: Data exchange, byte level logical operations, bit level logical operations, rotate and swap operations, instruction affecting flags, incrementing, decrementing, arithmetic operations, jump and recall instruction, assembly language programming of 8051 Calls and subroutines, interrupts and returns

UNIT-III

COUNTERS AND TIMERS IN 8051: Counters and timers in 8051, timer modes, Serial data input, output , serial data modes, interrupts, timer flag interrupt, serial port interrupt, external interrupts, software generated interrupt control, Addressing modes, external data moves, code memory, read only data moves. Push and Pop.

UNIT- IV

INTERFACING: LCD interfacing, Keyboard interfacing, External Memory interfacing, RTC Interfacing, ADC, DAC interfacing.

UNIT-V

APPLICATIONS: Applications: stepper motor control, speed/position control of ac/dc motors, control of physical parameters like temp, pressure, flow, level and humidity.

UNIT-IV

INTRODUCTION TO 16-BIT MICROCONTROLLER: Intel MCS-96 family, architecture, special interference to member with on chip EPROM, ADC, PWM etc.

TEXT BOOKS:

1. Muhammad A. Mazidi, Janice G. Mazidi, Rolin D. McKinlay, The 8051 Microcontroller and Embedded Systems, PHI/ Pearson.
2. Kenneth J. Ayala, The 8051 Microcontroller, Thomson Delmar Learning.

REFERENCES:

1. V. Udayashankara, M S Mallikarjunaswamy, 8051 Microcontroller Hardware, Software and Applications, TMH.
2. Todd D. Morton, Embedded Microcontroller, Pearson.

IV B.Tech, I-Sem (EIE) T C
3+1* 3

(A0429127) DIGITAL CONTROL SYSTEMS

OBJECTIVES:

At the end of the course the student is expected to understand

- Sampling and reconstruction of signals
- Z-Transforms
- Z-plane analysis of discrete time control system
- State space analysis of discrete time control systems
- Controllability and Observability of DTS
- Stability analysis of DTS
- Design of DTCS by conventional methods, Design of state feedback controllers and observers.

EXPECTED OUTCOMES:

At the end of the course the student will be

- Ability to reconstruction of signals.
- Ability to representation of DTCS using state space analysis.
- Ability to design DTCS by using conventional methods.
- Ability to design state feedback controllers and observers.

UNIT I:

INTRODUCTION: Introduction - Examples of Data control systems – Digital to Analog conversion and Analog to Digital conversion - Review of Sampling Theory – Selection of sampling period – Z-Transformation - Linear Transformation – Pulse Transfer Function – Data holds –Response of open loop and closed loop systems – Modified Z Transformation

UNIT II:

STATE SPACE ANALYSIS OF SAMPLE DATA SYSTEMS: Introduction – State Space Representation of discrete time systems - State transition matrix and it's Properties - Methods for Computation of State Transition Matrix – similarity transformation – Cayley Hamilton Theorem – State equations for sampled data system

UNIT III:

CONTROLLABILITY, OBSERVABILITY AND STABILITY ANALYSIS: Concepts of Controllability and Observability - Tests for controllability and Observability. Duality between Controllability and Observability - Mapping between the S-Plane and the Z-Plane – Primary strips and Complementary Strips – Constant frequency loci - Constant damping ratio loci - Stability Analysis of closed loop systems in the Z-Plane - Jury stability test – Stability Analysis by use of the Bilinear Transformation - Routh Stability criterion.

UNIT IV:

DESIGN OF DISCRETE TIME CONTROL SYSTEM BY ONVENTIONAL METHODS: Transient and steady – State response Analysis – Design based on the frequency response method – Bilinear Transformation and Design procedure in the w-plane (r-plane) – Lead - Lag and Lead-Lag compensators - digital PID controllers.

UNIT V:

DESIGN OF DIGITAL CONTROLLER: Control algorithms – Dead beat algorithm - Dahlin's algorithm - Kalman's algorithm – Smith Predictor algorithm.

UNIT VI:

STATE FEEDBACK CONTROLLERS AND OBSERVERS: Design of state feedback controller through pole placement – Necessary and sufficient conditions - Ackerman's formula - State Observers – Full order and Reduced order observers.

TEXT BOOKS:

1. Deshpande.P.B, and Ash.R.H, 'Computer Process Control', ISA Publication.
2. K. Ogata, Discrete-Time Control systems, Pearson Education/PHI.

REFERENCES:

1. Gopal.M, 'Digital Control Engineering', New Age International Pvt Ltd, New Delhi.
2. B.C. Duo, Digital Control Systems, Oxford University Press.

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IV B.Tech, I-Sem (EIE) T 3+1* C 3

(A1009127) ANALYTICAL INSTRUMENTATION

OBJECTIVES:

At the end of the course the student is expected to understand

- Conductivity and PH meters and dissolved oxygen analyzers
- Gas Analyzers of thermal conductivity type
- Principles and applications of liquid and gas chromatography
- The working principles and instrumentation for UV, Visible, IR, Flame emission, atomic absorption and atomic emission of single and double beams and their sources and detectors, Principles and instrumentation associated with NMR and ESR, Nuclear radiation detectors.

EXPECTED OUTCOMES:

- Ability to design and implement conductivity and PH meters.
- Ability to analysis and record the gas and liquid chromatography.
- Ability to work on UV,Visible and IR spectrophotometers.
- Ability to record flame photometers. , Ability to design instrumentation system for NMR

UNIT I

PH AND CODUCTIVITY & DISSOLVED COMPONENT ANALYSER: Conductivity meters - PH meters - Dissolved oxygen, hydrogen analyzers - sodium analyzer - silica analyzer.

UNIT II

GAS ANALYSERS: Thermal conductivity types - CO monitor – NOX analyzer – H2S analyzer – Theory and problems on Beer-Lamberts law.

UNIT III

CHROMOTOGRAPHY: Gas chromatography, liquid chromatography (HPLC): their principles, description of basic parts, applications and instrumentation.

UNIT IV

SPECTROPHOTOMETERS: UV, visible, IR, FTIR, atomic absorption, atomic emission, and flame spectrophotometers (single beam and double beam):their principles, description of basic parts, applications and instrumentation.

UNIT V

PRINCIPLES OF NUCLEAR MAGNETIC RESONANCE: NMR, ESR, and Mass spectrophotometers**:** their principles, description of basic parts, applications and instrumentation.

UNIT VI

NUCLEAR RADIATION DECTORS: Fundamentals of nuclear radiation- ionization chamber – GM counter – proportional counter – solid state detectors.

TEXT BOOK:

1. Hand book of Analytical instruments- by Khandpur. TMH

REFERENCES:

1. Instrumental methods of analysis- by Willard H.H, Merrit L.L, Dean J.A and Seattle F.L- CBS publishing and distributors.
2. Instrument technology- by Jones B.E, Butterworth scientific publications, London,1987.
3. Mechanical and industrial measurements- by Jain R.K, khanna publishing, New Delhi, 2/e, 1992.
4. Principles of instrumental analysis- by Skoog D.A and West D.M- Holt Sounder publication, Philadelphia, 1985.
5. Instrumental analysis- by Mann C.K, Vickerks T.J & Gullick W.H- Harper and Row publishers, New York, 1974.
6. Modern optical methods of analysis- by Euegene D Olsen –Mc Graw-Hill Book Company.

IV B.Tech, I-Sem (EIE) T C
3+1* 3

(A0417126) MICRO ELECTRONICS AND VLSI DESIGN

(ELECTIVE-I)

(Common to ECE & EIE)

OBJECTIVES:

- To understand VLSI circuit design processes.
- To understand basic circuit concepts and designing Arithematic Building Blocks.
- To have an overview of Low power VLSI.

OUTCOMES:

- Will be able to do VLSI circuit design.
- Will be able to do basic circuit concepts and designing Arithematic Building Blocks.

UNIT I

INTRODUCTION : Introduction to IC Technology – MOS, PMOS, NMOS, CMOS technologies- Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Encapsulation, Integrated Resistors and Capacitors, types of packages sets significance.

UNIT II

BASIC ELECTRICAL PROPERTIES: Basic Electrical Properties of MOS Circuits: I_{ds}-V_{ds} relationships, MOS transistor threshold Voltage, g_m, g_{ds}; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT III

VLSI CIRCUIT DESIGN PROCESSES: MOS Layers, Stick Diagrams, Design Rules and Layout: Lambda based CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates.

UNIT IV

BASIC CIRCUIT CONCEPTS: Sheet Resistance R_S and its concept to MOS, Area Capacitances of layers, standard unit of capacitance Cg, area capacitance calculations, The Delay unit, Inverter delays, estimation of CMOS inverter delay, Wiring Capacitances, Choice of layers.

UNIT V

DESIGNING ARITHMETIC BUILDING BLOCKS: Introduction; The Adders: Definition, the Full adder: Circuit design consideration, The Binary adder: Logic design consideration; The Multiplier: Definition, Partial product generation, Partial product accumulation, Final addition, Multiplier summary.
Introduction to FPGAs, CPLDs architectures and Standard Cells.

UNIT VI

INTRODCTION TO LOW POWER VLSI: Introduction, over view of power consumption, low power design through voltage scaling, estimation and optimization of switching activity.

TEXTBOOKS:

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, PHI, 2005 Edition.
2. CMOS digital integrated circuits analysis and design by Sung-Mo Kand and Yusuf Leblebici, Tata McGraw Hill, 3rd edition.

REFERENCES:

1. Introduction to VLSI Circuits and Systems - John .P. Uyemura, JohnWiley, 2003.
2. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.
3. VLSI Technology – S.M. SZE, 2nd Edition, TMH, 2003.
4. Principles of CMOS VLSI Design - Weste and Eshraghian, Pearson Education, 1999.
5. Digital Integrated Circuits – A design perspective, John M. Rabaey, Anantha Chandrakasan, Borivoje Nikolic Pearson Education, 2rd Edition.

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IV B.Tech, I-Sem (EIE) T C
3+1* 3

(A0423127) DIGITAL IMAGE PROCESSING

(Elective-I)

(Common to ECE, EIE & CSE)

OBJECTIVES:

- To learn the fundamentals of Image Processing.
- To learn sampling and reconstruction procedures.
- To learn the various transforms used in image Processing.
- To study various concepts of image enhancement, reconstruction and image compression.
- To design image processing systems.

OUTCOMES:

- Develops ability to identify, formulate &solve problems involving images.
- Develops ability to design &conduct experiments, analyze &interpret image data.
- To design a software, Component or process as per needs &specifications.
- It will demonstrate the skills to use modern engineering tools, software's &equipment to analyze problems.
- Develop confidence for self-education & ability for life-long learning.
- It will show the ability to participate &try to succeed in competitive Exams.

UNIT I

DIGITAL IMAGE FUNDAMENTALS: Introduction, Image sensing & acquisition, Concept of gray levels. Gray level to binary image conversion. Sampling and quantization. Relationship between pixels. Imaging Geometry, operations on digital image: array Vs matrix, linear Vs non-linear, arithmetic operations, set and logical operations, spatial operations, vector and matrix operations, probabilistic methods.

UNIT II

IMAGE TRANSFORMS: 2-D FFT, Properties. Walsh transform, Hadamard Transform, Discrete cosine Transform, Haar transform, Wavelet transform, Hotelling transform, comparison of different image transforms.

UNIT III

IMAGE ENHANCEMENT: Enhancement in Spatial Domain: Point processing. Histogram processing. Spatial filtering(Smoothing and sharpening), Enhancement in frequency domain: Basics of filtering in frequency domain, Image smoothing, Image sharpening, Homomorphic filtering, basics of colour image processing.

UNIT IV

IMAGE RESTORATION: Noise models, Degradation model, Restoration in the presence of noise only, Spatial filtering, Inverse filtering, Least mean square filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT V

IMAGE SEGMENTATION: Introduction, Detection of discontinuities. Edge linking and boundary detection, Thresholding, Region based segmentation. Use of motion in segmentation.

UNIT VI

IMAGE COMPRESSION: Need for image compression , Redundancies and their removal methods, Fidelity criteria, Image compression models, Source encoder and decoder, Error free compression, Lossy compression.

TEXT BOOK :

1. Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson education,2nd Education, 2002.
2. Digital image processing by S.Jayaraman, S.Esakkirajan & T.Veera Kumar, Tata McGraw Hill, 2010.

REFERENCES :

1. Fundamentals of Digital Image processing – A.K.Jain , PHI.
2. Digital Image processing using MAT LAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Edition, PEA, 2004.
3. Digital Image Processing – William K. Pratt, John Wilely, 3rd Edition, 2004.
4. Fundamentals of Electronic Image Processing – Weeks Jr., SPIC/IEEE Series, PHI.

IV B.Tech I-Sem (EIE) T C
3+1* 3

(A0431127) EMBEDDED REAL TIME SYSTEM OPERATING SYSTEM

(Elective-I)

OBJECTIVES:

At the end of the course the student is expected to understand

- Introduction to embedded systems
- Hardware and software programme modeling
- Embedded hardware design and development

EXPECTED OUTCOMES:

- Ability to understand the real time operating system based embedded system design
- .able to understand the programming concepts.

UNIT I

INTRODUCTION: History of Embedded Systems, Major Application Areas of Embedded Systems, Purpose of Embedded Systems, Core of the Embedded System, Sensors and Actuators, Communication Interface, Embedded Firmware.

UNIT II

HARDWARE SOFTWARE Co-DESIGN and PROGRAMME MODELLING: Characteristics of an Embedded System, Quality Attributes of Embedded Systems, Fundamental Issues in Hardware Software Co-Design, Computational Models in Embedded Design, Introduction to Unified Modeling Language (UML),Hardware Software Trade-offs.

UNIT III

EMBEDDED HARDWARE DESIGN AND DEVELOPMENT: Analog Electronic Components, Digital Electronic Components, VLSI and Integrated Circuit Design, Electronic Design Automation (EDA) Tools, Embedded Firmware Design Approaches, Embedded Firmware Development Languages.

UNIT IV

REAL-TIME OPERATING SYSTEMS (RTOS) BASED EMBEDDED SYSTEM DESIGN: Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling, Threads, Processes and Scheduling :Putting them Altogether, Task Communication, Task Synchronization, Device Drivers, How to Choose an RTOS.

UNIT V

DEVICES AND COMMUNICATION BUSES FOR DEVICES NETWORK: IO Types and Examples, Serial Communication Devices, Parallel Device Ports, Sophisticated Interfacing Features in Device Ports, Wireless Devices, Timer and Counting Devices, Watchdog Timer, Real Time Clock, Networked Embedded Systems, Serial Bus Communication Protocols, Parallel Bus Device Protocols- Parallel Communication Network Using ISA, PCI, PCI-X and Advanced Buses, Internet Enabled Systems- Network Protocols, Wireless and Mobile System Protocols.

UNIT VI

PROGRAM MODELING CONCEPTS: Program Models, DFG Models, State Machine Programming Models for Event-controlled Program Flow, Modeling of Multiprocessor Systems, UML Modeling.

TEXT BOOKS:

1. Introduction to Embedded System- Shibu KV, Mc-Graw Hill Higher Edition.
2. Embedded Systems Architecture, Programming and Design- Raj Kamal, 2nd Edition, McGraw-Hill Companies.
3. Embedded System Design by Peter Marwedel, Springer.

REFERENCES:

1. Embedded System Design – A Unified Hardware/Software Introduction-Frank Vahid, Tony D. Givargis, John Wiley, 2002.
2. Embedded/ Real Time Systems-KVKK Prasad, Dreamtech Press, 2005.
3. An Embedded Software Primer- David E. Simon, Pearson Ed. 2005.

IV B.Tech, I-Sem (EIE) T C
3+1* 3

(A1010127) POWER PLANT INSTRUMENTATION

(ELECTIVE-II)

OBJECTIVE:

At the end of the course the student is expected to understand

- Overview of power plant
- Parameters and measurements
- Controls of combustion of boiler, turbines and other controls

EXPECTED OUTCOMES:

- Ability to understand the various controls of power plants.

UNIT I

AN OVERVIEW OF POWER PLANT: Brief survey of methods of power generation- Hydrothermal, nuclear, solar, wind- Importance of instrumentation for power generation- Thermal power plants: building blocks, details of boiler processes, PI diagram of boiler, cogeneration.

UNIT II

PARAMETERS AND MEASUREMENTS-1: Electrical measurements: current, voltage, power, frequency, power factor, Trivector meter.

UNIT III

PARAMETERS AND MEASUREMENTS-1: Non-electrical parameters: flow of feed water, fuel, air and steam with correction factors for temperature- pressure- temperature- level radiation detectors- smoke density measurements- dust monitor.

UNIT IV

COMBUSTION CONTROL IN BOILERS: Combustion control- control of main header pressure, air fuel ratio control- furnace draft and excessive air control- drum level (three element control) main and reheat steam temperature control- burner tilting up- bypass damper- super heater.

UNIT V

OTHER CONTROLS: Spray and gas recirculation controls- BFP recirculation control- Hot well and deaerator level control- pulverizer control- computers in power plants.

UNIT VI

TURBINE MONITORING AND CONTROL: Condenser vacuum control- gland steam exhaust pressure control- speed, vibration, shell temperature monitoring and control- lubricating oil temperature control- Hydrogen- generator cooling system.

TEXT BOOKS:

1. Modern power station practice, Vol. 6, Instrumentation, controls and testing- pergamon press, oxford, 1971.
2. Power plant technology- Wakil M.M, Mc Graw Hill.

REFERENCES:

1. Standard boiler operations- questions and answers- Elonka S.M and Kohal A.L, TMH, New Delhi,1994

IV B.Tech, I-Sem (EIE) T C
3+1* 3

(A1011127) TELEMETRY AND TELECONTROL

(ELECTIVE-II)

OBJECTIVE:

At the end of the course the student is expected to understand

- Principles, symbols and codes
- Frequency division and time division multiplexed systems
- Telemetry and telecontrol methods

EXPECTED OUTCOMES:

- Ability to understand the principles of frequency division and time division multiplexed systems and telemetry and telecontrol methods

UNIT-I

TELEMETRY PRINCIPLES: Introduction, the basic system -classification**:** Non electrical telemetry systems, voltage and current telemetry systems, frequency telemetering- power line carrier communication.

UNIT-II

SYMBOLS AND CODES: Bits and symbols-Time function pulses-line and channel coding-modulation codes-inter symbol interference.

UNIT-III

FREQUECY DIVISION MULTIPLEXED SYSTEMS: FDM**:** An introduction, IRIG standards, FM and PM circuits-The receiving end-PLL.

UNIT-IV

TIME DIVISION MULTIPLEXED SYSTEMS: Introduction-TDM PAM systems, PAM/PM system and TDM-PCM systems-PCM reception-Differential PCM-Modems: Introduction, QAM, Protocols.

UNIT-V

TELMETRY SYSTEMS: Satellite telemetry: General consideration, TT&C service, digital transmission system, satellite telemetry and communication.

Optical telemetry: Optical fiber cable, Sources and detectors, transmitter and receiving circuits.

UNIT-VI

TELECONTROL METHODS: Analog and digital techniques in telecontrol, telecontrol apparatus - Remote adjustments, Guided and regulation- Telecontrol using information theory.

TEXT BOOKS:

1. Telemetry principles- D.Patranabis, Tata McGraw Hill, 2004.
2. Telecontrol methods and application of telemetry and remote control- Swoboda G., Reinhold publishing corporation, London, 1991.

REFERENCES:

1. Handbook of telemetry and remote control- Gruenberg.L, McGraw-Hill, New York, 1987.
2. Telemetry engineering- Young R.E., Little books Ltd, London, 1988.

IV B.Tech, I-Sem (EIE)

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(A1012127) ROBOTICS AND AUTOMATION

(ELECTIVE - II)

OBJECTIVES:

At the end of the course the student is expected to understand

- Basic concepts
- Sources, sensors, manipulators, actuators and grippers.
- Symbolic modelling, kinematics

EXPECTED OUTCOMES:

- Ability to understand the basic concepts robotics and modeling and kinematics.

UNIT I

BASIC CONCEPTS: Automation and Robotics – An over view of Robotics – present and future applications – classification by coordinate system and control system, Dynamic stabilization of Robotics.

UNIT II

POWER SOURCES AND SENSORS: Hydraulic, Pneumatic and electric drivers – Determination HP of motor and gearing ratio, variable speed arrangements, Path Determination - Machinery Vision – Ranging – Laser – Acoustic, Magnetic Fiber Optic and Tactile Sensor

UNIT III

MANIPULATORS: Construction of Manipulators, Manipulator Dynamic and Force Control, Electronic and Pneumatic manipulators.

UNIT IV

ACTUATORS AND GRIPPERS: Pneumatic, Hydraulic Actuators-Stepper Motor Control Circuits-End Effecter-Various types of Grippers, Design consideration.

UNIT V

SYMBOLIC MODELING: Differential transformation and manipulators, Jacobians – problems. **Dynamics:** Lagrange – Euler and Newton – Euler formations – Problems.

UNIT VI

KINEMATICS: Forward and Inverse Kinematic Problems- Solutions of Inverse Kinematic problems, Multiple Solution-**Path Planning:** Trajectory planning and avoidance of obstacles, path planning, Skew motion, joint integrated motion – straight line motion – Robot programming, languages and software packages.

TEXT BOOKS:

1. Industrial Robotics, Groover M P, Pearson Education.
2. Robotics, Fu K S, McGraw Hill.

REFERENCES:

1. Robotics, CSP Rao and V.V. Reddy, Pearson Publications (In press)
2. Robotics and Control , Mittal R K & Nagrath I J TMH.
3. An Introduction to Robot Technology, P. Coiffet and M. Chaironze , Kogam Page Ltd. 1983 London.
4. Robotic Engineering, Richard D. Klafter, Prentice Hall
5. Robot Analysis and Intelligence, Asada and Slow time , Wiley Inter-Science
6. Introduction to Robotics, John J Craig , Pearson Edu.
7. Robot Dynamics and Control by Mark W. Spong and M. Vidyasagar, John Wiley & Sons.

IV B.Tech, I-Sem (EIE) T C
3 2

(A0432126) EMBEDDED 'C'

(SKILL DEVELOPMENT COURSE)
(COMMON TO ECE & EIE)

OBJECTIVES:

At the end of the course the student is expected to understand

- RTOS
- ARM processor
- Embedded C
- Embedded tools
- Design examples

EXPECTED OUTCOMES:

- Ability to understand the fundamentals of embedded system, RTOS, ARM processor and embedded C and tools and designing the embedded system.

UNIT I

INTRODUCTION TO EMBEDDED SYSTEMS: Fundamentals of Embedded System- Definition, Purpose of Embedded System, real life examples of embedded systems, future of embedded systems, Hardware and Software Components, Classification of Embedded Systems- Small, Medium and Large Scale Embedded System, System On-Chip.

UNIT II

REAL TIME OPERATING SYSTEMS [RTOS]: Brief history of Operating System: XP, UNIX and LINUX-Commands, Shells; Real-Time Operating System-Definition, Special Characteristics of Real-Time Systems, a brief evolutionary history. Hardware Architectures Software architectures (concepts of interrupt driven activation, need for real time monitor, pseudo parallelism) of Real Time systems;
Kernel: Overview, Architecture, Scheduling algorithms, Objects, Applications

UNIT III

ARM PROCESSOR: Introduction to ARM processor – Its features, Architecture, Registers, Instruction set and Addressing Modes functions and Peripheral devices; of ARM Processor. Example programs.

UNIT IV

EMBEDDED 'C': Introduction, Purpose of the Standard, Guiding Principles, Comparison with 'C'; General Rules- Line Width Braces Parentheses, Common Abbreviations;
Data Types: -Naming Conventions, Fixed-Width Integers and Signed Integers, Floating Point, Structures and Unions;
Modules-Naming Conventions, Header Files, Source Files, File Templates, Procedures -Naming Conventions, Functions, Function-Like Macros, Tasks,
Variables-Naming Conventions, Initialization, Variable Declarations; Expressions and Statements, If-Else Statements, Switch Statements Loops, Unconditional Jumps. Preprocessor directives, Modifiers, Command line Arguments.

UNIT V

EMBEDDED TOOLS: Debugging Techniques, Compilers, Cross compilers, Global cross compilers, Command line arguments.
Keil: Introduction, features, Development tools, Testing sample programs.

UNIT VI

DESIGN EXAMPLES: Traffic light, UART, Water tank, Remote Access, Home Automation.

TEXT BOOKS:

1. Real-Time Concepts for Embedded system-Qing Li, Caroline Yao.
2. Embedded system Architecture, Programming and Design-Raj Kamal, Second Edition, TMH Companies.
3. Embedded C coding Standard –Michael Barr from Neutrino.

REFERENCES:

1. Embedded/ Real-Time Systems – KVKK Prasad, Dreamtech Press, 2005.
2. An Embedded Primer – David E. Simon, Pearson Edition,2005
3. Computer as Components, Principles of Embedded Computing System Design. – Wayne Wolf, 2nd Edition.

IV B.Tech, I-Sem (EIE) P 3 C 2

(A0488127) MICROCONTROLLERS&INTERFACING LAB

Introduction to TASM/MASM and KEIL
Write program for 8051 for implementing using Assembly /C

1. Data Transfer and Arithmetic Instructions - Block move, Exchange, Sorting, Finding largest element in an array- Addition/subtraction, multiplication and division, square.
2. Counters
3. Boolean & Logical Instructions (Bit manipulations)
4. Conditional CALL & RETURN
5. Code conversion: BCD – ASCII; ASCII – Décimal; Décimal - ASCII; HEX - Decimal and Decimal – HEX
6. Programs to generate delay, Programs using serial port and on-Chip timer /counter

II. INTERFACING:
Write Assembly / C programs to interface 8051 chip to develop embedded solutions

1. Alphanumeric LCD panel.
2. External ADC and Temperature control interface to 8051
3. Generate different waveforms Sine, Square, Triangular, Ramp etc. using DAC interface to 8051; change the frequency and amplitude
4. Stepper and DC motor control interface to 8051

IV B.Tech, I-Sem (EIE) P 3 C 2

(A1093127) ANALYTICAL AND PC BASED INSTRUMENTATION LAB

List of Experiments: (Minimum 10 experiments should be conducted)

1. Gas chromatography.
2. Spectrometer: UV and VIS spectrometer.
3. Flame photometer.
4. Measurement of calorific value.
5. Photo electric calorimeter
6. Nuclear Radiation detector.
7. Interfacing of ADC to PC and observe the data.
8. Interfacing of DAC to PC and generate various types of signals.
9. GPIB interface – master to slave data transfer.
10. GPIB interface – slave to slave data transfer.
11. Automatic Bottle Filling Station using PLC
12. Level Monitoring and Control using PLC. (AB)

IV B.Tech II-Sem (EIE)

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(A1013128) INDUSTRIAL ELECTRONICS

OBJECTIVES:

At the end of the course the student is expected to understand

- Regulated power supplies
- SCR and applications
- Choppers, DIAC and TRIAC, DC and AC motor speed control using drives

EXPECTED OUTCOMES:

- Ability to understand the SCR, DIAC, TRIAC, choppers and dc and ac motor speed control using drives

UNIT I:

REGULATED POWER SUPPLIES: Block diagram- Principle of voltage regulation - Series and Shunt type Linear Voltage Regulators - Protection Techniques: short Circuit, over voltage and Thermal Protection. Switched Mode voltage regulator-Comparison of Linear and Switched Mode Voltage Regulators- Servo Voltage Stabilizer- IC Voltage regulators.

UNIT II:

SCR: Structure, Principles of operation and characteristics of SCR - Triggering of Thyristors - Commutation Techniques of Thyristors (operation with waveforms only)**:** Class A, B, C, D, E and F **-** Ratings of SCR.

UNIT III:

APPLICATIONS OF SCR IN POWER CONTROL: Converters**:** Single phase half wave and Full wave converters with RL load– Inverters**:** Single Phase (voltage) half bridge and full bridge inverters – Static circuit breakers (DC&AC).

UNIT IV:

CHOPPERS, DIAC AND TRIAC: Choppers**:** Introduction, Principle of operation (step down & step up), control strategies, configurations (operation with waveforms only) - Diac and Triac: Structure, Principles of operation and characteristics– Triacs**:** Triggering modes, Firing Circuits, Commutation (operation with waveforms only).

UNIT V:

DC MOTOR SPEED CONTROL: Methods of speed control (armature and field control) - single phase separately excited drives and three phase separately excited drives **-** closed loop motor control system (two quadrant of operation).

UNIT VI:

AC MOTOR SPEED CONTROL: Methods of speed control (voltage & frequency) – speed control by variation of stator voltage using SCRs, variable frequency AC motor drive **,** Variable voltage and frequency controllers.

TEXTBOOKS:

1. Industrial and Power Electronics – G.K. Mithal and Maneesha Gupta, Khanna Publishers, 19th Ed., 2003.
2. Power electronics- By P.S Bimbra
3. Fundamentals of electrical drives- by Gopal K.Dubey, 2nd edition, Narosa publications house, New Delhi.

REFERENCES:

1. Thyristors and applications – M. Ramamurthy, East-West Press, 1977.
2. Power electronics, M.D Singh, TMH.
3. Power electronics- by P.C. Sen., TMH, 1999.

IV B.Tech, II-Sem (EIE) T 3+1* C 3

(A0235128) ELECTRICAL DRIVES AND CONTROL

(ELECTIVE-III)

UNIT-I

ELECTRICAL DRIVES- AN INTRODUCTION: Electrical drives- advantages of electrical drives- parts of electrical drives: electrical motors, power modulators, sources, control unit- choice of electrical drives- status of DC and AC drives.

UNIT-II:

PHASE CONTROLLED DC MOTOR DRIVES-I: Introduction-principles of DC motor speed control**:** fundamental relationship, field control, armature control, armature and field control, four quadrant operation- Phase controlled converters**:** Single phase, three phase, control unit, modeling of three phase converters, current source, half controlled converter, converter with freewheeling, configuration for a four quadrant DC motor drive.

UNIT-III:

PHASE CONTROLLED DC MOTOR DRIVES-II: Steady state analysis of three phase converter- controlled DC motor drives**:** Average analysis, steady state solution, including harmonics, critical triggering angle, and Discontinuous current conduction- two quadrant three phase converter controlled DC motor drives.

UNIT-IV:

DESIGN OF CONTROLLERS: Transfer function of subsystem**:** DC motor and load, converter, current and speed controllers, current feedback, and speed feedback- Design of controllers**:** current controller, speed controller-problems.

UNIT-V:

PHASE CONTRLOLLED INDUCTION MOTOR DRIVES: Introduction- stator voltage control**:** Power circuit and gating, reversible control, steady state analysis, approximate analysis, torque speed characteristics with phase control, Interaction of the load, closed loop operation, efficiency- Problems.

UNIT-VI:

FREQUECY CONTROLLED INDUCTION MOTOR DRIVES:

Voltage source: Cycloconverter control- closed loop speed control and converter rating for VSI and cycloconverter induction motors.

Current source: variable frequency control from a current source- current source inverter control- closed loop speed control of CSI drives- comparison of CSI and VSI drives.

TEXT BOOKS:

1. Electric motor drives: modeling, analysis and control- Krishnan.R. Prentice-Hall India. 2007.
2. Fundamentals of electric drives- Gopal K.Dubey, Narosa publishing House, New Delhi, 2005.

REFERENCES:

1. Electric drives- N.K.De and P.K.Sen, PHI, India.
2. A first course on electric drives- S.K.Pillai, New Age International (P) Ltd.
3. Fundamentals of electric drives- Mohd. AEL, Sharkawi, Vikas publishing house.
4. Power electronic drives of ac control- BK Bose.

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IV B.Tech, II-Sem (EIE) T C
3+1* 3

(A0439128) DIGITAL SYSTEM DESIGN

(ELECTIVE-III)

OBJECTIVES: At the end of the course the student is expected to understand

- Sequential designing
- Fault modelling and test generation
- Test pattern generation
- Fault diagnosis and sequential circuits
- PLA testing
- Asynchronous sequential machine

UNITI

SEQUENTIAL CIRCUIT DESIGN: Design of Iterative circuits, Design of sequential circuits using ROMs and PLAs, Sequential circuit design using CPLD, FPGAs.

UNITII

FAULTMODELING AND **TEST GENERATION**: Fault classes and models, Fault diagnosis of Combinational circuits Using Path Sensitization technique, Boolean difference method, Kohavi algorithm.

UNITIII

TESTPATTERNGENERATION:D–algorithm,Randomtesting,Transitioncountstesting,Signature analysis and testing for bridging faults.

UNIT IV

FAULT DIAGNOSISIN SEQUENTIAL CIRCUITS: State identification and fault detection experiment, Machine identification, Design of fault detection experiment.

UNIT V

PLATESTING: Fault models, Test generation and Testable PLA design.

UNIT VI

ASYNCHRONOUS SEQUENTIALMACHINE: Fundamental mode model, Flow table, State reduction, Minimal closed covers, Races, Cycles and hazards.

TEXTBOOKS:

1. Kohavi – “Switching & finite Automata Theory” (TMH)
2. N. Biswas – “Logic Design Theory” (PHI)
3. Parag K. Lala – “Fault Tolerant & Fault Testable Hardware Design” (PHI)

REFERENCES:

1. Charles H. Roth Jr. – “Fundamentals of Logic Design”.

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IV B.Tech II-Sem (EIE) T C
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(A0227127) NEURAL NETWORKS & FUZZY SYSTEMS

(Elective-III)

(Common to EEE & EIE)

COURSE OBJECTIVE

- This course introduces the basics of neural networks, single & multi layer feed forward networks, fuzzy sets & fuzzy logic components.

COURSE OUTCOME

- To introduce 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, Learning Strategies (Supervised, Unsupervised, Reinforcement), Learning Rules, Numerical problems, 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 --- Demonstration through MATLAB

UNIT IV

ASSOCIATIVE MEMORY NETWORK: Training Algorithms for Pattern Association, Auto Associative Memory Network, Hetero Associative Memory Network, BAM, Hopfield Networks, Applications

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, Applications

Text Books:

1. Neural Networks and Fuzzy Logic System by Bart Kosko, PHI Publications.
2. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by Rajasekharan and Pai – PHI Publications.
3. 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

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IV B.Tech II-Sem (EIE)

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(A1014128) DISTRIBUTED CONTROL SYSTEM, NETWORKS AND PROTOCOLS

(ELECTIVE-IV)

OBJECTIVE:

At the end of the course the student is expected to understand

- Data network fundamentals
- Internet working
- DCS
- HART protocol
- Field bus

EXPECTED OUTCOMES:

- Ability to understand the data network fundamentals ,DCS and HART protocols

UNIT I

DATA NETWORK FUNDAMENTALS: Network hierarchy and switching- open system interconnection model of ISO- Data link control protocol- HDLC – Media access protocol- command response- Token passing- CSMA/CD, TCP/IP.

UNIT II

INTERNET WORKING: Bridges- Routers- Gate ways- Standard ETHERNET and ARCNET configurations- Special recruitment for networks used for control.

UNIT III

DISTRIBUTED CONTROL SYSTEM: Evolution- Different architectures- Local control unit – Operator interface- Displays- Engineering interface.

UNIT IV

DCS CASED SUTDY: Study of any one popular DCS available in market (Honeywell) – Factors to be considered in selecting DCS- Case studies in DCS.

UNIT V

HART PROTOCOL: Introduction – Evolution of signal standard- HART communication protocol – Communication modes- HART networks- Control system interface- HART commands- HART field controller implementation – HART and OSI model.

UNIT VI

FIELD BUS: Introduction – General field bus architecture- Basic requirements of filed bus standard – Field bus topology- Interoperability- Inter changeability.

TEXT BOOKS:

1. Computer networks- by A.S. Tanenbaum, 3rd edition, PHI, 1996
2. Distributed control system- by Michael P. Lucas- Van Nastrand Reinhold Company, New York, 1986.

REFERENCES:

1. HART application guide- HART communication foundation, 1999.
2. Process industrial instrument and controls handbook- Mc-Graw Hill, New York, 1998.

IV B.Tech II-Sem (EIE)

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(A0434128) DSP PROCESSORS ARCHITECTURE & APPLICATIONS

(ELECTIVE-IV)

(Common to ECE & EIE)

OBJECTIVES:

- To understand the concept of DSP Architecture & comparison of this with that of microprocessors.
- To understand addressing modes, instruction sets , pipelining and application programs in TMS320C54XX processor
- To understand the architectural issues of programmable DSP devices and their relationship to the algorithmic requirements, architectures of commercially popular programmable devices and the use of such devices for software development and system design
- To highlight the suitability of programmable DSP devices for various application areas and motivate to design systems around these devices.

OUTCOMES:

- To become familiar with fundamentals of DSP Processors & architectures.
- To gain in knowledge about the different types of processors and their operation.
- Will demonstrate the ability to design a system component or process as per needs & specifications.
- Will demonstrate the ability to identify, formulate & solve engineering problems.

UNIT I:

ARCHITECTURE OF DSP PROCESSOR (TMS320C5X): Introduction, Bus structure, Central Arithmetic Logic Unit(CALU),Auxiliary Register ALU (ARAU),Index Register(INDX),Auxiliary Register Compare Register(ARCR),Block Move Address Register(BMAR)Block Repeat Registers(RPTC,BRCR, PASR,PAER), Parallel Logic Unit(PLU),Memory- Mapped Registers, Program Controller, Some flags in the status registers

UNIT II:

COMPUTATIONAL ACCURACY IN DSP IMPLEMENTATIONS: Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT III:

ARCHITECTURES FOR PROGRAMMABLE DSP DEVICES: Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT IV:

PROGRAMMABLE DIGITAL SIGNAL PROCESSORS: Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

UNIT V:

IMPLEMENTATIONS OF BASIC DSP ALGORITHMS: The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters,

Implementation of fft algorithms: An FFT Algorithm for DFT Computation, A Butterfly Computation, Overflow and scaling, Bit-Reversed index generation, An 8-Point FFT implementation on the TMS320C54XX, Computation of the signal spectrum.

UNIT VI:

INTERFACING &APPLICATIONS OF PROGRAMMABLE DSP DEVICES: DSP based Biotelemetry receiver, A speech processing system, An Image processing system, Memory interfacing, Synchronous serial interface, MCBSP, A CODEC interface circuit.

TEXT BOOKS:

1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
2. Digital Signal Processors, Architecture, Programming and Applications – B. Venkata Ramani and M. Bhaskar, TMH, 2004.

REFERENCES:

1. Digital Signal Processing – Jonathan Stein, John Wiley, 2005.
2. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. S. Chand & Co, 2000.

IV B.Tech II-Sem (EIE) T C
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(A1015128) INTRODUCTION TO MICRO ELECTRO MECHANICAL SYSTEMS

(ELECTIVE-IV)

OBJECTIVES:

- To understand MEM Sprinciples.
- To understand basic circuit concepts and designing Microelectronics in mechanical processes.
- To have an overview of Wireless MEMS

OUTCOMES:

- Will be able to do MEMS circuit design.
- Will be able to understand the importance of MEMs Devices

UNIT I

Introduction: History of MEMS, Overview of MEMS Processes, Properties of Silicon, ASample MEMS Process. Definitions and Terminology, A sample Process, Lithography and Etching. Micromachining: Subtractive Processes (Wet and Dry etching), Additive Processes(Evaporation, Sputtering, Epitaxial growth).Fundamental Devices and Processes: Basic mechanics and electrostatics for MEMS, parallel plate actuators, pull-in point, comb drives.

UNIT II

Electrostatic actuators; MEMS foundries, Cronos MUMPs (multi user MEMS process).

UNIT III

MUMPs (Multi User MEMS Process): JDS Uniphase MUMPs processing sequence and designrules. Design rules; applications; micro hinges and deployment actuators. CMOS MEMS:CMOS foundry processes, integrated IC/MEMS, MEMS post processing, applications.

UNIT IV

Thermal Transducers: bimorphs, "heatuators", cilia arrays. Micro Opto Electro Mechanical Systems (MOEMS): Micro Scanners, Digital Mirror Display, Retinal Scanning Display. Grating light valve, coroner cube retro reflector, optical switches, other micro-optical devices piezoresistivity; Scanning Probe Microscopy: scanning tunneling microscope (STM), atomic forcemicroscope (AFM)

UNIT V

Wireless MEMS: mechanical and electrical resonators, Q-factor, switches, filters. Power for MEMS: thin film batteries, micro fuel cells, energy fields, MEMS Packaging and Assembly: micro assembly: serial and parallel, deterministic and stochastic; micro grippers: HexSil process; packaging techniques

UNIT VI

The future of MEMS: Biomems – neural implants, gene chips, diagnostic chips; MEMS inspace; mechanical computers; invisible and ubiquitous computing

Text Books:

1. Fundamentals of Microfabrication: The Science of Miniaturization, Second Edition ISBN:0849308267, CRC Press, 1997 by Marc J Madou
2. MEMS a Practical Guide of Design, Analysis, and ApplicationsKorvink, Jan, Paul, Oliver2006,Approx. 9800 p., OliverISBN: 3-540-21117-9
3. Mechanics of Microelectromechanical SystemsLobontiu, Nicolae, Garcia, Ephrahim2004, XII, 405 P.295 illus., HardcoverISBN: 1-4020-8013-1
4. MEMS & Microsystems TMGH 2002 by Tai-ran Hsu5. Microsensors, MEMS & Smart Devices John Wiley 2002 by JW Gardner & VK Varadan

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IV B.Tech II-Sem (EIE) T C
3 2

(A1016128) PROGRAMMABLE LOGIC CONTROLLERS & SCADA

(SKILL DEVELOPMENT COURSE)

OBJECTIVES:

At the end of the course the student is expected to understand

- Contact and coil I/O programming
- Large process ladder diagram construction
- Timer functions and industrial applications
- PID controllers
- applications

EXPECTED OUTCOMES:

- Ability to write ladder logic programme for an application
- Able to understand SCADA programming.

UNIT- I: PROGRAMMABLE LOGIC CONTROLLER BASICS

Definition- Overview of PLC systems- Differences between PC and PLC – I/O modules- Power supplies- General PLC programming procedure- Programming on/off outputs- Creating ladder diagrams from process control descriptions.

UNIT- II: PLC BASIC FUNCTIONS

Register basics- Timer functions- Counter function – Examples

UNIT- II: PLC INTERMEDIATE FUNCTIONS

Arithmetic functions- number comparison functions- SKIP and MCR functions- Data move functions, utilizing digital bits, sequencer functions, matrix functions

UNIT- IV: PLC ADVANCED FUNCTIONS

Analog PLC operation- Networking of PLC- PLC PID functions- Alternate programming language of PLC- Auxiliary commands & functions- PLC installation, trouble shooting and maintenance.

UNIT-V: CONTROLLING A ROBOT

Basic two-axis Robot with a PLC sequencer control, three-axis Robot control with PLC.

UNIT-VI:SCADA

Software used for Rock Well PLC is RS VIEW 32 WORKS

Introduction and overview, Configuration of channel / node between PLC and PC, Creating tag database, Design of SCADA page [Animation like rotating / shifting / filling etc], Alarm and trend configuration.

TEXT BOOKS:

1 Programmable logic controllers, principles and applications, John W. Webb, Ronald A. Reis, Pearson education, 5th edition.
2 Computer control of process- M. Chidambaram, Narosa, 2003.
3 RSVIEW32 USER MANUAL by Rockwell Automation,USA.

REFERENCES:

1. Frank D Petruzella, " programmable logic controllers", Mc GraHill, New York, 1997
2. John Park and Steve Mackay, "practical data acquisition for instrumentation and control systems".
3. Krishna Kanth, "computer based industrial control", PHI-1997.