J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY

UGC AUTONOMOUS

(Permanently Affiliated to JNTUH, Approved by AICTE, New Delhi and Accredited by NBA, NAAC)

Bhaskar nagar, Moinabad Mandal, R.R. District,
Hyderabad – 500 075 Telangana State, India.
Tel : 08413-235127, 235053, Fax & Phone No. 910-8413-235753
Website: www.jbiet.edu.in, E-mail: principal@jbiet.edu.in

ACADEMIC REGULATIONS (JBIET R-14), COURSE STRUCTURE AND SYLLABI FOR B. TECH

ELECTRONICS AND COMMUNICATION ENGINEERING

B.Tech. Regular Four Year Degree Programme
(For the batches admitted from the Academic Year 2014 - 2015)

&

B.Tech. (Lateral Entry Scheme)
(For the batches admitted from the Academic Year 2015 - 2016)

Note: The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council of JBIET.

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ACADEMIC REGULATIONS- R14 FOR B. TECH. (REGULAR)

Applicable for the students of B. Tech. (Regular) from the Academic Year 2014-15 and onwards

1. Award of B. Tech. Degree

A student will be declared eligible for the award of B. Tech. Degree if he fulfills the following academic regulations:

1.1 The candidate shall pursue a course of study for not less than four academic years and not more than eight academic years(i.e. No student is allowed to have more than four times detention)

1.2 After eight academic years of course of study, the candidate is permitted to write the examinations for two more years.

1.3 The candidate shall register for 213 credits and secure 206 credits with compulsory subjects as listed in Table-1.

Table-1	
Serial Number	Subject Particulars
1	All practical subjects
2	Industry oriented mini project
3	Comprehensive Assignment
4	Industrial Internship
5	Comprehensive Viva-Voce
6	Seminar
7	Project work

2. Forfeiting B.Tech Degree

The students, who fail to fulfill all the academic requirements for the award of the degree within ten academic years from the year of their admission, shall forfeit their seats in B. Tech. course.

3. Courses of study

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

Branch Code	Branch
01	Civil Engineering
02	Electrical and Electronics Engineering
03	Mechanical Engineering
04	Electronics and Communication Engineering
05	Computer Science and Engineering
12	Information Technology
19	Electronics and Computer Engineering
25	Mining Engineering

4. Credits

Each course is normally assigned a certain number of credits as follows:

	Semester	
	Periods /Week	**Credits**
Theory	04+1*/4	04
	03+1*/3	03
Practical	03	02
Drawing	01+03	03
Mini Project	--	02
Comprehensive Assignment	-	02
Industrial Internship	-	02
Comprehensive Viva Voce	--	02
Seminar	6	02
Project	15	10

*Tutorial

5. Distributions and Weightage of Marks

5.1 The performance of a student in each semester shall be evaluated subject-wise for a maximum of 100 marks for a theory and 75 marks for a practical subject. In addition, industry-oriented mini-project, Comprehensive Assignment, Industrial Internship, seminar, Comprehensive viva and project work shall be evaluated for 50, 50, 50, 50, 100 and 200

marks, respectively.

5.2 For theory subjects the distribution shall be 25 marks for Internal Evaluation and 75 marks for the End-Examination.

5.3 For theory subjects, during a semester there shall be 2 mid-term examinations. Each mid-term examination consists of 2 parts. Part-A contains objective and Part-B contains descriptive questions and assignment. The Part-A and Part-B shall be for 10 marks each with a total duration of 1 hour 20 minutes. The Part-A is set with 20 bits of multiple choice, fill-in the blanks and matching type of questions for a total of 10 marks. The Part-B shall contain 4 full questions (two from each unit for first mid and minimum one from each unit in the second mid) out of which, the student has to answer 2 questions, each carrying 5 marks. While the first mid-term examination shall be conducted in first Two Units of the syllabus, the second mid-term examination shall be conducted in last Three Units. Five (5) marks are allocated for Assignments (as specified by the subject teacher concerned). The first Assignment should be submitted before the conduct of the first mid-examination, and the second Assignment should be submitted before the conduct of the second mid-examination. The total marks secured by the student in each mid-term examination are evaluated for 25 marks, and the average of the two mid-term examinations shall be taken as the final marks secured by each candidate. . If any candidate is absent from any subject of a mid-term examination with a valid reason (only medical reasons are allowed), re-examination will be conducted for such student.

The details of End Examination Question Paper pattern is as follows:

- ***The End semesters Examination will be conducted for 75 marks which consist of two parts viz. i). Part-A for 25 marks, ii). Part –B for 50 marks***
- ***Part-A is compulsory question which consists of Five questions, one from each unit and carries 5 marks each.***
- ***Part-B consists of five Questions (numbered from 2 to 6) carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice (that means there will be two questions from each unit and the student should answer any one question)***

5.4 For practical subjects there shall be a continuous evaluation during a semester for 25 sessional marks and 50 end semester examination marks. Out of the 25 marks for internal evaluation, day-to-day work in the laboratory shall be evaluated for 15 marks and internal practical examination shall be evaluated for 10 marks conducted by the laboratory teacher concerned. The end semester examination shall be conducted with an external examiner and the laboratory teacher. The external examiner shall be appointed from the other colleges which are decided by the examination branch of JBIET.

5.5 For the subject having design and/or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and Estimation, the distribution shall be 25 marks for internal

evaluation (15 marks for day-to-day work and 10 marks for internal tests) and 75 marks for end semester examination. There shall be two internal tests in a Semester and the average of the two shall be considered for the award of marks for internal tests.

5.6 There shall be Science based Mini-Project, to be taken up during the vacation after I year II Semester examination for regular students, after II year I Semester for Lateral Entry students and it will be evaluated in II Year II semester. However, the Science based mini-project marks will be added in II year II Semester. The Comprehensive Assignment shall be submitted in a report form and presented before the committee. It shall be evaluated for 50 marks. The committee consists of head of the department, and the supervisor of the Comprehensive Assignment and a senior faculty member of the department. There shall be no external marks for Comprehensive Assignment.

5.7 As per the direction from the state Government a New Course 'Gender Sensitization' has been introduced for B.Tech 2-2 Students who are studying under JBIET R14 regulation. This is a compulsory Subject and posses '2' Credits. It should be treated as a lab subject with two credits from the academic Year 2015-2016.

5.8 There shall be an Industrial internship, in collaboration with an industry of their specialization, to be taken up during the vacation after II year II Semester examination and it will be evaluated in III Year II semester. The Industrial internship report shall be submitted in a report form and presented before the committee. It shall be evaluated for 50 marks. The committee consists of head of the department, and internship supervisor and a senior faculty member of the department. There shall be no external marks for internship.

5.9 There shall be an industry-oriented Mini-Project, in collaboration with an industry of their specialization, to be taken up during the vacation after III year II Semester examination. However, the mini-project and its report shall be evaluated along with the project work in IV year II Semester. The industry oriented mini-project shall be submitted in a report form and presented before the committee. It shall be evaluated for 50 marks. The committee consists of an external examiner, head of the department, the supervisor of the mini-project and a senior faculty member of the department. There shall be no internal marks for industry-oriented mini-project.

5.10 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 of the topic, and submit it to the department. It shall be evaluated by the departmental committee consisting of head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for the seminar.

5.11 There shall be a Comprehensive Viva-Voce in IV year II semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is intended to assess the student's understanding of the subjects he studied during the B. Tech. course of study. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee. There are no internal marks for the Comprehensive Viva-Voce.

5.12 Out of a total of 200 marks for the project work, 50 marks shall be allotted for Internal Evaluation and 150 marks for the End Semester Examination (50 marks for thesis, 50 marks for successful execution of the project and 50 marks for Viva Voce). The End Semester Examination of the project work shall be conducted by the same committee as appointed for the industry-oriented mini-project. In addition, the project supervisor shall also be included in the committee. The topics for Comprehensive Assignment, Industrial Internship, industry oriented mini project, and seminar and project work shall be different from one another. The evaluation of project work shall be made at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project.

5.13 The Laboratory marks and the sessional marks awarded by the examiners are subject to scrutiny and scaling by the college wherever necessary. In such cases, the sessional and laboratory marks awarded by the examiners will be referred to a Committee. The Committee will arrive at a scaling factor and the marks will be scaled accordingly. The recommendations of the Committee will be final and binding. The laboratory records and internal test papers shall be preserved and should be produced before the Committees as and when required.

6. Attendance Requirements

6.1 A student is eligible to write the End Semester examinations only if he acquires a minimum of 75% of attendance in aggregate of all the subjects.

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

6.3 Shortage of Attendance below 65% in aggregate shall not be condoned and student will be detained on account of shortage of attendance below 65%.

6.4 A student who is short of attendance in semester may seek re-admission into that semester when offered within 4 weeks from the date of the commencement of class work.

6.5 Students whose shortage of attendance is not condoned in any semester are not eligible to write their end semester examination of that class and their registration stands cancelled.

6.6 A stipulated fee shall be payable towards condonation of shortage of attendance.

6.7 A student will be promoted to the next semester if he satisfies the attendance requirement of the present semester, as applicable, including the days of attendance in sports, games, NCC and NSS activities.

6.8 If any candidate fulfills the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.

7. Minimum Academic Requirements

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

7.1 A student is deemed to have satisfied the minimum academic requirements if he/she has earned the credits allotted to each theory/practical design/drawing subject/project and secures not less than 35% of marks in the end semester exam, and minimum 40% of marks in the sum total of the mid-term and end semester exams.

7.2 A student shall be promoted from first year to second year if he fulfills the minimum attendance requirement.

7.3 A student will not be promoted from II year to III year unless he fulfills the academic requirement of 40 credits up to II year II semester or 30 credits up to II year I semester from all the examinations, whether or not the candidate takes the examinations.

7.4 A student shall be promoted from III year to IV year only if he fulfils the academic requirements of 60 credits up to III year II semester or 50 credits up to III year I semester from all the examinations, whether or not the candidate takes the examinations.

7.5 A student shall register and put up minimum attendance in all 213 credits and earn 206 credits. Marks obtained in the best 204 credits shall be considered for the calculation of percentage of marks.

7.6 Students who fail to earn 206 credits as indicated in the course structure within ten academic years (8 years of study + 2 years additionally for appearing for exams only) from the year of their admission, shall forfeit their seat in B.Tech. Course and their admission stands cancelled.

8 Course Pattern

8.1 The entire course of study is for four academic years. I , II, III and IV years shall be on semester pattern.

8.2 A student, eligible to appear for the end examination in a subject, but absent from it or has failed in the end semester examination, may write the exam in that subject during the period of supplementary exams.

8.3 When a student is detained for lack of credits/shortage of attendance, he may be re-admitted into the next semester. However, the academic regulations under which he was first admitted shall continue to be applicable to him.

9 Award of Class

After a 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:

Class Awarded	% of marks to be secured	From the aggregate marks secured from 204 Credits.
First Class with Distinction	70% and above	
First Class	Below 70 but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

The marks obtained in internal evaluation and end semester examination shall be shown separately in the memorandum of marks.

10 Minimum Instruction Days

The minimum instruction days for each semester shall be 90 days. Tentatative Schedule must be as per the pattern given below.

First Semester	Instructions Days	16 Weeks
	Mid Term Examinations	2 Weeks
	Preparation & Practical Examinations	2Weeks
	End Examinations	2Weeks
Semester Break		2Weeks
Second Semester	Instructions Days	16 Weeks
	Mid Term Examinations	2 Weeks
	Preparation & Practical Examinations	2Weeks
	End Examinations	2Weeks
Summer Break		6 weeks

11. Branch Transfer of students

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

12. Transfer of students from other colleges/universities

Transfer of students from the Constituent Colleges of *JNTUH* or from other Colleges/Universities shall be considered only on a case-to-case basis by the Academic Council of the Institute while following rules as in the force at that time promulgated by JNTUH and State government of Telangana.

13. Withholding Of Results

If the student has not paid the dues, if any, to the college or if any case of indiscipline is pending against him, the result of the student will be withheld and he will not be allowed into the next semester. His degree will be withheld in such cases.

14. Transitory regulations

14.1 Discontinued, detained, or failed candidates are eligible for readmission, as and when next offered.

14.2 After the revision of the regulations, the students of the previous batches will be given two chances for passing in their failed subjects, one supplementary and the other regular. If the students cannot clear the subjects in the given two chances, they shall be given equivalent subjects as per the revised regulations which they have to pass in order to obtain the required number of credits.

14.3 In case of transferred students from other Universities and colleges, the credits shall be transferred to JBIET as per the academic regulations and course structure of the JBIET.

15. General

15.1 Wherever the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.

15.2 The academic regulation should be read as a whole for the purpose of any interpretation.

15.3 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.

15.4 The College 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 College.

15.5 The students seeking transfer to JBIET from various other Universities/ Institutions have to pass the failed subjects which are equivalent to the subjects of JBIET, and also pass the subjects of JBIET which the candidates have not studied at the earlier Institution on their own without the right to sessional marks. Further, though the students have passed some of the subjects at the earlier institutions, if the same subjects are prescribed in different semesters of JBIET, the candidates have to study those subjects in JBIET in spite of the fact that those subjects are repeated.

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ACADEMIC REGULATIONS R14 FOR B. TECH. (LATERAL ENTRY SCHEME)

Applicable for the students admitted into II year B. Tech. (LES) from the Academic Year 2014-15 and onwards

1 Eligibility for award of B. Tech. Degree (LES)

1.1 The LES candidates shall pursue a course of study for not less than three academic years and not more than six academic years.

1.2 They shall be permitted to write the examinations for two more years after six academic years of course work.

1.3 The candidate shall register for 163 credits and secure 156 credits from II to IV year B.Tech. Program (LES) for the award of B.Tech. degree with compulsory subjects as listed in Table-2.

Table-2	
Serial Number	Subject Particulars
1	All practical subjects
2	Industry oriented mini project
3	Comprehensive Assignment
4	Industrial Internship
5	Comprehensive Viva-Voce
6	Seminar
7	Project work

1.4 The students, who fail to fulfil the requirement for the award of the degree in 8 consecutive academic years (6 years of study + 2 years additionally for appearing exams only) from the year of admission, shall forfeit their seats.

1.5 The attendance regulations of B. Tech. (Regular) shall be applicable to B.Tech. (LES).

2. Promotion Rule

A student shall be promoted from second year to third year if he fulfills the minimum attendance requirement.

A student shall be promoted from III year to IV year only if he fulfils the academic requirements of 40 credits up to III year II semester or 30 credits up to III year I semester from all the examinations, whether or not the candidate takes the examinations.

3. Award of Class

After a student has satisfied the requirement 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:

Class Awarded	% of marks to be secured	
First Class with Distinction	70% and above	From the aggregate marks secured for 154 Credits. (i.e. II year to IV year)
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 obtained in the internal evaluation and the end semester examination shall be shown separately in the marks memorandum.

4. All other regulations as applicable to **B. Tech. 4-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme)**.

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper conduct	**Punishment**
	If the candidate:	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that Subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and kept with the examination branch.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated,

		shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all End semester examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all End semester examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the

	or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all End semester examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the Examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the

		subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for invigilators : (if the squad reports that the invigilator is also involved in encouraging malpractices)
   (i) A show cause notice shall be issued to the invigilator.
   (ii) Impose a suitable fine on the invigilator.

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ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE STRUCTURE - R14

I B.Tech-I Semester

Sl.No	Code	Subject	L	T-P-D	C
1	C110A	English	3	0-0-0	3
2	C110B	Mathematics-I	4	1-0-0	4
3	C110C	Engineering Physics	3	1-0-0	3
4	C115A	Computer Programming	3	1-0-0	3
5	C113D	Engineering Drawing-I	1	0-0-3	3
6	C1101	Computer Programming Lab	0	0-3-0	2
7	C1102	Engineering Physics Lab	0	0-3-0	2
8	C1104	Engineering Workshop	0	0-3-0	2
9	C1105	English Lab	0	0-3-0	2
Total			**14**	**3-12-3**	**24**

I B.Tech-II Semester

Sl.No	Code	Subject	L	T-P-D	C
1	C120A	Technical English	3	0-0-0	3
2	C120B	Mathematics-II	4	1-0-0	4
3	C120D	Engineering Chemistry	3	0-0-0	3
4	C125A	Data Structures	3	1-0-0	3
5	C120F	Professional Ethics	3	0-0-0	3
6	C120E	Mathematical Methods	4	1-0-0	4
7	C1201	Data Structure Lab	0	0-3-0	2
8	C1203	Engineering Chemistry Lab	0	0-3-0	2
9	C1204	IT Workshop	0	0-3-0	2
Total			**20**	**3-9-0**	**26**

II B.Tech-I Semester

Sl.No	Code	Subject	L	T-P-D	C
1	C210D	Complex Analysis	3	1-0-0	3
2	C214D	Probability Theory and Stochastic Processes	4	0-0-0	4
3	C210B	Environment Studies	3	0-0-0	3
4	C214C	Electronic Devices and Circuit	4	0-0-0	4
5	C214A	Signals and Systems	4	1-0-0	4
6	C212E	Electrical Circuits	3	1-0-0	3
7	C211D	Basic Simulation Lab	0	0-3-0	2
8	C2105	Electronic Devices and Circuits Lab	0	0-3-0	2
9	C2111	Electrical Circuits Lab	0	0-3-0	2
Total			**21**	**3-9-0**	**27**

II B.Tech-II Semester

Sl.No	Code	Subject	L	T-P-D	C
1	C224A	Electronic Circuit Analysis	4	1-0-0	4
2	C224B	Pulse and Digit Circuits	4	0-0-0	4
3	C222D	Principles of Electrical Engineering	4	0-0-0	4
4	C224C	Switching Theory and Logic Design	3	1-0-0	3
5	C224D	Electromagnetic Theory and Transmission Lines	3	1-0-0	3
6	C2214	Electronic Circuit Analysis Lab	0	0-3-0	2
7	C2215	Pulse and Digital Circuits Lab	0	0-3-0	2
8	C2216	Principles of Electrical Engineering Lab	0	0-3-0	2
9	C2217	Comprehensive Assignment	0	0-0-0	2
10	C2218	Gender Sensitization	0	0-3-0	2
Total			**18**	**3-12-0**	**28**

III B.Tech-I Semester

Sl.No	Code	Subject	L	T-P-D	C
1	C314A	Computer Organization and Operating System	3	1-0-0	3
2	**OPEN ELECTIVE**		3	0-0-0	3
	C314O	MAT LAB Programming			
	C315Q	OOPS With C++			
	C314P	Global Positioning Systems			
3	C314D	IC Applications	4	0-0-0	4
4	C314B	Microprocessors and Microcontrollers	4	0-0-0	4
5	C312B	Control Systems	3	1-0-0	3
6	C314C	Analog Communications	4	1-0-0	4
7	C3109	IC Applications Lab	0	0-3-0	2
8	C3110	Microprocessors and Microcontrollers Lab	0	0-3-0	2
9	C3111	Analog Communications Lab	0	0-3-0	2
Total			**21**	**3-9-0**	**27**

III B.Tech-II Semester

Sl.No	Code	Subject	L	T-P-D	C
1	C324A	Antennas and Wave Propagation	3	1-0-0	3
2	C324B	Digital Signal Processing	4	1-0-0	4
3	C324C	Microwave Engineering	4	1-0-0	4
4	**ELECTIVE-I**		3	0-0-0	3
	C324D	Telecommunication Switching Systems and Networks			
	C324E	Television Engineering			
	C323E	Nano Technology			
5	C324F	Digital Communications	4	0-0-0	4
6	C3211	Digital Signal Processing Lab	0	0-3-0	2
7	C3212	Microwave Engineering Lab	0	0-3-0	2
8	C3213	Digital Communications Lab	0	0-3-0	2
9	C3214	Industrial Internship	0	0-0-0	2
Total			**18**	**3-9-0**	**26**

IV B.Tech-I Semester

Sl.No	Code	Subject	L	T-P-D	C
1	C414A	Digital Image Processing	4	1-0-0	4
2	C414B	Electronic Measurements and Instruments	3	1-0-0	3
3	C414C	VLSI Design	4	1-0-0	4
4	**ELECTIVE-II**		3	0-0-0	3
	C414D	Multi Rate Signal Processing			
	C414E	Spread Spectrum Communications			
	C414F	Optical Communications			
5	**ELECTIVE-III**		3	0-0-0	3
	C414G	Satellite Communications			
	C414H	Cellular and Mobile Communications			
	C414I	Wireless Communications and Networks			
	C414J	Radar Systems			
6	C415I	Computer Networks	4	0-0-0	4
7	C4110	VLSI Lab	0	0-3-0	2
8	C4111	Digital Image Processing Lab	0	0-3-0	2
9	C4112	Soft Skills Lab-I	0	0-3-0	2
Total			**21**	**3-9-0**	**27**

IV B.Tech-II Semester

Sl.No	Code	Subject	L	T-P-D	C
1	C420A	Management Science for Engineers	4	0-0-0	4
2	**ELECTIVE-IV**		3	1-0-0	3
	C424A	Embedded System Design			
	C424B	Low Power VLSI Design			
	C425F	Artificial Neural Network			
3	**ELECTIVE-V**		3	1-0-0	3
	C424D	RF Circuit Design			
	C424E	DSP Processors and Architecture			
	C424F	Biomedical Signal Processing			
4	C4216	Soft Skills Lab-II	0	0-3-0	2
5	C4217	Seminar	0	0-6-0	2
6	C4218	Industry Oriented Mini project	0	0-0-0	2
7	C4219	Project Work	0	0-15-0	10
8	C4220	Comprehensive Viva	0	0-0-0	2
Total			**10**	**2-24-0**	**28**

Note: All End Examination (Theory and Practical) are of three hours duration.
L-Lecture, T-Tutorial, P-Practical, D-Drawing, C-Credits.

J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
UGC AUTONOMOUS

B.Tech. ECE	**L**	**T-P-D**	**C**
I Year - I Semester	**3**	**0-0-0**	**3**

ENGLISH

(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

UNIT - I: Word Formation

-Word Disintegration
-Root/Base Word- Word Origin
-Affixation-Prefix & Suffix
-Synonym/Antonym-Homophone/Homonym/Homograph
Use of Dictionary &Thesaurus
-Phrasal Verbs, Idioms
-One Word Substitutes
-Collocations
-Technical Vocabulary

UNIT - II: Grammar

-Parts of Speech- Introduction to English Grammar
-All about- Noun, Pronoun, Verb, Adverb
- Adjective, Preposition, Conjunction, Interjection
- Articles- Use of Articles A, An and The.
-Punctuations

Tenses

-Tenses in English
-Use of appropriate Tenses in different contexts
-Use of Tenses in Narration

UNIT - III: Improving Reading Skills

-Reading for Specific Purposes
-Reading for General Information
-Reading for facts
-Reading between/beyond the lines
-Reading for Skimming & Scanning
-Dialogue Reading
-Comprehension

UNIT - IV: Basics of Writing

-Syntax & Sentence Structure
-Construction of Proper Sentences in English
-Sentences Types- Purposes
-Email Etiquette
-Note Making and Note Taking.

UNIT - V: Common Errors in English

-Subject-Verb Agreement

Text Books:

1. **Language In Use - Intermediate: Self-Study Workbook with Answer Key/2008** Adrian Doff , PB Cambridge University Press.
2. **English Vocabulary in Use: Pre-Intermediate & Intermediate**(PB +CD ROM)/3rd Edition Stuart Redman Cambridge University Press.

Reference Books:

1. **Technical Communication: Principles And Practice** (With Dvd) 2nd Edition (English) 2nd Edition Sangeeta Sharma, Meenakshi Raman, Oxford Univesity Press
2. **The Fundamental Aspects of Communication Skills**/2009,Dr.P. Prasad, S.K Kataria & Sons **Active Grammar with Answer Level 1,2 &3** Davis Cambridge University Press

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UGC AUTONOMOUS

B.Tech. ECE	**L**	**T-P-D**	**C**
I Year - I Semester	**4**	**1-0-0**	**4**

MATHEMATICS – I

(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

UNIT - I: Sequences – Series

Basic definitions of Sequences and Series – Convergence and divergence – Ratio test – Comparison test – Integral test - Cauchy's root test – Raabe's test – Absolute and conditional convergence.

Function of Single Variable

Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – Generalized mean value theorem (all theorems without proof).

UNIT - II: Function of Several Variables

Functional dependence – Jacobian – Maxima and Minima of functions of two variables with constraints and without constraints.

UNIT - III: Curve Tracing: Cartesian, polar and parametric curves.

Geometrical applications of Differential Calculus: Radius of Curvature, Centre and Circle of Curvature-Evolutes and Envelopes

UNIT - IV: Multiple Integrals: Double and triple integrals – change of order of integration – change of variable.

UNIT - V:Vector Calculus: Gradient-Divergence-Curl and their related properties, Potential function – Laplacian and second order operators. Line integral – work done – surface integrals-Flux of a vector valued functions.

Vector integrals theorem: Green's –Stoke's and Gauss's Divergence Theorems (Statement & their verification).

Text Books:

1. **Grewal B.S, "Higher Engineering Mathematics"**, Khanna publications, 42nd edition 2012
2. **Advanced Engineering Mathematics** by Jain and S.R.K. Iyangar, Narosa Publications.

Reference Books:

1. **Engineering Mathematics** by B.V.Ramana, Tata McGrawhill Publishing company Ltd .New Delhi, 5th edition, 2011.
2. **Engineering Mathematics-I** by T.K.V. Iyengar & B.Krishna Gandhi & Others, S.Chand
3. **Engineering Mathematics-I** by G.Shankar Rao, I.K.International Publications.

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B. Tech. ECE	**L**	**T-P-D**	**C**
I Year - I Semester	**3**	**1-0-0**	**3**

ENGINEERING PHYSICS
(Common to EEE, ECE,CSE, IT, ECM)

UNIT – I: Crystallography

Space Lattice**,** Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Packing Factor of SC, BCC, FCC, Diamond Structures, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems

XRD &its applications: Basic Principles of XRD, Bragg's Law, X-Ray diffraction Methods: Laue Method, Powder Method, XRD its Applications.

UNIT – II: Defects in solids:

Vacancies, Substitution, Interstitial, Concentration of Frenkel and Schottky Defects, line defects (Qualitative) & Burger's Vector

Principles of Quantum Mechanics:

Waves and Particles, de Broglie Hypothesis , Matter Waves, G.P.Thomson , Davisson and Germer's Experiment, Heisenberg uncertainty principle, Schrödinger's Time Independent Wave Equation – Physical Significance of the Wave Function – Particle in a One-Dimensional potential well(Zero point energy).

UNIT – III: Dielectric Properties:

Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities(Electronic and Ionic): Internal Fields in Solids, Clausius -Mossotti Equation, Ferro- electricity,piezo and Pyro Electricity, Its applications.

Magnetic Properties:

Permeability, Field Intensity, Magnetic Field Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magnetron, Classification of magnetic materials, Properties of Anti-Ferro and Ferri Magnetic Materials and their Applications ,Explanation of Hysteresis curve on the basis of Domain Theory of Ferro magnetism, soft and Hard Magnetic Materials.

UNIT – IV: Superconductivity:

Concept of superconductivity, Properties of Superconductors, Type-I and Type-II superconductor, BCS Theory, Applications of Superconductors.

Semiconductor Physics:

Fermi Level in Intrinsic and Extrinsic Semiconductors, Calculation of carrier concentration in Intrinsic &, Extrinsic Semiconductors, Hall Effect and its Applications.

UNIT – V: Lasers:

Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Einstein's Coefficients and Relation between them, Population Inversion, Lasing Action, Ruby Laser, Helium-Neon Laser, Semiconductor laser, Applications of Lasers

Optical fiber:

Principle of Optical Fiber, Construction of optical fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers: Step Index and Graded Index Fibers, Attenuation in Optical Fibers, Application of Optical Fiber in communication systems.

Text Books:

1. **Applied Physics – P.K.Mittal** (I.K.Internationalhosesepvt Ltd) (New Edition)
2. **Engineering Physics** - P.K Palaniswamy (Scitech Publications India) Pvt Ltd, Fifth Print 2010).

Reference Books:

1. **Engineering Physics** - Senthilkumar ((Vrb Publishers Limited
2. **Applied Physics for Engineers** – A.J. Dekker (Macmillan).
3. **Introduction to Solid State Physics** – C. Kittel (Wiley Eastern).

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B.Tech. ECE	**L**	**T-P-D**	**C**
I Year - I Semester	**3**	**1-0-0**	**3**

COMPUTER PROGRAMMING

(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

UNIT - I:

Computer fundamentals-Hardware, software, computer language, translators, Compiler, Interpreter, Loader, and linker, Program Development steps-Algorithms, Pseudo code, flow charts, Specification for Converting Algorithms into Programs basic,

Introduction to C Language – History, Simple C Program, Structure of a C Program, Identifiers, Basic data types, user defined data types, Variables, Constants, type qualifiers, Managing Input / Output, Operators, Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Simple C Programming examples.

UNIT - II:

Selection Statements – if and switch statements, Repetitive statements – while, for, do-while statements, C Programming examples, other statements related to looping – break, continue, go to, C Programming examples. Arrays– Basic concepts, one-dimensional arrays, two – dimensional arrays, multidimensional arrays, C programming examples.

UNIT - III:

Introduction to Structured Programming, Functions- basics, user defined functions, inter function communication, Standard functions, Storage classes-auto, register, static, extern, scope rules, arrays to functions, recursive functions, example C programs. Command line arguments in C.

Strings – Basic concepts, String Input / Output functions, arrays of strings, string handling functions, strings to functions, C programming examples.

UNIT - IV:

Derived types – Structures – Basic concepts, nested structures, arrays of structures, structures and functions, unions, bit fields, C programming examples.

Pointers – Basic concepts, pointers and functions, pointers and strings, pointers and arrays, pointers and structures, self-referential structures, example C programs.

UNIT - V:

Introduction Using Files in C, Declaration of File Pointer, Opening a File, Closing and Flushing Files, Working with Text Files, Character Input and Output, End of File (EOF). Creating header file and using in the C Program. Working with Binary Files, Direct File Input and Output, Sequential Versus Random File Access, Files of Records, working with Files of Records, Random Access to Files of Records, Other File Management Functions, Deleting a File Renaming a File. Low-Level I/O. Working with C graphics functions.

Text Books:

1. **Programming in C.** P. Dey and M Ghosh, Oxford University Press.
2. **The C Programming Language**, by Brian W. Kernighan , Dennis M. Ritchie

Reference Books:

1. **C programming** A Problem-Solving Approach by Behrouz A.Forouzan
2. **Programming with C**, B.Gottfried, 3rd edition, Schaum's outlines, TMH.
3. **Graphics Under C** by Yashavant Kanetkar, BPB Publications, 2003

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B.Tech. ECE	**L**	**T-P-D**	**C**
I Year - I Semester	**1**	**0-0-3**	**3**

ENGINEERING DRAWING - I
(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

UNIT – I: INTRODUCTION TO ENGINEERING DRAWING

Principles of Engineering Drawing and their Significance – Drawing Instruments and their Use – Conventions in Drawing – Lettering – BIS Conventions.
SCALES:
Different types of Scales, Plain scales, Vernier Scale, Digonal Scale, Scales of chords.

UNIT – II: CONSTRUCTION OF CURVES USED IN ENGINEERING PRACTICE

a) Conic Sections Ellipse- General, Concxentric Circle, Arcs of circle and Oblong Method
   Parabola- General, Tangent and Rectangle Methods
   Hyperabola-General, Point/Rectangle Method
b) Cycloid, Epicycloid and Hypocycloid
c) Involute for Circle, Rectangle and Triangle

UNIT – III: PROJECTIONS OF POINTS AND LINES
Principles of Orthographic Projections – Conventions – First and Third Angle, Projections of Points and Lines inclined to planes, True lengths, traces.

UNIT – IV: PROJECTIONS OF PLANES
Projections of regular Planes, auxiliary planes and Auxiliary projection inclined to both planes.

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

Text Books:
1. **Engineering Drawing,** N.D. Bhat / Charotar
2. **Engineering Drawing and Graphics**, Venugopal / New age.

Reference Books:
1. **Engineering Drawing** – Basant Agrawal, TMH
2. **Engineering drawing** – P.J. Shah.S.Chand.
3. **Engineering Drawing**, Narayana and Kannaiah / Scitech publishers.

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B.Tech. ECE	**L**	**T-P-D**	**C**
I Year - I Semester	**0**	**0-3-0**	**2**

COMPUTER PROGRAMMING LAB

(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

Experiment: 1. Simple C programs -to implement basic arithmetic operations – sum, average, product, smallest, largest of the numbers, difference, quotient and remainder of given numbers etc.

Experiment: 2. Programs on if, else-if, nested if, else if ladder - largest and smallest of given numbers, to find the grade of a student based on marks, roots of a quadratic equation etc.

Experiment: 3.a Programs on switch-case – to check the type of a given character, to find the grade of a student etc.

b. Programs on while and do-while- to find factorial, Fibonacci series, GCD, Sin(x), Cos(x) series, to check whether a given number is an Armstrong, Palindrome, Perfect, number conversion, and Prime number etc.

Experiment: 4.Programs on "for loop" - sum of n natural numbers, factorial, sin(x), to generate Pascal's triangle etc.

Experiment: 5.a. Programs on nested loops – check for Fibonacci prime, Pyramids of numbers, generation of prime numbers in the given range, multiplication table etc.

b. Programs using break, go to, and continue.

Experiment: 6.a. Programs on 1-D array-finding Minimum and maximum element, Sorting and Searching etc.

b. Programs on 2-D array – Sum, product and Multiplication of two Matrices etc.

Experiment: 7.a. Programs on Functions-Implementation of user defined functions categories, passing of arrays to functions etc.

b. Programs on recursion - factorial of a given integer, GCD of two given integers etc.

Experiment: 8.a. Programs on String handling functions-Copying, reverse, substring, and concatenation.

b. Programs on structure and unions.

Experiment: 9. Programs using pointers- pointer basic operations, pointers and functions etc.

Experiment: 10. Programs on pointers and structures, Pointers and arrays, pointers and strings.

Experiment: 11. Programs on files-Implementation of file handling functions. Programs on files error handling. Programs on Dynamic memory allocation.

Experiment: 12.Programs on command line arguments. Programs on preprocessor directives.

Experiment: 13.Program draws basic shapes such as circle, line, rectangle, ellipse and display text on screen using c graphics. Smiling face Animation using c graphics displaying face at random position on screen.

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B. Tech-ECE	**L**	**T-P-D**	**C**
I Year-I Semester	**0**	**0-3-0**	**2**

ENGINEERING PHYSICS LAB

(Common to EEE, ECE, CSE, IT & ECM)

Experiment: 1. Torsional pendulum.

Experiment: 2. Melde's experiment – Transverse and longitudinal modes.

Experiment: 3. Time constant of an R-C circuit.

Experiment: 4.L-C-R circuit.

Experiment: 5. Magnetic field along the axis of current carrying coil – Stewart and Gees method.

Experiment: 6. Study the characteristics of LASER sources.

Experiment: 7.Study the characteristics of light emitting diode.

Experiment: 8. Evaluation of numerical aperture of given fiber.

Experiment: 9. Bending losses in optical fiber.

Experiment: 10. Energy gap of a material of p-n junction.

Experiment: 11. Impedance Analysis/Dielectric constant of Measurements of materials.

Experiment: 12. Analysis of XRD spectra.

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B.Tech. ECE	**L**	**T-P-D**	**C**
I Year - I Semester	**0**	**0-3-0**	**2**

ENGINEERING WORKSHOP

(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

TRADES FOR EXPERIMENTS

Three experiments from each trade

- **(i)** Carpentry
- **(ii)** Fitting
- **(iii)** Black Smithy
- **(iv)**Welding

TRADES FOR DEMONSTRATION & EXPOSURE

- **(i)** Power Tools in Construction, Wood working, Electrical Engineering works and Mechanical Engineering
- **(ii)** Plumbing

TEXT BOOKS:

1. **Work shop manual**-P.Kannaiah, K.Narayana, Scitech Publishers
2. **Workshop Manual**-Venkat Reddy

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B.TECH ECE	L	T-P-D	C
I YEAR- I Semester	0	0-3-0	2

ENGLISH LAB

(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

MULTI-MEDIA LANGUAGE LAB

Experiments /Activity-1 Introduction to Phonetics

Experiments /Activity-2 Sounds of English- Vowels, Diphthongs

Experiments /Activity-3 Consonants

Experiments /Activity-4 Introduction to Stress, Rhythm and Intonation

Experiments /Activity-5 Improving Listening Skills

ENGLISH COMMUNICATION SKILLS LAB

Experiments /Activity-6 Self Introduction

Experiments /Activity-7 Introducing others

Experiments /Activity-8 Agreeing/Disagreeing and Asking Questions

Experiments /Activity-9 Just A Minute' Sessions (JAM) & Situational Dialogues

Experiments /Activity-10 Describing Objects / Situations / People.

Experiments /Activity-11 Oral Presentations- Prepared and Extempore.

Experiments /Activity-12 Debate

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B. Tech: ECE	**L**	**T-P-D**	**C**
I Year – II Semester	**3**	**0-0-0**	**3**

TECHNICAL ENGLISH

(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

UNIT - I: Formal & Informal Writing

Formal & Informal Writing, Cover Letter

UNIT II: Writing Techniques

Developing Paragraphs- Cohesion-Developing passage by arranging paragraphs

UNIT - III: Official Correspondence

Types of Business Correspondence -Technical

Vocabulary, Report writing, Applications, Complaints & Requisitions

UNIT - IV: e-Writing

e-Mail Etiquette

UNIT - V:Presentation Skills

- Paper, Seminars, Conferences, Symposia, Workshop presentation
- Power Point Presentation (Microsoft Office Suit)
- Project Proposal Presentation

Text Books:

1. **Fundamentals of Technical Communications** - oxford – Meenakshi Raman, Sangeeta Sharma
2. **Strengthen Your Writing**- V.R. Narayanaswami -Orient Longman

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B. Tech. ECE	**L**	**T-P-D**	**C**
I Year - II Semester	**4**	**1-0-0**	**4**

MATHEMATICS – II

(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

UNIT - I: Differential equations of first order and their applications

Overview of differential equations – exact, linear and Bernoulli. Applications to Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories

Higher Order Linear differential equations and their applications

Linear differential equations of second and higher order with constant coefficients, RHS term of the $f(X)=e^{ax}$, Cosax, Sinax, x^n, e^{ax} V(x), x^n V(x) and method of variation of parameters. Applications on bending of beams, Electrical circuits, simple harmonic motion.

UNIT - II: Laplace transform and its application to Ordinary differential equations

Laplace transform of standard functions – Inverse transform – first shifting theorem, Transforms of derivatives and integrals – Unit step function – second shifting theorem –Convolution theorem-Periodic function – differentiation and integration of transforms-Application of Laplace transforms to ordinary differential equations.

UNIT - III:Fourier Series

Determination of Fourier coefficients – Fourier series – even and odd functions – Fourier series in an arbitrary interval- even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

UNIT - IV: Transforms

Fourier Transform: Fourier integral theorem – Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms, Parseval's formula.

Z-Transform: Z-Transform-Properties-Damping rule-shifting rule-Initial & Final value theorems-convolution theorem –solution of difference equations by Z-transform.

UNIT - V:Partial differential equations

Introduction and Formation of partial equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and nonlinear (Standard type) equations-Classification of PDE-Finite difference methods for: Elliptic, Hyperbolic & Parabolic equations-solution of Heat equation(one dimensional)

Text Books:

1. **Grewal B.S, "Higher Engineering Mathematics",** Khanna publications, 42nd edition 2012
2. **Advanced Engineering Mathematics** by Jain and S.R.K. Iyengar, Narosa Publications.

Reference Books:

1. **Engineering Mathematics** by B.V.Ramana, Tata McGrawhill Publishing company Ltd .New Delhi, 5th edition, 2011
2. **Engineering Mathematics-I, Mathematical Methods** by T.K.V. Iyengar & B.Krishna Gandhi & Others, S.Chand
3. **Engineering Mathematics-I, Mathematical methods'** by G.Shankar Rao, I.K.International Publications.

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B.Tech. ECE	**L**	**T-P-D**	**C**
I Year - II Semester	**3**	**0-0-0**	**3**

ENGINEERING CHEMISTRY

(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

UNIT - I: Electrochemistry and Batteries:

Concept of Electrochemistry, Conductance-Electrolyte in solution, Conductance-Specific, Equivalent and molar conductance, Kolrausch's Law, application of conductance. EMF: Galvanic Cells, Reference Electrode, Nernst equation, galvanic series, Application of EMF measurements.

Batteries: Primary and secondary cells, (lead-Acid cell, Ni-Cd cell, Lithium cells). Application's of batteries. Fuel cells – Hydrogen – Oxygen fuel cells, advantages of fuel cells.

UNIT - II: Polymers:

Introduction-classification-natural and synthetic polymers; Types of Polymerization (Chain growth & Step growth).Plastics: Thermoplastic & Thermoset resins. Engineering applications of: Teflon, Bakelite, Nylon. Conducting polymers- Poly acetylene, polyaniline- conduction, doping, and its application. Fibers – polyester, fiber reinforced plastics (FRP), applications.

UNIT - III: Energy sources:

Introduction- fuels, classification – conventional fuels (solid, liquid, gaseous). Calorific value-HCV and LCV. Solid fuels – coal –processing of coal. Liquid fuels – primary – petroleum – refining of petroleum-cracking knocking synthetic petrol – Bergius and Fischer-tropsech's process.

UNIT - IV: Water Technology

Introduction, Hardness: Causes, expression of hardness – units – types of hardness, estimation of temporary & permanent hardness of water. Boiler troubles – Scale & sludge formation, caustic embrittlement, corrosion, priming & foaming Softening of water (Internal & external treatment-Lime soda, Zeolites, Ion exchange process) Reverse osmosis, electro dialysis.

UNIT - V: Photochemistry:

Laws of photochemistry - Grotthuss–Draper law, Stark–Einstein law and Lambert- Beer Law. Photo processes - Internal Conversion, Inter-system crossing, Fluorescence, Phosphorescence. **Spectroscopy:** Electromagnetic spectrum - Absorption of radiation – Electronic, Vibrational and rotational transitions. UV-visible and IR spectroscopy – principles, instrumentation (Block diagram only).

Nanochemistry:

Introduction. Synthesis: Top down and bottom up processes, Properties and Applications and future prospects.

Text Books:

1. Text Book of Engineering Chemistry – Shasi Chawla, Dhantpat Rai publishing Company, New Delhi (2008).
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).

Reference Books:

1. Text of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co,New Delhi(2006)

2. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited , New Delhi(2006)
3. Engineering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills co., New Delhi (2004).

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B.Tech. ECE	**L**	**T-P-D**	**C**
I Year - II Semester	**3**	**1-0-0**	**3**

DATA STRUCTURES

(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

UNIT - I: Data Structures:

Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, circular linked list implementation, Doubly linked list implementation, insertion, deletion and searching operations. Applications of linked lists.

UNIT - II: Stacks:

Operations, array and linked representations of stacks, stack applications-infix to postfix conversion, postfix expression evaluation, recursion implementation. Queues-operations, array and linked representations. Circular Queue operations, Dequeue, applications of queue

UNIT - III: Trees

Definitions, Binary tree representation, Binary search tree, binary tree traversals, AVL tree – operations, B-tree – operations, B+ trees, Red Black tree.

UNIT - IV: Graphs:

Terminology, sequential and linked representation, graph traversals : Depth First Search & Breadth First Search implementation. Spanning trees, Prims and Kruskals method.

UNIT - V: Searching and Sorting:

Big O Notation, Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort, Searching- linear and binary search methods.

Text Books:

1. **Data Structures Using C** Reema Thareja, Oxford University Press, 2011 Learning.
2. **Data Structures Using C** (Paperback) by Aaron M. Tenenbaum

Reference Books:

1. **C Programming & Data Structures**, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage
2. **C& Data structures** – P. Padmanabham, Third Edition, B.S. Publications.
3. **Data Structures using C** – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education

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B.Tech. ECE	**L**	**T-P-D**	**C**
I Year - II Semester	**3**	**0-0-0**	**3**

PROFESSIONAL ETHICS

(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

UNIT - I : Basic Concepts

Introduction, terminology, stake holders, governing edicts, contextual aspects, ethical dilemmas, life skills, emotional, intelligence, Indian and western thoughts on ethics, value education, dimensions of ethics, setting goals in life, importance of morality and ethics, basic ethical principles, moral developments theories, classification of ethical theories, some basic theories, moral issues, moral dilemmas autonomy.

UNIT - II : Professional and professionalism

Introduction, meaning of profession, professionals, professionalism, professional association, professional's roles and professional risks, professional accountability, successful professional, ethics and profession, engineering profession, engineering as social experimentation, engineering professionals, engineering ethics, roles of engineers, balanced out look on law, rights and responsibilities as citizens, professional responsibilities, professional rights.

UNIT - III : Global issues and safety

Introduction, current scenario, business ethics, environmental ethics, computer ethics, media ethics, war ethics, bio-ethics, research ethics, intellectual property right, safety and risk, assessment of risk, risk and cost, engineers responsibility for safety, risk benefit, analysis, risk cause and management, case studies, providing for safe exit, ethical issues of safety.

UNIT - IV: Ethical codes and audits

Introduction, need for ethical codes, sample codes, corporate codes, limitations of the codes, need for ethical audit, ethical profile of organizations, ethical standards and bench marketing, audit brief, ethical auditors, procedure for ethical audit, ethical audit report, examples.

UNIT - V: Human values and ethical living

Introduction, terminology, domains of learning, human values, attitudes, values, attitudes and professionals, needs of life, harmony in life, what is ethical living, case studies.

Text Books:

1. **Professional ethics** by R. Subramanian, Oxford press.
2. **Text book on Professional ethics** and human values by R.S.Nagarajan, New age international.

Reference Books:

1. **Professional ethics** and human value by D.R.Kiran, Tata McGraw Hills education.
2. **Ethics in engineering** by Mike W. Martin and Roland Schinzinger, Tata McGraw Hills education.
3. **Fundamental of Ethics** by Edmund G Seebauer and Robert L.Barry, Oxford University press.

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MATHEMATICAL METHODS

(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

UNIT - I: Solution of Algebraic and Transcendental Equations

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

Interpolation:

Introduction – Errors in Polynomial Interpolation – Finite differences – Forward Difference – Backward difference – Central difference – Symbolic relations and separation of symbols – Difference Equations – Differences of polynomial – Newton's formulae for interpolation – Central difference interpolation Formulae – Gauss Central Difference Formulae – Interpolation with unevenly spaced points.

UNIT - II: Solution for linear systems

Matrices and Linear systems of equations: Elementary row transformations- Rank-Echelon form, Normal forms–Existence of solution-Gauss elimination with pivoting-Gauss Jordan Method-Ill conditioned systems-Jacobi iterative method-Gauss seidal method-convergence of iterative methods.

UNIT - III: Vector Spaces & Linear Transformations

Vector Spaces: Vector Spaces- Linear independence- Basis & Dimensions- Linear transformation- Matrix linear transformation- permutations-inner product- orthogonal and –Orthonormal sets – Gram-Schmidt process.

Linear Transformations: Properties of Real & Complex Matrices, orthogonal matrices, Linear Transformation – Orthogonal Transformation. Eigen values and Eigen vectors of Real & complex matrices and their properties.

UNIT - IV: Eigen Values & Eigen Vectors

Quadratic forms- Reduction of quadratic form to canonical form – Rank – Positive, Negative definite – semi definite – index – signature- Sylvester law, Singular value decomposition.

Eigen values, Eigen vectors – properties, Cayley-Hamilton – Theorem (with Proof) – Inverse and powers of a matrix by Cayley-Hamilton theorem – Diagonization of matrix. Calculation of powers of matrix – Model and spectral matrices.

UNIT - V:Numerical Differentiation & Numerical solution of IVP's in ODE

Numerical Differentiation:

Derivatives using Forward, Backward & central difference formulae.

Numerical solution of IVP's in ODE:

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

Text Books:

1. **Grewal B.S, "Higher Engineering Mathematics**", Khanna publications, 42nd edition 2012
2. **Advanced Engineering Mathematics** by Jain and S.R.K. Iyangar, Narosa Publications.

Reference Books:

1. **Engineering Mathematics** by B.V.Ramana, Tata McGrawhill Publishing company Ltd. New Delhi, 5th edition, 2011.
2. **Engineering Mathematics-I** by T.K.V. Iyengar & B.Krishna Gandhi & Others, S.Chand
3. **Engineering Mathematics-I** by G.Shankar Rao, I.K.International Publications.

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DATA STRUCTURES LAB

(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

Experiments:1. Write a C program that uses functions to perform the following operations on singly linked list:

I) Creation II) Insertion III) Deletion IV) Traversal V) merge two single linked lists

Experiments:2. Write a C program that uses functions to perform the following operations on doubly Linked list.

I) Creation II) Insertion III) Deletion IV) Traversal

Experiments:3. Write a C program that uses functions to perform the following operations on circular linked list:

II) Creation II) Insertion III) Deletion IV) Traversal

Experiments:4. Write a C program that implement stack operations using

I) Arrays II) Linked Lists

Experiments:5.I) Write a C program to convert infix expression to postfix expression using stack

II) Write a C program to evaluate postfix expression

Experiments:6.I) Programs using recursion

II) Write a C program to convert infix expression to prefix expression using stack

Experiments:7. Write a C program to implement Linear queue using

I) Arrays II) Linked Lists

Experiments:8. Write a C program to perform following operations on a circular Queue

I) insertion II) deletion III) search and count

Experiments:9. Write a C program to perform following operations on a circular DeQueue

I) insertion II) deletion III) search and count

Experiments:10. Write a C program to implement Linear search

II) Write a C program to implement Binary Search

Experiments:11. Write C programs that implement the following sorting methods to sort a given list of

integers in ascending order:

I) Bubble sort II) Selection sort III) Insertion Sort

Experiments:12. Write C programs that implement the following sorting methods to sort a given list of

integers in ascending order:

I) Merge sort II) Quick sort

Experiments:13. I) Write a C Program to implement binary tree traversals

II) Write a C Program to implement AVL tree operations

Experiments:14. 1. Implementation of a Graph representation using Adjacency Matrix

2. Write a C program to implement graph traversals.

Text Books:

1. **C Programming & Data Structures**, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. **Data Structures Using C** (Paperback) by Aaron M. Tenenbaum

Reference Books:

1. **C& Data structures** – P. Padmanabham, Third Edition, B.S. Publications.
2. **Data Structures using C** – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI
3. **C Programming & Data Structures**, E. Balagurusamy, TMH.

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ENGINEERING CHEMISTRY LAB
(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

List of Experiments (Total 12 experiments)

Introduction:

- Laboratory safety and precautions.
- Preparation of solution.
- Determination of unknown concentration of given solutions and calculations.

Titrimetry:

1. Estimation of hardness of water by EDTA method.

Mineral Analysis:

2. Determination of percentage purity of pyrolusite.

Instrumental Methods:

3. Conductometric titration of a) strong acid Vs strong base.
b) Weak acid vs strong base
c) Mixture of acids vs strong base

6. Effect of dilution on conductance for i) Strong acids, ii) weak acids and iii) Ionic salts.
7. Determination of ferrous iron in cement by colorimetric method
8. Estimation of Copper by Colorimetric method.

Physical Properties:

9. Determination of viscosity of sample oil by Oswald's viscometer
10. Determination Surface Tension of given unknown liquid using stalganometer.

Preparations:

11. Preparation of organic compound Asprin.

Demonstration Experiments:

12. Preparation of Thiokol rubber.

Text Books:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Inorganic quantitative analysis, Vogel.

Reference Books:

1. Text Book of engineering chemistry by R. N. Goyal and Harrmendra Goel.
2. A text book on experiments and calculation Engg. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

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IT WORKSHOP

(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

EXPERIMENT 1: Familiarizing with Computer Hardware

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.

EXPERIMENT 2: PC Assembly

Every student should disassemble and assemble the PC back to working condition. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

EXPERIMENT 3: Installation of Windows

Every student should individually install MS windows on the personal computer.

EXPERIMENT 4: Installation of Linux

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.

EXPERIMENT 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.

EXPERIMENT 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.

EXPERIMENT 7: Networking Concepts

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. Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured

EXPERIMENT 8: Internet and Search Engines

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 / yahoo / Bing. 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 antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and / or worms.

EXPERIMENT9: Word Processor

The mentor needs to give an overview of Microsoft (MS) office / Libre Office tool - Overview of toolbars, saving files, Using help and resources, rulers, format painter. Overview of 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, Inserting Table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes. Overview of Creating a Table of Content, Newspaper columns, Images from files and clipart. Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXPERIMENT 10: Spread Sheet

The mentor needs to tell the importance of MS Excel / Libre office Calc tool - teach toolbars, saving excel files, Using help and resources. Create employee payroll using functions. Other features to be covered are Cell Referencing, Charts, Renaming and Inserting worksheets, Hyper linking, LOOKUP/VLOOKUP, Sorting, Conditional formatting.

EXPERIMENT 11: Presentation

The mentor needs to give overview of MS Power Point / Libre office Impress tool – to create basic power point presentation. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows. Students need to create a PPT and present it.

EXPERIMENT 12: Virtual Box Installation

Installing multiple operating systems on your PC using (virtual box) / hyper-v / VM Ware

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COMPLEX ANALYSIS
(Common to ECM, ECE & EEE)

UNIT – I: Special Functions I

Gamma and Beta Functions– Their properties – evaluation of improper integrals. Bessel functions – properties – Recurrence relations – Orthogonality.

Special Functions II: Legendre polynomials – Properties – Rodrigue's formula – Recurrence relations – Orthogonality.

UNIT-II: Functions of a complex variable

Continuity – Differentiability – Analyticity – Properties – Cauchy-Riemann conditions, Maxima – Minima principle, Harmonic and conjugate harmonic functions – Milne – Thompson method.

UNIT-III: Complex integration

Line integral – evaluation along a path and by indefinite integration – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula. Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series.

UNIT-IV: Complex power series

Singular point –Isolated singular point – pole of order m – essential singularity. (Distinction between the real analyticity and complex analyticity)

Contour Integration

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) $\int_{c}^{c+2\pi} f(\cos\theta, \sin\theta)d\theta$

.

UNIT-V: Conformal mapping

Transformation by e^z, Imz, z^2, z^n (n positive integer), Sin z, cos z, z + a/z. Translation, rotation, inversion and bilinear transformation – fixed point – cross ratio – properties – invariance of circles and cross ratio – determination of bilinear transformation mapping 3 given points .

TEXT BOOKS:

1. Grewal B.S, "Higher Engineering Mathematics", Khanna publications, 42nd edition 2012
2. Advanced Engineering Mathematics by Jain and S.R.K. Iyangar, Narosa Publications.
3. Engineering Mathematics by B.V.Ramana, Tata McGrawhill Publishing company Ltd .New Delhi, 5th edition, 2011

REFERENCES:

1. Engineering Mathematics-I by T.K.V. Iyengar & B.Krishna Gandhi & Others, S.Chand
2. Engineering Mathematics-I by G.Shankar Rao, I.K.International Publications.
3. KREYSZIG. E, "Advanced Engineering Mathematics" JohnWiley & Sons Singapore, 10th edition, 2012.

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PROBABILITY THEORY AND STOCHASTIC PROCESSES

Unit I: Introduction to Probability and Random Variable

Probability introduced through Sets and Relative Frequency, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Probability as a Relative Frequency, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, Independent Events. Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variables, Distribution and Density functions and their Properties - Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh and Conditional Distribution, Methods of defining Conditional Event, Conditional Density, Properties

Unit II: Operation on Random Variable – Expectations

Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Variance and Skew, Joint Moments about the Origin, Central Moments, Joint Central Moments, Chebychev's Inequality, Characteristic Function, Joint Characteristic Functions, Moment Generating Function, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties.

Unit III: Transformations of Random Variables

Monotonic Transformations for a Continuous Random Variable, Non-monotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables, Central Limit Theorem (Proof not expected), Unequal Distribution, Equal Distributions.

Unit IV: Stochastic Processes – Temporal Characteristics

The Stochastic Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Concept of Stationary and Statistical Independence, First-Order Stationary Processes, Second-Order and Wide-Sense Stationary, N^{th} Order and Strict-Sense Stationary, Time Averages and Ergodic, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and its Properties, Cross-Correlation

Function and its Properties, Covariance and its Properties, Linear System Response: Mean and Mean-squared Value, Autocorrelation Function, Cross-Correlation Functions of Linear System Response, Gaussian Random Processes, Poisson Random Process**.**

Unit V: Stochastic Processes - Spectral Characteristics and Noise

Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function, Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Spectral Density of Input and Output of a Linear System.

Types of Noise: Resistive (Thermal) Noise Source, Shot noise, Extra terrestrial Noise, Arbitrary Noise Sources, White Noise, Narrowband Noise : In phase and quadrature phase components and its Properties, Modeling of Noise Sources, Average Noise Bandwidth, Effective Noise Temperature, Average Noise Figures, Average Noise Figure of cascaded networks.

TEXT BOOKS:

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, 4 ed., 2001, TMH.
2. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis and S. Unnikrishna Pillai, 4 ed., TMH.

REFERENCES:

1. Theory of Probability and Stochastic Processes- Pradip Kumar Gosh, University Press
2. Probability Theory and Stochastic Processes- Mallikarjuna Reddy, Cengage Learning.
3. Principles of Communication systems – H.Taub, Donald.L.Schilling, Goutam Saha, 3 ed., 2007, TMH.

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ENVIRONMENTAL STUDIES

(Common to EEE, ECE, CSE, IT, ECM)

UNIT-I: ECOSYSTEMS & NATURAL RESOURCES, **BIODIVERSITY:** Classification of Resources: Living and Non-Living resources, Renewable and Non-Renewable resources. Water resources: use and over utilization, Land resources, land degradation, Forest resources, Mineral resources uses & Exploitation Energy resources: growing energy needs, use of alternate energy sources. Concept of ecosystem, Classification of ecosystem, Functions of ecosystem, Food chains, Food webs and ecological pyramids, Flow of energy, Biogeochemical cycles, Biomagnifications, carrying capacity. Species, Ecosystem Diversity, Hotspots, Value Of Biodiversity, Threats To Biodiversity, Conservation Of Biodiversity: In-Situ And Ex-Situ Conservation.

UNIT-II: **ENVIRONMENTAL POLLUTION AND CONTROL**: Classification of pollutions and pollutants, causes, effects of water, air, noise pollution, Introduction to control technologies: Water (primary, secondary, tertiary), Air(particulate and gaseous emissions), Soil(conservation and remediation), Noise(controlling devices) Solid waste, (Municipal) types, collection and disposal methods, characteristics of e-waste & hazardous waste, biomedical waste management. Biological disasters, pandemic and epidemics, Biological warfare.

UNIT-III: GLOBAL ENVIRONMENTAL PROBELEMS AND GLOBAL EFFORTS: Green house effect, Green House Gases(GHG), Global Warming, Sea level rise, climate change and their impacts on human environment. Ozone depletion and Ozone depleting substances(ODS). Deforestation and desertification, International conventions/protocols: Earth Summit, Kyoto Protocol and Montreal Protocol, green-belt-development, Concept of Green Building, Clean Development Mechanism(CDM). Biological disasters, pandemic and epidemics, Biological warfare.

UNIT-IV: **ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AND ENVIRONMENTAL MANAGEMENT PLAN:** definition of Impact, classification of impacts, methods of baseline data acquisition. Impacts on different components: such as human health resources, air, water, flora, fauna and society, EIA guide lines as per ministry of environment & forest, impact assessment methodologies. Environmental Impact Statement (EIS). Environmental management plan (EMP).

UNIT-V: **ENVIRONMENTAL POLICY, LEGISLATION, RULES AND REGULATIONS & TOWARDS SUSTAINABLE FUTURE**: Concept of Sustainable Development, Threats to Sustainability, Strategies for achieving Sustainable development, Environmental Ethics, Environmental Economics, Concept of Green Computing, Green chemistry and low Carbon life styles..**:** National Environmental Policy, Environmental Protection Act: Air (Prevention and control of pollution) Act-1981, Water (Prevention and control of pollution) Act-1974, Water pollution Cess Act-1977, Forest Conservation Act, solid waste (biomedical waste and hazardous waste)management and handling rules.

Text Book:

1. Text Book Of Environmental Science and Technology by M.Anji Reddy 2007
2. Principles of Environmental Science and Engineering by P.Venugopal Rao

References Book:

1. Tata McgrawHill : Introduction to Environmental Studies by Benny Joseph
2. Environmental studies by Erach Bharucha 2005, University Grants Commission, University Press
3.Introduction to Environmental Studies by K.Mukkanti

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ELECTRONIC DEVICES AND CIRCUITS

(Common to EEE, ECE, CSE, IT, ECM)

Unit- I: P-N Junction Diode

Qualitative Theory of p-n Junction, p-n Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semi Conductor Diodes, Zener Diode Characteristics.

Rectifiers and Filters: The p-n junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L- Section Filters, π- Section Filters, Comparison of Filters, Voltage Regulation using Zener Diode.

Unit- II: Bipolar Junction Transistor

The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation , BJT Specifications.

Transistor Biasing and Stabilization: Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector - Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against variations in V_{BE} and β, Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability.

Unit- III: Small Signal Low Frequency BJT Models

BJT Hybrid Model For CE,CB and CC Configuration, simplified H- parameter model Determination of h-parameters from Transistor Characteristics, Comparison of CB, CE, and CC Amplifier Configurations, Conversion of h-parameters CE to CB, CE to CC, vice versa

Unit-IV: Field Effect Transistor

The Junction Field Effect Transistor (Construction, principle of operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes.
FET Amplifiers: Biasing of FET, FET as Voltage Variable Resistor, Comparison of BJT and FET, Introduction to UJT.

Unit V: Special Purpose Electronic Devices
Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram) and Varactor Diode. Principle of Operation of Schottky Barrier Diode, SCR, and Semiconductor Photo Diode.

Text Books

1. Electronics Devices and circuits by David Bell Oxford press.
2. Millman's Electronic Devices and Circuits – J. Millman, C.Halkias, and Satyabrata Jit, 2ed., 1998, TMH.

References

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 ed., 2008, TMH.
2. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal, 1 ed., 2009, Wiley India Pvt. Ltd.
3. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 ed., 2006, PEI/PHI.

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SIGNALS AND SYSTEMS

Unit I : Signal Analysis

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 : Fourier Analysis

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 Transform, Fourier Transforms involving Impulse function and Signum function, Introduction to Hilbert Transform

Unit III: Signal Transmission through Linear Systems

Linear System, Impulse response, Response of a Linear System, Linear Time Invariant (LTI) System, Linear Time Variant (LTV) System, Transfer function of a LTI system, Filter characteristics of Linear Systems, Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, 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 property of Fourier Transforms, Cross Correlation and Auto Correlation of functions, Properties of Correlation function, Energy density spectrum, Parseval's Theorem, Power density spectrum, Relation between Auto Correlation function and Energy/Power spectral density function, Relation between Convolution and Correlation,

Detection of periodic signals in the presence of Noise by Correlation, Extraction of signal from noise by filtering.

Unit V : Sampling and Laplace Transforms

Sampling theorem – Graphical and analytical proof for Band Limited Signals, Impulse Sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Effect of under sampling – Aliasing, Introduction to Band Pass sampling.

Review of Laplace Transforms (L.T), 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, Relation between L.T and F.T of a signal

Text Books:

1. Signals, Systems & Communications - B.P. Lathi, 2009, BSP
2. Signals and Systems – A. Rama Krishna Rao – 2008, TMH.

References:

1. Fundamentals of Signals and Systems - Michel J. Robert, 2008, MGH International Edition.

2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2 ed., PHI

3. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2 ed.

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Electrical Circuits

UNIT-I Introduction to Electrical Circuits: Circuit concept –R-L-C parameters-Voltage and Current sources- Independent and dependent sources-source transformation-Voltage - Current relationship for passive elements (for different input signals-square, ramp, saw tooth, triangular)

Kirchhoff's laws – network reduction techniques-series, parallel, series parallel, star-to-delta or delta-to-star transformation, Nodal analysis, mesh analysis, super node and super mesh for D.C excitations.

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

Locus diagrams & Resonance; Locus diagrams - series R-L, R-C, R-L-C and parallel combination with variation of various parameters - Resonance-series, parallel circuits, concept of band width and Q factor.

UNIT-III Network topology

Definitions – Graph – Tree, Basic cutest and Basic Tieset matrices for planar networks – Loop and Nodal methods of analysis of Networks with dependent & independent voltage and current sources – Duality & Dual networks.

UNIT-IV Network theorems (with D.C& A.C)

Superposition, Thevenin's, Norton's, Maximum Power Transfer, Reciprocity, Millman's Tellegen's, and Compensation theorems for D.C& A.C excitations.

UNIT-V Magnetic Circuits

Magnetic circuits-Faraday's laws of electromagnetic induction-concept of self and mutual inductance-dot convention-coefficient of coupling-composite magnetic circuit-analysis of series and parallel magnetic circuits

Computer Aided Circuit Simulation

Circuit simulation using PSpice.

TEXT BOOKS:

1. Engineering circuit analysis by William Hayt and Jack E. Kemberly, Mc Graw Hill Company, 6th edition.
2. Circuits & Networks by A. Sudhakar and Shyammohan S Palli, Tata McGraw- Hill

REFERENCE BOOKS:

1. Network Analysis by M.E Van Valkenberg.
2. Linear circuit analysis (time domain phasor and Laplace transform approaches) Second edition by Raymond A. Decarlo and PEN-MIN-LIN, Oxford University Press. Second edition 2004.

3. Electric Circuit theory by K. Rajeswaran, Pearson Education 2004.

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UGC AUTONOMOUS

B.Tech. ECE	**L**	**T-P-D**	**C**
II Year - I Semester	**0**	**0-3-0**	**2**

BASIC SIMULATION LAB

Experiment: 1. Basic Operations on Matrices.
Experiment: 2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
Experiment: 3. Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
Experiment: 4. Finding the Even and Odd parts of Signal/Sequence and Real and Imaginary parts of Signal.
Experiment: 5. Convolution between Signals and sequences.
Experiment: 6. Auto Correlation and Cross Correlation between Signals and Sequences.
Experiment:7. Verification of Linearity and Time Invariance Properties of a given Continuous/Discrete System.
Experiment: 8. Computation of unit sample, unit step and sinusoidal responses of the given LTI system and verifying its physical realiazability and stability properties.
Experiment: 9. Gibbs Phenomenon
Experiment: 10. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
Experiment: 11. Waveform Synthesis using Laplace Transform.
Experiment: 12. Locating the zeros and poles and plotting the pole-zero maps in S-plane and Z-plane for the given transfer function
Experiment: 13. Generation of Gaussian noise (Real and Complex), Computation of its mean, M.S. Value and its Skew, Kurtosis, and PSD, Probability Distribution Function.
Experiment: 14. Sampling Theorem Verification.
Experiment: 15. Removal of noise by Autocorrelation / Cross correlation.
Experiment: 16. Extraction of Periodic Signal masked by noise using Correlation.
Experiment: 17. Verification of Weiner-Khinchine Relations.
Experiment: 18. Checking a Random Process for Stationarity in Wide sense.

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B.Tech. ECE	**L**	**T-P-D**	**C**
II Year - I Semester	**0**	**0-3-0**	**2**

ELECTRONIC DEVICES AND CIRCUITS LAB

(COMMON FOR ECE, CSE, EEE, IT, ECM)

PART A: (Only for Viva-voce Examination)

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, PCB's

2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.

3. Study and operation of

- Multimeters (Analog and Digital)
- Function Generator
- Regulated Power Supplies
- CRO.

PART B: (For Laboratory Examination – Minimum of 10 experiments)

Experiment: 1. Forward & Reverse Bias Characteristics of PN Junction Diode.

Experiment: 2. Zener diode characteristics and Zener as voltage Regulator.

Experiment: 3. Input & Output Characteristics of Transistor in CB Configuration.

Experiment: 4. Input & Output Characteristics of Transistor in CE Configuration.

Experiment: 5. Half Wave Rectifier with & without filters

Experiment: 6. Full Wave Rectifier with & without filters

Experiment: 7. FET characteristics

Experiment: 8. Measurement of h parameters of transistor in CB, CE, CC configurations

Experiment: 9. Frequency Response of CC Amplifier.

Experiment: 10. Frequency Response of CE Amplifier.

Experiment: 11. Frequency Response of Common Source FET amplifier

Experiment: 12. SCR characteristics.

Experiment: 13. UJT Characteristics

Equipment required for Laboratories:

1.	Regulated Power supplies (RPS)	-	0-30 V
2.	CRO's	-	0-20 MHz.
3.	Function Generators	-	0-1 MHz.
4.	Multimeters		
5.	Decade Resistance Boxes.		
6.	Decade Capacitance Boxes		
7.	Ammeters (Analog or Digital)	-0-20 µA, 0-50µA, 0-100µA, 0-200µA, 0-10 mA.	
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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B. Tech. ECE	**L**	**T-P-D**	**C**
II Year - I Semester	**0**	**0-3-0**	**2**

ELECTRICAL CIRCUITS LAB

PART-A ELECTRICAL CIRCUITS

Experiment: 1. Verification of KVL and KCL

Experiment: 2. Verification of Thevenin's and Norton's Theorems

Experiment: 3. Verification of maximum power transfer theorem. Verification on DC, and AC Excitation with Resistive and Reactive loads

Experiment: 4. Verification of Superposition theorem and RMS value of complex wave 93

Experiment: 5. Verification of Compensation Theorem

Experiment: 6. Verification of Reciprocity , Millmann's Theorems

Experiment: 7. Locus Diagrams of RL and RC Series Circuits

Experiment: 8. Serial and Parallel Resonance – Timing, Resonant frequency, Bandwidth and Q-factor determination for RLC network

Experiment: 9. Determination of Self, Mutual Inductances and Coefficient of coupling

PART-B : SIMULATION

Experiment: 10. Simulation of DC Circuits (KVL,KCL)

Experiment: 11. Mesh Analysis

Experiment: 12 Nodal Analysis

NOTE:

- Pspice Software package is necessary.

- Eight experiments are to be conducted from part-A and any two from part-B.

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B. Tech. ECE	**L**	**T-P-D**	**C**
II Year - II Semester	**4**	**1-0-0**	**4**

ELECTRONIC CIRCUIT ANALYSIS

(Common to ECE,ECM)

Unit – I: Single Stage Amplifiers

Classification of Amplifiers – Distortion in Amplifiers, Analysis of CE, CC, and CB Configurations with simplified Hybrid Model, Analysis of CE amplifier with Emitter Resistance and Emitter follower, Miller's Theorem and its dual, Design of Single Stage RC Coupled Amplifier using BJT.

Multi Stage Amplifiers: Analysis of Cascaded RC Coupled BJT amplifiers, Cascode Amplifier, Darlington Pair, Different Coupling Schemes used in Amplifiers - RC Coupling , Transformer Coupling , Direct Coupling .

Unit – II: BJT Amplifiers - Frequency Response

Logarithms, Decibels, General frequency considerations, Frequency response of BJT Amplifier, Analysis at Low and High frequencies, Effect of coupling and bypass Capacitors, The Hybrid- pi (π) - Common Emitter Transistor Model, CE Short Circuit Current Gain, Current Gain with Resistive Load, Single Stage CE Transistor Amplifier Response, Gain-Bandwidth Product, Emitter follower at higher frequencies.

Unit –III : MOS Amplifiers [3]

Basic concepts, MOS Small signal model, Common source amplifier with Resistive load, Diode connected Load and Current Source Load, Source follower, Common Gate stage Cascode and Folded Cascode Amplifier and their Frequency response.

Unit – IV: Feedback Amplifiers

Concepts of Feedback, Classification of Feedback Amplifiers, General characteristics of Negative Feedback Amplifiers, Effect of Feedback on Amplifier Characteristics, Voltage Series, Voltage Shunt, Current Series and Current Shunt Feedback Configurations, Illustrative Problems.

Oscillators: Classification of Oscillators, Conditions for Oscillations, RC Phase Shift Oscillator, Generalized analysis of LC oscillators - Hartley, and Colpitts Oscillators, Wien-

Bridge & Crystal Oscillators, Stability of Oscillators.

Unit – V : Large Signal & Tuned Amplifier

Classification, Class A Large Signal Amplifiers, Transformer Coupled Class A Audio Power Amplifier, Efficiency of Class A Amplifier, Class B Amplifier, Efficiency of Class B Amplifier, Class-B Push-Pull Amplifier, Complementary Symmetry Class B Push-Pull Amplifier, Distortion in Power Amplifiers, Thermal Stability and Heat Sinks.

Tuned Amplifiers: Introduction, Q-Factor, Small Signal Tuned Amplifiers, Effect of Cascading Single Tuned Amplifiers on Bandwidth, Effect of Cascading Double Tuned Amplifiers on Bandwidth, Stagger Tuned Amplifiers, Stability of Tuned Amplifiers.

TEXT BOOKS:

1. Integrated Electronics - Jacob Millman and Christos C Halkias, 1991 ed., 2008, TMH.
2. Electronic Devices and Circuits - S. Salivahanan, N.Suresh Kumar, A Vallavaraj, 2 ed., 2009, TMH.

REFERENCES:

1. Electronic Devices and Circuit Theory - Robert L.Boylestad, Louis Nashelsky, 9 ed., 2008 PE.
2. Electronic Circuit Analysis – K. Lal Kishore, 2004, BSP.
3. Electronic Devices and Circuits, David A. Bell – 5 ed., Oxford University Press.

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B. Tech. ECE	**L**	**T-P-D**	**C**
II Year - II Semester	**4**	**0-0-0**	**4**

PULSE AND DIGITAL CIRCUITS

Unit-I

Linear Wave Shaping : High pass and low pass RC circuits and their response for Sinusoidal, Step, Pulse, Square, & Ramp inputs, High pass RC network as Differentiator, Low pass RC circuit as an Integrator, Attenuators and its application as a CRO Probe, RL and RLC Circuits and their response for Step Input, Ringing Circuit.

Non-Linear Wave Shaping: Diode clippers, Transistor clippers, Clipping at two independent levels, Clamping Operation, Clamping circuit taking Source and Diode resistances into account, Clamping Circuit Theorem, Practical Clamping Circuits, Effect of diode characteristics on clamping voltage.

Unit-II

Switching Characteristics of Devices : Diode as a Switch, Piecewise Linear Diode Characteristics, Diode Switching times, Transistor as a Switch, Break down voltages, Transistor in Saturation, Transistor-switching times. **Multivibrators**: Analysis and Design of Bitable, Monostable, Astable Multivibrators and Schmitt trigger using Transistors.

Unit-III

Time Base Generators : General features of a Time base Signal, Methods of Generating Time Base Waveform, Miller and Bootstrap Time base Generators-Basic Principles, Transistor Miller Time Base generator, UJT as relaxation oscillator, Transistor Bootstrap Time Base Generator, Transistor Current Time Base Generators, Methods of Linearity improvement.

Unit-IV

Synchronization and Frequency Division: Pulse Synchronization of Relaxation Devices, Frequency division in Sweep Circuit, Stability of Relaxation Devices, Astable Relaxation Circuits, Monostable Relaxation Circuits, Synchronization of a Sweep Circuit with Symmetrical Signals, Sine wave frequency division with a Sweep Circuit, A Sinusoidal Divider using Regeneration and Modulation.

Unit-V

Sampling Gates: Basic operating principles of Sampling Gates, Unidirectional and Bi-directional Sampling Gates, Four Diode Sampling Gate, Reduction of pedestal in Gate Circuits, Six Diode Gate, Application of Sampling Gates.

Realization of Logic Gates Using Diodes & Transistors: AND, OR and NOT Gates using Diodes and Transistors, DCTL, RTL, DTL, TTL and CML Logic Families and its Comparison.

Text Books:

1. Millman's Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S. Prakash Rao, 2 ed., 2008, TMH.
2. Solid State Pulse circuits –David A. Bell, 4 ed., 2002 PHI.

References Books:

1. Pulse and Digital Circuits – A. Anand Kumar, 2005, PHI.
2. Fundamentals of Pulse and Digital Circuits- Ronald J. Tocci, 3 ed., 2008.

3. Pulse and Digital Circuits – Motheki S. Prakash Rao, 2006, TMH.

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II Year - II Semester	**4**	**0-0-0**	**4**

PRINCIPLES OF ELECTRICAL ENGINEERING

Unit – I – **Transient Analysis** (First and Second Order Circuits) Transient Response of RL , RC Series, RLC Circuits for DC excitations, Initial Conditions, Solution using Differential Equations approach and Laplace Transform Method.

Unit – II – **Two Port Networks** Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, Conversion of one Parameter to another, Conditions for Reciprocity and Symmetry, Interconnection of Two Port networks in Series, Parallel and Cascaded configurations, Image Parameters, Illustrative problems.

Unit – III – **Filters** Classification of Filters, Filter Networks, Classification of Pass band and Stop band, Characteristic Impedance in the Pass and Stop Bands, Constant-k Low Pass Filter, High Pass Filter, m-derived T-Section, Band Pass filter and Band Elimination filter, Illustrative Problems.

Symmetrical Attenuators Symmetrical Attenuators – T-Type Attenuator, π–Type Attenuator, Bridged T type Attenuator, Lattice Attenuator.

Unit –IV – **DC Machines** Principle of Operation of DC Machines, EMF equation, Types of Generators, Magnetization and Load Characteristics of DC Generators.

DC Motors DC Motors, Types of DC Motors, Characteristics of DC Motors, Losses and Efficiency, Swinburne‘s Test, Speed Control of DC Shunt Motor, Flux and Armature Voltage control methods.

Unit –V –**AC Machines** Principle of Operation of Single Phase transformer, Types, Constructional Features, Phasor Diagram on No Load and Load, Equivalent Circuit, Losses and Efficiency of Transformer and Regulation, OC and SC Tests , Predetermination of Efficiency and Regulation ,Load test on 1 phase transformer, determination of efficiency(Simple Problems).

Single Phase Induction Motors Principle of Operation, Shaded Pole motors, Capacitor motors, AC Servomotor, AC Tachometers, Synchros, Stepper Motors, Characteristics.

Text Books :

1. Fundamentals of Electric Circuits – Charles K. Alexander, Mathew N. O. Sadiku, 3 ed.,

2008,TMH.

2. Network Analysis – A Sudhakar ,Shyammohan S.Palli, 3 ed., 2009, TMH. 3. Introduction to Electrical Engineering – M.S.Naidu and S. Kamakshaiah, 2008, TMH.

Reference Books :

1. Networks, Lines and Fields – John.D.Ryder, 2 ed.,, 2008 (Reprint), PHI.

2. Engineering Circuit Analysis - W.H.Hayt and J. E Kemmerly and S.M.Durbin, 6 ed., 2008, TMH.

3. Network analysis and Synthesis – C L Wadhwa, 3 ed., 2007, New Age International Publishers.

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B.Tech. ECE	**L**	**T-P-D**	**C**
II Year - II Semester	**3**	**1-0-0**	**3**

SWITCHING THEORY AND LOGIC DESIGN

UNIT I: Number Systems & Codes

Philosophy of Number Systems, Complement Representation of Negative Numbers, Binary Arithmetic, Binary Codes, Error Detecting & Error Correcting Codes, Hamming codes.

UNIT II: Boolean Algebra and Switching Functions

Fundamental Postulates of Boolean Algebra, Basic theorems and Properties, Switching Functions, Canonical and Standard forms, Algebraic simplification Digital Logic Gates, Properties of XOR gates, Universal Gates, Multilevel NAND/NOR Realizations.

Minimization of Switching Functions: Map method, Prime implicants, Don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime –Implicant chart, Simplification rules.

UNIT III: Combinational Logic Design

Design using conventional logic gates, Encoder, Decoder, Multiplexer, De-Multiplexer, Modular design using IC chips, MUX Realization of switching functions Parity bit generator, Code-converters, Hazards and Hazard free Realizations.

Programmable Logic Devices & Threshold Logic: Basic PLD's-ROM, PROM, PLA, PAL, Realization of Switching functions using PLD's, Capabilities and Limitations of Threshold gate, Synthesis of Threshold functions, Multigate Synthesis.

UNIT IV: Sequential Circuits - I

Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples), Basic Flip-Flops, Triggering and Excitation tables, Steps in Synchronous Sequential Circuit Design, Design of modulo-N Ring & Shift counters, Serial binary adder, Sequence detector.

Sequential Circuits - II : Finite State Machine-Capabilities and Limitations, Mealy and Moore models, Minimization of Completely Specified and Incompletely Specified Sequential Machines, Partition Techniques and Merger chart methods, Concept of Minimal cover table.

UNIT V: Algorithmic State Machines

Salient features of the ASM chart, Simple examples, System design using data path and control subsystems, Control implementations, Examples of Weighing Machine and Binary multiplier.

TEXTBOOKS :

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

REFERENCES BOOKS:

1. Switching Theory and Logic Design – A. Anand Kumar, 2008, PHI.
2. An Engineering Approach to Digital Design – Fletcher, PHI.
3. Fundamentals of Logic Design – Charles H. Roth, 5 ed., 2004, Thomson Publications.

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B.Tech. ECE	**L**	**T-P-D**	**C**
II Year - II Semester	**3**	**1-0-0**	**3**

ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

UNIT I

Electrostatics – I : Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Illustrative Problems. Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation. Poisson's and Laplace equations, parallel plate capacitance

UNIT II

Magnetostatics: Biot-Savart's Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy, Illustrative Problems.

UNIT III

Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer emf, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements, Conditions at a Boundary Surface : Dielectric-Dielectric and Dielectric-Conductor Interfaces, Illustrative Problems .

UNIT I V

EM Wave Characteristics : Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H, , Wave Propagation in Lossless and Conducting Media, Conductors & Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics ,polarization , Poynting Vector and Poynting Theorem , Illustrative Problems.

UNIT V

Transmission Line : Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Losslessness/Low Loss Characterization, Distortion –

Condition for Distortionlessness and Minimum Attenuation, Loading - Types of Loading, Illustrative Problems.

Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR,UHF Lines as Circuit Elements : $\lambda/4$, $\lambda/2$, $\lambda/8$ Lines – Impedance Transformations, Significance of Z_{min} and Z_{max} Smith Chart – Configuration and Applications, Single and Double Stub Matching, Illustrative Problems.

TEXT BOOKS :

1. Elements of Electromagnetics – Matthew N.O. Sadiku, 4 ed., 2008, Oxford Univ.Press.

2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, 2 ed., 2000, PHI.

REFERENCES Books:

1. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan, 2001, (Tech. India Publications), New Delhi.

2. Engineering Electromagnetics – Nathan Ida, 2 ed., 2005, Springer (India) Pvt. Ltd., New Delhi.

3. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, 7 ed., 2006, TMH.

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B.Tech. ECE	**L**	**T-P-D**	**C**
II Year - II Semester	**0**	**0-3-0**	**2**

ELECTRONIC CIRCUIT ANALYSIS LAB

(Common to ECE,ECM)

List of Experiments (12 experiments to be done) :

I) Design and Simulation in Simulation Laboratory using any Simulation Software.

(Any 6 Experiments):

Experiment 1. Common Emitter Amplifier

Experiment 2. Common Source Amplifier

Experiment 3. Two Stage RC Coupled Amplifier

Experiment 4. Current shunt and Voltage Series Feedback Amplifier

Experiment 5. Cascade Amplifier

Experiment 6. Wien Bridge Oscillator using Transistors

Experiment 7. RC Phase Shift Oscillator using Transistors

Experiment 8. Class A Power Amplifier (Transformer less)

Experiment 9. Class B Complementary Symmetry Amplifier

Experiment 10. Common Base (BJT) / Common Gate (JFET) Amplifier.

II) Testing in the Hardware Laboratory (6 Experiments)

A) Any Three circuits simulated in Simulation laboratory

B) Any Three of the following

Experiment 11. Class A Power Amplifier (with transformer load)

Experiment 12. Class C Power Amplifier

Experiment 13. Single Tuned Voltage Amplifier

Experiment 14. Hartley & Colpitt's Oscillators

Experiment 15. Darlington Pair

Experiment 16. MOS Amplifier

Equipments required for Laboratories:

1. For software simulation of Electronic circuits
    i) Computer Systems with latest specifications
    ii) Connected in LAN (Optional)
    iii) Operating system (Windows XP)
    iv) Suitable Simulations software

2. For Hardware simulations of Electronic Circuits
    i) Regulated Power Supply (0-30V)
    ii) CRO's
    iii) Functions Generators
    iv) Multimeters
    v) Components

3. Win XP/ Linux etc.

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B. Tech. ECE	**L**	**T-P-D**	**C**
II Year - II Semester	**0**	**0-3-0**	**2**

PULSE AND DIGITAL CIRCUITS LAB

Minimum Twelve experiments to be conducted:

Experiment: 1. Linear wave shaping.

Experiment: 2. Non Linear wave shaping – Clippers.

Experiment: 3. Non Linear wave shaping – Clampers.

Experiment: 4. Transistor as a switch.

Experiment: 5. Study of Logic Gates & some applications.

Experiment: 6. Study of Flip-Flops & some applications.

Experiment: 7. Sampling Gates.

Experiment: 8. Astable Multivibrator

Experiment: 9. Monostable Multivibrator

Experiment: 10. Bistable Multivibrator

Experiment: 11. Schmitt Trigger.

Experiment: 12. UJT Relaxation Oscillator.

Experiment: 13. Bootstrap Sweep Circuit.

Equipment required for Laboratories:

1. Regulated Power Supply - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. Components
5. Multi Meters

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II Year - II Semester	**0**	**0-3-0**	**2**

PRINCIPLES OF ELECTRICAL ENGINEERING LAB

The following experiments are required to be conducted compulsory experiments:

Experiment: 1.Time response of first order RC/RL network for periodic non-sinusoidal inputs – time constant and steady state error determination.
Experiment: 2.Two port network parameters – Z-Y Parameters, chain matrix and analytical verification.
Experiment:3.Two port network parameters – ABCD and h- Parameters
Experiment: 4. Constant – k Low Pass Filter and High Pass Filter – Design and Test.
Experiment: 5. Magnetization characteristics of DC shunt generator. Determination of critical field resistance and critical speed.
Experiment: 6. Load test on DC shunt generator. Determination of characteristics.
Experiment: 7. Brake test on DC shunt motor. Determination of performance curves.
Experiment: 8. Swinburne's test and speed control of DC shunt motor. Predetermination of efficiencies.
Experiment: 9. O.C. & S.C. Tests on Single phase Transformer
In addition to the above nine experiments, atleast any one of the experiments from the following list are required to be conducted:
Experiment:10.Measurement of Reactive Power for Star and Delta connected balanced loads
Experiment: 11.Load test on DC compound generator. Determination of characteristics.
Experiment:12.Load Test on Single phase Transformer

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UGC AUTONOMOUS

B. Tech. IT	**L**	**T-P-D**	**C**
II Year - II Semester	**0**	**0-3-0**	**2**

GENDER SENSITIZATION

(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

UNIT - I: Gender: Why should we study it?,
Socialization: Making women, Making Men, Introduction, Preparing For Womanhood, Growing up male, First lessons in caste, Different masculinities.

UNIT - II: Housework : The Invisible Labour
"My mother does not work", "Share the load", Missing Women: Sex Selection and Its Consequences, Declining sex ratio, Demographic consequences, Point of view, Gender and the structure of knowledge, Further reading : Unacknowledged women artists of Telangana, Sexual Harassment: Say No! Sexual harassment, not eve-teasing, Coping with everyday harassment, Further reading. "Chupulu".

UNIT - III: Women's Work: Its Politics and Economics,
Fact and fiction, Unrecognized and unaccounted work, Further reading: Wages and conditions of work, Domestic Violence: Speaking Out, Is home a safe place? When women unite [Film], Rebuilding lives, Further reading: New forums for justice.

UNIT - IV: Whose History? Questions for Historians and Others,
Reclaiming a past, Writing other histories, further reading: Missing pages from modern Telangana history. Gender Spectrum: Beyond the Binary, Two or many?, Struggles with discrimination, Thinking about Sexual Violence, Blaming the victim, "I fought for my life…", Further reading: The caste face of violence.

UNIT - V: Just Relationships: Being Together as Equals, Mary kom and Onler, Love and acid just do not mix, Love letters, Mothers and fathers, Further Reading: Rosa Parks – The brave heart.

TEXT BOOKS:

1. Towards a world of equals by A.Suneetha Susic Tharu publication Telugu academy Hyderabad.

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III Year – I Semester	**3**	**1-0-0**	**3**

COMPUTER ORGANIZATION AND OPERATING SYSTEMS

UNIT-1: 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.

Register Transfer Language and Micro Operations: Register Transfer Language, Register Transfer Bus and Memory Transfers, Arithmetic Micro operations, Logic Micro Operations, Shift Micro operations, Arithmetic Logic shift unit, Instruction codes, and computer Registers computer instructions-instruction cycle.

UNIT-II: Memory-Reference instructions: input-output and interrupt, STACK Organization, instruction formats, addressing modes, DATA transfer and manipulation, program control, reduced instruction set computer.

UNIT-III: Micro programmed control: control memory, Address sequencing, micro program examples, design of control unit, hard wired control, micro programmed control.

The Memory System: Basic concepts of semiconductor RAM memories, read-only memories, cache memories performance considerations, virtual memories secondary storage, introduction to RAID.

UNIT-IV: Input-Output Organization: peripheral devices, input-output interface. Asynchronous data transfer modes, priority interrupt, direct memory access, input-output processor (IOP), Serial communication introduction to peripheral components, interconnect (PCI) Bus, introduction to standard serial communication protocols like RS232,USB, IEEE1394.

UNIT-V: Operating system overview: overview of computer operating systems functions, protection and security, Distributed systems, special purpose systems, operating systems structures operating system services and systems calls, system programs, operating systems generation.

Memory Management: Swapping, contiguous Memory allocation, paging, structure of the page table, segmentation , virtual memory, demand paging, page-Replacement algorithms, allocation of frames, thrashing case studies –UNIX, Linux, windows.

TEXT BOOKS:

1. Computer organization-carl Hamacher, Zvonks Vranesic, safeaZaky, 5th Edition, McGraw Hill.

2.computer systems Architecture-M Moris Mano,3rd Edition, pearson

REFERENCE BOOKS:

1. Computer organization and Architecture –William stallings 6th Edition, Pearson.

2. Structured computer organization-Andrew S.Tanenbaum, 4th Edition PHI.

3. Fundamental of computer organization and design-Sivaraama Dandamudi springer int.Edition..

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III Year – I Semester	**3**	**0-0-0**	**3**

MAT LAB PROGRAMMING

(Open Elective)

UNIT-1: MATLAB basics, The MATLAB environment, Basic computer programming, variable3s and constants, operators and simple calculations, Formulas and functions, MATLAB toolboxes, Exercises, Exercises

UNIT-II. Mat ricers and vectors, Matrix and linear algebra review, vectors and matrices in MATLAB, Matrix operations and function in MATLAB, Exercises**.**

UNIT-III: Computer programming, Algorithms and structures, MATLAB scripts and functions (m-files), simple sequential algorithms, control structures (if…then, loop), Exercises.

UNIT-IV: MATLAB programming, Reading and writing data, file handling, Reading and writing data, file handling, personalized functions, Toolbox structure, MATLAB graphic functions, Exercises.

UNIT-V: Numerical simulations-Numerical methods and simulations, Random number generation, Montecarlo methods (Wikipedia article on Monte_Carlo_method and MATLAB help (statistics Toolbox, User's Guide: Random Number and Generation Functions).

Hands-on session

Interactive hands-on-session where the whole class will develop one or more MATLA B scripts that solve an assigned problem

TEXT BOOK :

1. **MATLAB PROGRAMMING** by **Y.KIRANI SINGH, B.B CHOWDARI** , PHI publications 2007 edition
2. **MATLAB AND ITS APPLICATIONS IN ENGINEERING** by **RAJKUMAR BANSAL , ASHOK KUMAR GOEL, MANOJ KUMAR SHARMA** , PEARSON EDUCATION PUBLICATIONS , version 7.5

REFERENCE BOOKS:

1. **GETTING STARTED WITH MATLAB by RUDRAPRATAP, OXFORD PUBLICATION**. 2002 EDITION

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B. Tech. ECE	**L**	**T-P-D**	**C**
III Year – I Semester	**3**	0-0-0	**3**

OBJECT ORIENTED PROGRAMMING WITH C++

(Open Elective)

UNIT-1: Different paradigms for problem solving, need for OOP paradigm, classes and instances, fundamental characteristics of OOP(Alan key), differences between OOP and procedure Oriented Programming.

UNIT-II: C++ Basics: Structure of a C++ program, Data type, Declaration of variables, Expressions, Operators, Operator precedence, Evaluation of expressions, Type conversions, pointers, Arrays, Pointers and Arrays, Strings, Structures, References. Flow control statements-if, switch, while, for , do, break, continue, go to statements.

UNIT-III: C++ Functions-scope of variables, Parameter passing methods, Default arguments, inline functions, Recursive functions, pointers to functions. C++ Classes And Data Abstraction: Class definition, Class objects, Class scope, this pointer, Friends to a class, static class members, constant member functions, constructors and Destructors, Data abstraction. Dynamic memory allocation and deallocation operators new and delete, Dynamic Creation and destruction of objects, preprocessor directives, name space polymorphism: Function overloading operator overloading.

UNIT-IV: Inheritance: Defining a class hierarchy, Different forms of inheritance, Defining the Base and Derived classes. Access to the bade class members, Base and Derived class construction, Destructors, Virtual base class.

UNIT-V: C++ I/O:I/O using C functions, C++ Stream classes hierarchy, Stream I/O, File streams and string streams, File operations, Overloading << and >> operators, Error handling during file operations, Formatted I/O Exception Handling: Benefits of exception handling. Throwing an exception, The try block, Catching an exception, Exception objects, Exception specifications, Stack unwinding. Rethrowing an exception, catching all exceptions.

Text books:

1. Object Oriented programming in C++, 4th Edition , R Lafore , SAMS, Pearson Education.

2. An Introduction to OOP, 3rd Edition, T. Budd, Pearson Education, 2008.

REFERENCE BOOKS:

1. C++, The Complete Reference, 4th Edition, Herbert Schildt,TMH.

2. Programming principles and practice using C++, B.Stroutstrup, Addison-Wesley, Pearson Education

3. Problem solving with C++ , 6th Edition, Walter Savitch, Pearson Education, 2007.

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III Year – I Semester	**3**	**0-0-0**	**3**

GLOBAL POSITIONING SYSTEMS

(Open Elective)

Unit I: Introduction to Global Navigation Satellite Systems (GNSSs): The History of GPS. The Evolution of GPS, Development of NAVSTAR GPS, Block I, Block II satellites, Block IIA, Block IIR and Block II R-M satellites.

Unit II: GPS working principle, Trilateration, Determination of where the satellites are, Determination of how far the satellites are, Determining the receiver position in 2D or X-Y Plane, Determining the receiver position in 3D or X-Y-Z Plane.

Unit III: Other Global Navigation Satellite Systems, GLONASS, GALILEO. Comparison of 3 GNSS (GPS, GALILEO, and GLONASS) interns of constellation and services provided.

Unit IV: GPS Satellite constellation and signals GPS system segments, Space segment, Control segment, User segment, GPS Signals, Pseudorandom noise (PRN) code, C/A code, P code Navigation and services provided.

Unit V: Coordinate systems: Geoid Ellipsoid, Coordinate systems, Geodetic and Geo centric coordinate systems, ECEF coordinates, Datums, world geodetic 1984 (WGS84). Conversion between Cartesian and geodetic coordinate frame.

Textbook :

1. G S RAO, **Global Navigation Satellite Systems,** McGraw-Hill Publications, New Delhi, 2010.
2. Scott Gleason and Demoz Gebre-Egziabher, GNSS Applications and Methods, Artech House, 685 Canton Street, Norwood, MA 02062, 2009.

Reference Books:

1. James Ba – Yen Tsui, 'Fundamentals of GPS receivers – A software approach', John Wiley & Sons (2001).
2. GPS Principles and applications By Sathesh gopi Tata Mcgraw Hill.
3. Global Navigation Satellite System By B.Bhatta ,BS- Publication.

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III Year – I Semester	**4**	**0-0-0**	**4**

IC APPLICATIONS

(Common to ECE, EEE)

UNIT I: INTEGRATED CIRCUITS

Classification, Chip Size and Circuit Complexity, Ideal and Practical Op-Amp, Op-amp characteristics-DC and AC Characteristics, 741 Op-Amp and its Features, Concept of Virtual Ground ,Modes of operation-inverting, non-inverting, differential.

UNIT II: OP-AMP APPLICATIONS

Basic Applications of Op-Amp, Instrumentation Amplifier, AC Amplifier, V to I and I to V Converters, Sample & Hold Circuits, Differentiators and Integrators, Comparators, Schmitt Trigger, Multivibrators,

UNIT III: ACTIVE FILTERS & OSCILLATORS

Introduction, First Order and Second Order Low Pass, High Pass and Band Pass Filters, Active Band Reject and All Pass Filters.

Principle of Operation and Types of Oscillators – RC, Wien Bridge and quadrature type. Waveform Generators – Triangular, Saw Tooth, Square Wave.

UNIT IV: TIMERS & PHASE LOCKED LOOPS

Introduction to 555 Timer, Functional Diagram, Monostable and Astable Operations and Applications, Schmitt Trigger, PLL - Introduction, Block Schematic, Principles and Description of Individual Blocks of 565, VCO. Introduction to Voltage Regulators, Features of 723 Regulator.

UNIT V: D-A AND A- D CONVERTERS

Introduction, Basic DAC Techniques - Weighted Resistor Type, R-2R Ladder Type, Inverted R-2R Type. Different types of ADCs – Parallel Comparator Type, Counter Type, Successive Approximation Register Type and Dual Slope Type. DAC and ADC Specifications.

TEXT BOOKS:

1. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd, 3rd Ed., 2008.

2. Op-Amps & Linear ICs – Ramakanth A. Gayakwad, PHI, 1987.

REFERENCES:

1. Modern Digital Electronics – RP Jain – 4/e – TMH, 2010.
2. Op-Amps and Linear Integrated Circuits – Concepts and Applications by James M.Fiore, Cengage/ Jaico, 2/e, 2009.
3. Operational Amplifiers and Liner Integrated Circuits by K.Lal Kishore – Pearson, 2008.

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MICROPROCESSORS AND MICROCONTROLLERS

UNIT-I: 8086 Architecture: 8086 Architecture-Functional diagram, Register organization, memory segmentation, programming model, memory addresses, physical memory organization, architecture of 8086, signal descriptions of 8086-common function signals, Timing diagrams, interrupts of 8086.

UNIT-II: Instruction set and assembly language programming of 8086: instruction formats, addressing modes, instruction set, assembler directives, macros, simple programs involving logical, branch and call instructions, sorting, evaluating arithmetic expressions, string manipulations.

UNIT-III: I/O Interface: 8255 PPI, Various modes of operation and interfacing to 8086, interfacing keyboard, Display, D/A and A/D converter.
Interfacing with advanced devices: memory interfacing to 8086, interrupt structure of 8086, vector interrupt table, interrupt service routine.
Communication interface: serial communication standards, serial data transfer schemes, 8251 USART architecture and interfacing.

UNIT-IV: Introduction to Microcontrollers: overview of 8051 microcontroller, architecture, I/O ports, memory organization, addressing modes and instruction set of 805, simple programs.

UNIT-V: 8051 Real Time control: programming time interrupts, programming external hardware interrupts, programming the serial communication interrupts, programming 8051 Timers and counters.

TEXT BOOKS:

1. D.V.Hall, Microprocessors and interfacing, TMGH,2nd Edition 2006.
2. Kenneth.J.Ayala, The 8051 Microcontroler, 3rd Ed., Cengage Learning.

REFERENCE BOOKS:

1. Advanced Microprocessors and peripherals-A.K.Ray and K.M Bhurchandani, TMH,2 nd Edition 2006.
2. The 8051 Microcontrollers. Architecture and programming and applications- K.Uma Rao, Andhe Pallavi, Pearson, 2009.
3. Micro computer system 8086/8088 family architecture. Programming and design-Du and GA Gibson, PHI 2nd Edition.

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B. Tech. ECE	**L**	**T-P-D**	**C**
III Year – I Semester	**3**	**1-0-0**	**3**

CONTROL SYSTEMS

UNIT – I INTRODUCTION

Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems-Classification of control systems, Feed-Back Characteristics, Effects of feedback.

Mathematical models – Differential equations, Impulse Response and transfer functions - Translational and Rotational mechanical systems

UNIT II: TRANSFER FUNCTION REPRESENTATION

Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using Mason‘s gain formula.

TIME RESPONSE ANALYSIS

Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.

UNIT III: STABILITY ANALYSIS IN S-DOMAIN

The concept of stability – Routh‘s stability criterion – qualitative stability and conditional stability – limitations of Routh‘s stability

Root Locus Technique:

The root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT-IV: **FREQUENCY RESPONSE ANALYSIS AND STABILITY ANALYSIS IN**

FREQUENCY DOMAIN

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots, Polar Plots-Nyquist Plots-Stability Analysis.

UNIT – V CLASSICAL CONTROL DESIGN TECHNIQUES AND STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS

Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain, PID Controllers.

Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it‘s Properties – Concepts of Controllability and Observability

TEXT BOOKS:

1. Automatic Control Systems 7th edition– by B. C. Kuo 2009– PHI/Jhon wiley 8ed
2. Control Systems Engineering by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.

REFERENCES BOOKS:

1. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.
2. Control Systems by Anand Kumar,PHI 2008.
3. Control Systems Engg. by NISE 5th Edition – John wiley

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B. Tech. ECE	**L**	**T-P-D**	**C**
III Year – I Semester	**4**	**1-0-0**	**4**

ANALOG COMMUNICATIONS

UNIT-I: Introduction to communication system, Need for modulation, Amplitude Modulation, Definition, Time domain and frequency domain description, power relations in AM waves, Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves; Square law detector, Envelope detector.

DSB MODULATION: Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Ring Modulator, Coherent detection of DSB-SC Modulated waves, COSTAS Loop.

UNIT-II: **SSB MODULATION:** Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves, Vestigial side band modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave pulse Carrier, Comparison of AM Techniques, Applications of different AM Systems.

UNIT-III: ANGLEMODULATION: Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Comparison of FM & AM. Generation of FM Waves: Direct Method: Parametric Variation Method: Varactor Diode, Reactance Modulator, indirect Method: Armstrong Method, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Foster Seeley Discriminator, Ratio detector,

UNIT-IV: TRANSMITTERS and RECEIVERS: Radio Transmitters-Classification of Transmitters, AM transmitter block diagram and explanation of each block. FM transmitter block diagram and explanation of each block.
Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.

UNIT-V: NOISE : Noise in Analog communication System, Noise in DSB& SSB System, Noise in AM System, Noise in Angle Modulation System, Threshold effect in Angle Modulation System, Pre-emphasis & de-emphasis

PULSE MODULATION: Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation & demodulation of PWM, PPM, Generation and demodulation of PPM

TEXTBOOKS:

1. Communication Systems - Simon Haykin, 2 Ed, Wiley Publications.
2. Communication Systems – B.P. Lathi, BS Publication, 2004.

REFERENCES BOOKS:

1. Electronic Communication Systems - Modulation and Transmission - Robert J. Schoenbeck, 2nd Edition, PHI.
2. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.
3. Principles of Communication Systems - H Taub & D. Schilling, Gautam Sahe, TMH, 2007, 3rd Edition

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B. Tech. ECE	**L**	**T-P-D**	**C**
III Year – I Semester	**0**	0-3-0	**2**

IC APPLICATIONS LAB

List of Experiments:

Experiment: 1. Adder, Sub tractor, using IC 741 Op-Amp.

Experiment: 2. Inverting and Non Inverting Comparator using IC 741 Op-Amp.

Experiment: 3.Integrator and Differentiator using IC741 Op-Amp.

Experiment: 4.Active Low Pass & High Pass Butterworth (second Order).

Experiment: 5.Sample and Hold circuit using Op-Amp.

Experiment: 6.RC Phase Shift and Wien Bridge Oscillators using IC 741 Op-Amp.

Experiment: 7.Wave form generators using IC741.

Experiment: 8.IC 555 Timer in Monostable and Astable operation.

Experiment: 9.Schmitt trigger circuits using IC 741 & IC 555.

Experiment:10.IC 565 – PLL

Experiment: 11.Voltage regulator IC 723, three terminal voltage regulators- 7805, 7809, 7912.

Experiment: 12.A/D and D/A converters.

EQUIPMENT REQUIRED:

1. 20 MHz/ 40 MHz/60 MHz Oscilloscope.
2. 1 MHz Function Generator (Sine, Square, Triangular and TTL) .
3. Regulated Power Supply.
4. Multimeter / Volt Meter.

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III Year – I Semester	**0**	0-3-0	**2**

MICROPROCESSORS AND MICROCONTROLLERS LAB

List of Experiments:

The Following programs/experiments are to be written for assembler and execute the same with 8086 and 8051 kits.

Experiment: 1.Programs for 16 bit arithmetic operations for 8086 (using Various Addressing Modes).
Experiment: 2.Program for sorting an array for 8086.
Experiment: 3.Program for searching for a number or character in a string for 8086.
Experiment: 4.Program for string manipulations for 8086.
Experiment: 5.Program for digital clock design using 8086.
Experiment: 6.Interfacing ADC and DAC to 8086.
Experiment: 7.Parallel communication between two microprocessors using 8255.
Experiment: 8.Serial communication between two microprocessor kits using 8251.
Experiment: 9.Interfacing to 8086 and programming to control stepper motor.
Experiment: 10.Programming using arithmetic, logical and bit manipulation instructions of 8051.
Experiment: 11Program and verify Timer/ Counter in 8051.
Experiment: 12.Program and verify Interrupt handling in 8051
Experiment: 13.UART Operation in 8051.
Experiment: 14.Communication between 8051 kit and PC.
Experiment: 15.Interfacing LCD to 8051.
Experiment: 16.Interfacing Matrix/ Keyboard to 8051.
Experiment: 17.Data Transfer from Peripheral to Memory through DMA controller 8237 / 8257.

Note: - Minimum of 12 experiments to be conducted.

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ANALOG COMMUNICATIONS LAB

All these experiments are to be simulated first either using MATLAB, SCILAB or any other simulation package and then to be realized in hardware

Experiment: 1.Amplitude modulation and demodulation
Experiment: 2.DSB-SC Modulator & demodulation
Experiment: 3.SSB-Sc Modulator & demodulation (Phase Shift Method)
Experiment: 4.Frequency modulation and demodulation.
Experiment:5.Study of spectrum analyzer and analysis of AM and FM Signals
Experiment: 6.Pre-emphasis & de-emphasis.
Experiment:7.Time Division Multiplexing & De multiplexing
Experiment: 8.Frequency Division Multiplexing & De multiplexing
Experiment: 9.Verification of Sampling Theorem
Experiment: 10.Pulse Amplitude Modulation & Demodulation
Experiment: 11.Pulse Width Modulation & Demodulation
Experiment:12.Pulse Position Modulation & Demodulation
Experiment: 13.Frequency Synthesizer.
Experiment: 14.AGC Characteristics.
Experiment: 15.PLL as FM Demodulator

Equipment required for Laboratories:

1. RPS - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. RF Generators - 0 – 1000 M Hz./0 – 100 M Hz.
5. Multimeters
6. Lab Experimental kits for Analog Communication
7. Components
8. Radio Receiver/TV Receiver Demo kits or Trainees.
9. Spectrum Analyzer - 60 M Hz.
10. Any one simulation package

Note: Minimum 12 experiments should be conducted:

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III Year – II Semester	**3**	**1-0-0**	**3**

ANTENNAS AND WAVE PROPAGATION

Unit I: Antenna Basics: Introduction, Basic Antenna Parameters – Patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain-Resolution, Antenna Apertures, Effective Height, Antenna Temperature, Front - to-back Ratio, Radiation Resistance , Illustrative Problems.

Thin Linear Wire Antennas – Radiation from Small Electric Dipole, Quarter Wave Monopole and Half Wave Dipole – Current Distributions, Field Components, Radiated Power, Radiation Resistance, Beam Width, Directivity, Effective Area and Effective Height , Far Fields and Patterns of Thin Linear Centre-fed Antennas of Different Lengths,

Unit II: Loop Antennas - Introduction, Small Loop, Comparison of Far Fields of Small Loop and Short Dipole, Radiation Resistances and Directivities of Small and Large Loops (Qualitative Treatment).

Antenna Arrays: Point Sources – Definition, Patterns**,** arrays of 2 Isotropic Sources - Different Cases, Principle of Pattern Multiplication, Uniform Linear Arrays – Broadside Arrays, Endfire Arrays, EFA with Increased Directivity, Derivation of their Characteristics and Comparison, BSAs with Non-uniform Amplitude Distributions – General Considerations and Binomial Arrays,.

Unit III: VHF, UHF and Microwave Antennas - I : Arrays with Parasitic Elements, Yagi-Uda Array, Folded Dipoles and their Characteristics, Helical Antennas – Helical Geometry, Helix Modes, Monofilar Helical Antenna in Axial and Normal Modes. Horn Antennas – Types, Fermat‘s Principle, Optimum Horns, Design Considerations of Pyramidal Horns,

VHF, UHF and Microwave Antennas - II: Microstrip Antennas – Introduction, Features, Advantages and Limitations, Rectangular Patch Antennas – Geometry and Parameters, Characteristics of Microstrip Antennas. Impact of Different Parameters on Characteristics, Reflector Antennas – Introduction, Flar Sheet and Corner Reflectors, Paraboloidal Reflectors – Geometry, Pattern Characteristics, Feed Methods, Reflector Types – Related Features

Unit IV: Reflector Antennas – Introduction, Flar Sheet and Corner Reflectors, Paraboloidal

Reflectors – Geometry, Pattern Characteristics, Feed Methods, Reflector Types – Related Features,.

Lens Antennas – Introduction, Geometry of Non-metallic Dielectric Lenses, Zoning, Tolerances, Applications.

Antenna Measurements: Introduction, Concepts - Reciprocity, Near and Far Fields, Coordinate System, Sources of Errors. Patterns to be Measured, Pattern Measurement Arrangement, Directivity Measurement, Gain Measurements (by Comparison, Absolute and 3-Antenna Methods)

Unit V: Wave Propagation – I: Introduction, Definitions, Classifications, Different Modes of Wave Propagation. Ground Wave Propagation ,Plane Earth Reflections, Space and Surface Waves, Wave Tilt, Curved Earth Reflections. Space Wave Propagation, Field Strength Variation with Distance and Height, Effect of Earth‘s Curvature, Absorption. Super Refraction, M-Curves and Duct Propagation, Scattering Phenomena, Troposphere Propagation, Fading and Path Loss Calculations.

Wave Propagation – II: Sky Wave Propagation Structure of Ionosphere, Refraction and Reflection of Sky Waves by Ionosphere, Ray Path, Critical Frequency, MUF, LUF, OF, Virtual Hight and Skip Distance, Relation between MUF and Skip Distance, Multi-hop Propagation, Energy Loss in Ionosphere

TEXT BOOKS:

1. Antennas and Wave Propagation – J.D. Kraus, R.J. Marhefka and Ahmad S. Khan, TMH, New Delhi, 4th ed., 2010.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd ed., 2000.

REFERENCES:

1. Antenna Theory - C.A. Balanis, John Wiley & Sons, 3rd ed., 2005.
2. Antennas and Wave Propagation – K.D. Prasad, Satya Prakashan, Tech India Publications, New Delhi, 2001.
3. Antennas –John D. Kraus, McGraw-Hill (International Edition), 2nd ed. 1988.

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III Year – II Semester	**4**	1-0-0	**4**

DIGITAL SIGNAL PROCESSING

Unit I:Z-Transforms

Discrete time signal representation using complex exponential and sinusoidal components, Periodicity of Discrete time signal using complex exponential signal, concept of Z-transform of a discrete sequence, region of convergence in ZT, constraints on ROC for various classes of signals, inverse Z-Transform, properties of ZT.

Introduction: Introduction to Digital Signal Processing: Discrete time signals & sequences, linear shift invariant systems, stability, and causality, linear constant coefficient difference equations, Frequency domain representation of discrete time signals and systems

Unit II : Discrete Fourier Series, Discrete Fourier Transforms & Fast Fourier Transforms

Discrete Fourier Series: DFS representation of Periodic Sequences, Properties of Discrete Fourier Series, Relation between DFT, DTFT and ZT

Discrete Fourier Transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT: Over-lap Add method, Over-lap Save method.

Fast Fourier Transforms: Fast Fourier transforms (FFT) - Radix-2 decimation-in-time and decimation-in-frequency FFT Algorithms, Inverse FFT

Unit III: IIR Digital Filters

Analog filter approximations – Butterworth and Chebyshev, Design of IIR Digital filters from analog filters, Step and Impulse invariant techniques, Bilinear transformation method, Spectral transformations.

Realization of IIR filters – Direct, Canonic, Cascade and Parallel forms

Unit IV: FIR Digital Filters

Characteristics of FIR Digital Filters, Frequency response, Design of FIR Filters: Fourier Method, Digital Filters using Window Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters

Realization of FIR Filters: Direct form, cascade realization and Linear phase Realization.

Unit V: Multirate Digital Signal Processing

Introduction, Down sampling, Decimation, Upsampling, interpolation, Sampling Rate

Conversion, conversion of band pass signals, Concept of resampling, Applications of multi rate signal processing

Finite Word Length Effects : Limit cycles, Overflow oscillations, Round-off noise in IIR digital filters, Computational output round off noise, Methods to prevent overflow, Tradeoff between round off and overflow noise, Measurement of coefficient quantization effects through pole-zero movement, Dead band effects.

TEXT BOOKS:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.
2. Digital Signal Processing-R.Ramesh Babu, SCITECH 5^{TH} Ed.

REFERENCE BOOKS:

1. Fundamentals of Digital Signal Processing using Matlab – Robert J. Schilling, Sandra L. Harris, Thomson, 2007
2. Digital Signal Processing – Trun Kumar Rawat, Oxford Publications, 2015
3. Discrete Time Signal Processing – A. V. Oppenheim and R.W. Schaffer, PHI, 2009

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MICROWAVE ENGINEERING

Unit I: Microwave Transmission Lines I & II

Microwave Transmission Lines – I: Introduction, Microwave Spectrum and Bands, Applications of Microwaves. Rectangular Waveguides – Solution of Wave Equations in Rectangular Coordinates, TE/TM mode analysis, Expressions for Fields, Characteristic Equation and Cut-off Frequencies, Filter Characteristics, Dominant and Degenerate Modes, Impossibility of TEM Mode ,Sketches of TE and TM mode fields in the cross-section, Mode Characteristics – Phase and Group Velocities, , Illustrative Problems.

Microwave Transmission Lines – II: Rectangular Guides - Cavity Resonators– Introduction, Rectangular Cavities, Dominant Modes and Resonant Frequencies, Q factor and Coupling Coefficients, Power Transmission and Power Losses, , Micro strip Lines– Introduction, Zo Relations, Effective Dielectric Constant, Losses, Q factor. Illustrative Problems

Unit II: Waveguide Components And Applications- I & II

Waveguide Components And Applications - I: Coupling Mechanisms – Probe, Loop, Aperture types. Waveguide Discontinuities – Waveguide Windows, Tuning Screws and Posts, Matched Loads. Waveguide Attenuators – Different Types, Resistive Card and Rotary Vane Attenuators; Waveguide Phase Shifters – Types, Dielectric and Rotary Vane Phase Shifters, Waveguide Multiport Junctions – E plane and H plane Tees, Magic Tee. Directional Couplers – 2 Hole, Bethe Hole types. Illustrative Problems.

Waveguide Components And Applications - II: Scattering Matrix– Significance, Formulation and Properties, S Matrix Calculations for – Two port Junctions, E plane and H plane Tees, Magic Tee, Circulator and Isolator Ferrites– Composition and Characteristics, Faraday Rotation; Ferrite Components – Gyrator, Isolator, Circulator. Scattering Matrix–. Illustrative Problems.

Unit III : Microwave Tubes – I

Limitations and Losses of conventional tubes at microwave frequencies. Microwave tubes – O type and M type classifications. O-type tubes : Two Cavity Klystrons – Structure, Reentrant Cavities, Velocity Modulation Process and Applegate Diagram, Bunching Process and Small Signal Theory – Expressions for o/p Power and Efficiency. Reflex Klystrons – Structure, Velocity Modulation and Applegate Diagram, Mathematical Theory of Bunching, Power Output, Efficiency,. Illustrative Problems.

Unit IV: M-Type Tubes

Introduction, Cross-field effects, Magnetrons – Different Types, Cylindrical Traveling Wave

Magnetron – Hull Cut-off and Hartree Conditions, Modes of Resonance and PI-Mode Operation, Separation of PI-Mode, o/p characteristics. Illustrative Problems.

Helix TWTs: Significance, Types and Characteristics of Slow Wave Structures; Structure of TWT and Amplification Process (qualitative treatment), Suppression of Oscillations, Gain Considerations.

Unit V: Microwave Solid State Devices

Introduction, Classification, Applications. TEDs – Introduction, Gunn Diodes – Principle, RWH Theory, Characteristics, Basic Modes of Operation - Gunn Oscillation Modes, LSA Mode, Introduction to Avalanche Transit Time Devices- Introduction, IMPATT and TRAPATT Diodes– Principle of Operation and Characteristics.

Microwave Measurements: Description of Microwave Bench – Different Blocks and their Features, Errors and Precautions; Microwave Power Measurement – Bolometers. Measurement of Attenuation, Frequency Standing Wave Measurements – Measurement of Low and High VSWR, Cavity Q. Impedance Measurements

TEXT BOOKS:

1. Microwave Devices and Circuits – Samuel Y. Liao, Pearson, 3rd Edition,2003.
2. Microwave Principles – Herbert J. Reich, J.G. Skalnik, P.F. Ordung and H.L. Krauss, CBS Publishers and Distributors, New Delhi, 2004.

REFERENCES BOOKS:

1. Foundations for Microwave Engineering – R.E. Collin, IEEE Press, John Wiley, 2nd Edition, 2002.

2. Microwave Circuits and Passive Devices – M.L. Sisodia and G.S.Raghuvanshi, Wiley Eastern Ltd., New Age International Publishers Ltd., 1995.
3. Microwave Engineering Passive Circuits – Peter A. Rizzi, PHI, 1999.

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UGC AUTONOMOUS

B. Tech. ECE	**L**	**T-P-D**	**C**
III Year – II Semester	**3**	**0-0-0**	**3**

Telecommunication Switching Systems and Networks
(Elective – I)

UNIT I: Switching Systems

Evolution of Telecommunications; Basics of a switching system, functions of a switching system, Strowger switching components, step by step switching, Design parameters;100 line switching system;1000 line Blocking Exchange; 10,000 Line exchange, Principle of Crossbar switching; Crossbar switch configurations; Crosspoint Technology, Crossbar Exchange organization; A general trunking; Electronic and digital switching systems.

Telecommunications Traffic: Introduction; Unit of traffic; congestion; Traffic measurement; A Mathematical model; Lost-call systems-Theory; Traffic performance; Loss systems in Tandem; Use of traffic tables; Queuing systems-the second Erlang distribution ; Probability of Delay; Finite Queue capacity; some other useful results; Systems with a single server; Queues in tandem; Delay tables; Applications of Delay formulae.

UNIT II: Switching Networks

Introduction, Single stage networks; Grading Principles; Two, Three and four stage networks.

Time Division switching: Basic time division space switching; basic time division time switching; Time multiplexed space switching; Time multiplexed time switching; Combination switching; Three stage Combination switching.

Control of switching systems: call processing functions-sequence of operations; signal exchanges; State transition diagrams; common control; Reliability; Availability and security ; Stored program control.

UNIT III: Signaling

Introduction; Customer Line signalling; Audio frequency Junctions and trunk circuits; FDM carrier systems-Out band signalling; Inland (VF) signalling; PCM signalling; Inter Register signalling; Common channel signalling principles- General signalling networks; CCITT signalling system number 6; CCITT signalling system number 7; High level data link control protocol; Signal units; The signalling information field.

UNIT IV: Packet Switching

Introduction; Statistical multiplexing; Local and wide Area networks-Bus networks, Ring networks, comparison of bus and Ring networks, Optical fibre Networks; Large scale networks-General; Datagrams and virtual circuits; Routing; Flow control; Standards; Frame relay; Broadband networks-General; Asynchronous Transfer mode; ATM switches.

UNIT V: Networks

Introduction, Analog Networks, Integrated Digital Networks, Integrated services Digital Networks; Cellular Radio Networks; intelligent Networks; private Networks; charging; Routing-

General, Automatic, Alternative routing.

TEXT BOOKS

1. Telecommunications Switching and Traffic Networks, J.E Flood, Pearson Eduction, 2006.

2. Telecommunications Switching systems and Networks, Tyagarajan Viswanathan, Prentice hall of India Pvt. Ltd., 2006

REFERENCES

1. Digital Telephony, John C Bellamy, John Wiley International Student Edition, 3rd Edition,2000.

2. Data Communications and Networking, Behrouz A. Ferouzan, TMH, 2nd Edition, 2000.

3. Introduction to Data Communications and Networking, Tomasi, Pearson Education, 1st Edition, 2007.

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UGC AUTONOMOUS

B. Tech. ECE	**L**	**T-P-D**	**C**
III Year – II Semester	**3**	**0-0-0**	**3**

TELEVISION ENGINEERING

(Elective – I)

Unit I: Introduction

TV transmitter and receivers, synchronization. Geometric form and aspect ratio, image continuity, interlaced scanning, picture resolution, Composite video signal, TV standards. Camera tubes: image Orthicon, Plumbicon, vidicon, silicon Diode Array vidicon, Comparison of camera tubes, Monochrome TV camera,

TV Signal Transmission a**nd Propagation**: Picture Signal transmission, positive and negative modulation, VSB transmission, sound signal transmission, standard channel BW,TV transmitter, TV signal propagation, interference, TV broadcast channels, TV transmission Antennas.

Unit II: Monochrome TV Receiver

RF tuner, IF subsystem, video amplifier, sound section, sync separation and processing, deflection circuits, scanning circuits, AGC, noise cancellation, video and inter carrier sound signal detection, vision IF subsystem of Black and White receivers, Receiver sound system: FM detection, FM Sound detectors, and typical applications.

Unit-III: Sync Separation and Detection

TV Receiver Tuners, Tuner operation, VHF and UHF tuners, digital tuning techniques, remote control of receiver functions. Sync Separation, AFC and Deflection Oscillators: Synchronous separation, k noise in sync pulses, separation of frame and line sync pulses. AFC, single ended AFC circuit, Deflection Oscillators, deflection drive ICs, Receiver Antennas, Picture Tubes.

Unit IV: Color Television

Colour signal generation, additive colour mixing, video signals for colours, colour difference signals, encoding, Perception of brightness and colours luminance signal, Encoding of colour difference signals, formation of chrominance signals, color cameras, Colour picture tubes, colour specifications,

Color Signal Encoding and Decoding: NTSC colour system PAL colour system, PAL encoder, PAL-D Decoder, chrome signal amplifiers, separation of U and V signals, colour burst separation, Burst phase discriminator, ACC amplifier, Reference oscillator, Indent and colour killer circuits, U& V demodulators, colour signal mixing.

Unit –V: Color Receiver

introduction to colour receiver, Electron tuners, IF subsystem, Y-signal channel, Chroma decoder, Separation of U & V Color, Phasors, synchronous demodulators, Sub carrier generation, raster circuits.Introduction to Digital TV, Digital Satellite TV, Direct to Home Satellite TV, Digital TV Transmitter, Digital TV Receiver, Digital Terrestrial TV, LCD TV, LED TV, CCD Image Sensors, HDTV.

Test Books:

1. Television and Video Engineering- A.M.Dhake, 2nd Edition.
2. Monochrome and Colour TV- R.R. Gulati, New Age International Publication, 2002.

References Books:

1. Colour Television Theory and Practice- S.P. Bali, TMH, 1994
2. Basic Television and Video Systems-B.Grob and C.E. Hemadon, McGraw Hill, 1999
3. Modern Television Practice – Principles, Technology and Service- R.R. Gallatin, New Age International Publication, 2002.

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UGC AUTONOMOUS

B. Tech. ECE	**L**	**T-P-D**	**C**
III Year - II Semester	**3**	**0-0-0**	**3**

NANO TECHNOLOGY

(Elective – I)

(Common to MECH,ECE)

Unit-I: Introduction to nanotechnology

Importance of nanoscale, Nanostructure types, electronic, magnetic, optical Properties of Nanomaterials, top-down and bottom- up approach to nanostructures.

Quantum Mechanical phenomenon in nanostructures:

Quantum confinement of electrons in semiconductor Nano structures, one dimensional confinement (Quantum wires), two dimensional confinements (Quantum Wells), three dimensional confinements (Quantum dots).

Unit-II: Carbon Nano Structures:

Carbon nanotubes (CNTs), Fullerenes, C60, C80 and C240 Nanostructures, Properties (mechanical, optical and electrical) and applications.

Fabrication of Nanomaterials:

Physical Methods: Inert gas condensation, Arc discharge, RFplasma, Plasma arc technique, Ion sputtering, Laser ablation, Laser pyrolysis, Molecular beam epitaxy, Chemical vapour deposition method.

Unit-III: Nano scale characterization techniques

Scanning probe techniques (AFM, MFM, STM, SEM, TEM), XRD

Nanodevices and Nanomedicine:

Lab on chip for bioanalysis, Core/shell Nanoparticles in drug delivery systems (site specific and targeted drug delivery), cancer treatment, and bone tissue treatment.

Unit-IV: Nano and molecular electronics

Resonant-Tunneling structures, single electron tunneling, Single Electron transistors, coulomb blockade, giant magneto resistance, tunneling magneto resistance.

Unit-V: Nanolithography and nanomanipulation:

e-beam lithography and SEM based nanolithography and nanomanipulation, Ion beam

lithography, oxidation and metallization. Mask and its application. Deep UV lithography, X-ray based lithography.

TEXT BOOKS:

1. Charles.p.pode, Introduction to nanotechnology, springer publications
2. Springer Handbook of Nanotechnology - Bharat Bhusan

REFERENCES BOOKS:

1. David Ferry “Transport in Nano structures” Cambridge University press 2000
2. Nanobiotechnology; ed. C.M.Niemeyer, C.A. Mirkin.
3. Nanofabrication towards biomedical application: Techniques, tools, Application and impact – Ed. Challa S.,S. R. Kumar, J. H. Carola.

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UGC AUTONOMOUS

B. Tech. ECE	**L**	**T-P-D**	**C**
III Year – II Semester	**4**	**0-0-0**	**4**

DIGITAL COMMUNICATIONS

Unit-1: Elements of Digital Communication Systems

Model of Digital Communication Systems, Digital Representation of Analog Signal, Certain issues in Digital Transmission, Advantages of Digital Communication Systems, Bandwidth-S/N tradeoff, Hartley Shanon Law, Sampling Theorem.

Unit-II: Pulse Code Modulation

PCM Generation and Reconstruction, Quantization noise, Non uniform Quantization and Companding, DPCM, Adaptive DPCM, DM and Adaptive DM, Noise in PCM and DM.

Digital Modulation Techniques: Introduction, ASK,ASK Modulator, Coherent ASK Detector, Non-Coherent ASK Detector, FSK, Bandwidth and Frequency Spectrum of FSK, Non coherent FSK Detector, Coherent FSK

Detector, FSK Detection Using PLL, BPSK, Coherent PSK Detection, QPSK, Differential PSK.

Unit-III: Baseband transmission and Optimal Reception of Digital Signal

Pulse shaping for optimum transmissions, A Baseband Signal Receiver, Probability of Error, Optimum Receiver, optimal of Coherent Reception, Signal Space Representation and Probability of Error, eye diagrams, Cross talk.

Information Theory: Information and entropy, conditional entropy and redundancy, Shannon Fano coding, Mutual Information, Information loss due to noise, source codings – Huffman Code, variable length coding, Source coding to Increase average Information per bit, Lossy source coding.

Unit-IV: Linear Block Codes

Matrix description of Linear Block Codes, Error detection and error Correction capabilities of linear block codes. **Cyclic Codes:** Algebraic structure, encoding, syndrome calculation, Decoding.

Convolution Codes: Encoding, Decoding using State, tree and trellis diagrams, Decoding using Viterbi algorithm, Comparison of Error Rates in Coded and Uncoded Transmission.

Unit-V: Spread Spectrum Modulation

Use of Spread Spectrum, Direct Sequence Spread Spectrum (DSSS), Code Division Multiple Access, Ranging using DSSS, Frequency Hopping Spread Spectrum, PN - sequences: Generation

and Characteristics, Synchronization in Spread Spectrum Systems

TEXT BOOKS:

1. Principles of communication systems - Herbert Taub, Donald L Schiling, Goutam Saha, 3rd Edition, McGraw-Hill, 2008.
2. Digital and Analog Communicaton Systems – Sam Shanmugam, John Wiley, 2005.

REFERENCES:

1. Digital Communications – John G. Proakis, Masoud salehi – 5th Edition, McGraw-Hill, 2008.
2. Digital Communication – Simon Haykin, Jon Wiley, 2005.
3. Communication Systems – B.P. Lathi, BS Publication, 2006.

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UGC AUTONOMOUS

B. Tech. ECE	**L**	**T-P-D**	**C**
III Year – II Semester	**0**	**0-3-0**	**2**

DIGITAL SIGNAL PROCESSING LAB

The programs shall be implemented in software (Using MATLAB / Lab view / C programming/OCTAVE Equivalent) and hardware (Using TI / Analog devices / Motorola / Equivalent DSP processors).

Experiment:1.Generation of Sinusoidal waveform / signal based on recursive difference equations
Experiment: 2.To find DFT / IDFT of given DT signal
Experiment: 3.To find frequency response of a given system given in (Transfer Function/ Differential equation form).
Experiment: 4.Implementation of FFT of given sequence
Experiment: 5.Determination of Power Spectrum of a given signal(s).
Experiment: 6.Implementation of LP FIR filter for a given sequence
Experiment: 7.Implementation of HP FIR filter for a given sequence
Experiment: 8.Implementation of LP IIR filter for a given sequence
Experiment: 9.Implementation of HP IIR filter for a given sequence
Experiment:10.Generation of Sinusoidal signal through filtering
Experiment: 11.Generation of DTMF signals
Experiment: 12.Implementation of Decimation Process
Experiment: 13.Implementation of Interpolation Process
Experiment: 14.Implementation of I/D sampling rate converters
Experiment: 15.Audio application such as to plot a time and frequency display of microphone plus a cosine using DSP. Read a .wav file and match with their respective spectrograms.
Experiment: 16.Noise removal: Add noise above 3 KHz and then remove, interference suppression using 400 Hz tone.
Experiment: 17.Impulse response of first order and second order systems.

Note: - Minimum of 12 experiments has to be conducted.

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III Year – II Semester	**0**	0-3-0	**2**

MICROWAVE ENGINEERING LAB

Experiment1: Study of microwave bench (cables, connectors, Adapters, wave-guides, components & passive devices.)

Experiment 2: Measurement of gain and frequency characteristics of reflex klystron tube.

Experiment 3: Gunn diode characteristics

Experiment4: Determination of standing wave ratio (VSWR) and reflection coefficient

Experiment 5: Study of microwave tee's

Experiment 6: Attenuation measurement

Experiment 7: Determination of characteristics of isolator

Experiment 8: Determination of characteristics of circulator

Experiment 9: Characteristics of multihole directional coupler

Experiment 10: Measurement of wave impedance and wave length using slotted waveguide section

Experiment 11: Study of propagation of microwaves using horn Antenna

Experiment 12: Measurement of microwave power using a thermistor Mount/variable flap attenuator

Experiment 13: Measurement of radiation pattern of a test antenna.

Experiment 14: Determination of unknown load impedance of transmission line using smith chart

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III Year – II Semester	**0**	0-3-0	**2**

DIGITAL COMMUNICATIONS LAB

List of experiments:

Experiment:1.Pulse Amplitude Modulation and Demodulation

Experiment:2.Pulse Width Modulation and Demodulation

Experiment:3.Pulse Position Modulation and Demodulation

Experiment:4.PCM Generation and Detection

Experiment: 5.Differential Pulse Code Modulation.

Experiment: 6.Delta Modulation

Experiment: 7.Time Division Multiplexing of 2 Band Limited Signals

Experiment: 8.Amplitude shift keying : Generation and Detection

Experiment: 9.Frequency shift keying : Generation and Detection

Experiment: 10.Phase shift keying : Generation and Detection

Experiment: 11.Study of spectral Characteristics of PAM, QAM.

Experiment: 12.DPSK: Generation and Detection

Experiment: 13.QPSK: Generation and Detection

Equipment required:

1. RPS -0 – 30 V
2. CRO -0 – 20 M Hz.
3. Function Generators -0 – 1 M Hz
4. RF Generators -0 – 1000 M Hz./0 – 100 M Hz.
5. Multimeters
6. Lab Experimental kits for Digital Communication
7. Components
8. Radio Receiver/TV Receiver Demo kits or Trainees.

NOTE: Minimum 12 experiments to be conducted

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IV Year – I Semester	**4**	**1-0-0**	**4**

DIGITAL IMAGE PROCESSING

Unit I: Digital Image Processing Fundamentals

Digital Image fundamentals, Basic steps of Image Processing System, Sampling and quantization of an image, Relationship between pixels.

Image Transforms

2-D Discrete Fourier Transform , Discrete Cosine Transform (DCT), Walsh transform, Hadamard Transform, Discrete Cosine Transform, Haar transform, Slant transform, and Hotelling transform.

Unit II: Image Enhancement (Spatial Domain)

Introduction, Image Enhancement in spatial domain, enhancement through point operation, types of point operation, histogram manipulation, linear and non – linear gray level transformation, local or neighborhood operation, median filter, Spatial domain high-pass filtering.

Image Enhancement (Frequency Domain): Filtering in frequency domain, obtaining frequency domain filters from spatial filters, Generating filters directly in the frequency domain, Low pass (smoothing) and High pass (sharpening) Filters in Frequency Domain.

Unit III: Image Restoration

Degradation model, Algebraic approach to restoration, Inverse filtering, least mean square filters, Constrained Least Squares Restoration, Interactive Restoration.

Image segmentation: Detection of discontinuities, Edge linking and boundary detection, Thresholding, Region oriented segmentation.

Unit IV: Image Compression

Redundancies and their removal methods, Fidelity criteria, Image compression models, Source encoder and decoder, Error free compression, Lossy compression, JPEG 2000 Standards.

Unit V: Wavelet based Image processing

Introduction to Wavelet Transform, Continuous Wavelet Transform, Discrete Wavelet Transform, Filter banks, Wavelet based image compression.

Morphological Image processing: Dilation and Erosion: Dilation, Structuring Element Decomposition, The Strel function, Erosion. Combining Dilation and Erosion: Opening and closing, the hit or miss Transformation.

TEXT BOOKS:

1. Digital Image Processing - Rafael C. Gonzalez, Richard E. Woods, 3rd edition, Pearson, 2008

2. Digital Image Processing- S Jayaraman, S Esakkirajan, T Veerakumar- TMH, 2010.

REFERENCES:

1. Digital Image Processing using MAT LAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Eddings, 2nd Edition, TMH, 2010.

2. Fundamentals of Digital Image Processing – A.K.Jain , PHI, 1989

3. Digital Image processing and Computer vision – Somka, Hlavac, Boyle- Cengage learning (Indian edition) 2008.

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B. Tech. ECE	**L**	**T-P-D**	**C**
IV Year - I Semester	**3**	**1-0-0**	**3**

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

UNIT - I:
Block Schematics of Measuring Systems, Performance characteristics, Static characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag; Measuring Instruments: DC Voltmeters, D' Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Multimeters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments. Electronic Voltmeters, Multimeters, AC,DC Meters, Digital Voltmeters: Ramp Type, Staircase Ramp, Dual Slope Integrating type, Successive Approximation Type,Autoranging,$3^{1/2}$,$3^{3/4}$ Digit Display, Pico ammeter, High Resistance Measurements, Low current Ammeter, Applications.

UNIT - II: Signal Generators
AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square wave Generators, Function Generators, Arbitrary waveform Generator, Video Signal Generators, and Specifications.
Signal Analyzers, AF, HF Wave Analyzers, Harmonic Distortion, Heterodyne wave Analyzers, Spectrum Analyzers, Power Analyzers, Capacitance-Voltage Meters, Oscillators.

UNIT -III: DC and AC Bridges
Wheat Stone Bridge, Kelvin Bridge, AC Bridges, Maxwell, Hay, Schering, Wien, Anderson Bridges, Resonance Bridge, Similar Angle Bridge ,Wagner's ground connection, Twin T, Bridged T Networks, Detectors.

UNIT – IV: **Oscilloscopes**
CRT, Block Schematic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes, High Frequency CRO Considerations, Delay lines, Applications, Specifications.
Special Purpose Oscilloscopes: Dual Trace, Dual Beam CROs, Sampling Oscilloscopes, Storage Oscilloscopes, Digital Storage CROs, Frequency Measurement, Period Measurement, Errors in time/Frequency Measurements, universal counters, Extension of range; Recorders: Strip chart, X-Y, oscillographic recorders.

UNIT -V:Transducers
Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Digital Temperature sensing system, Piezoelectric Transducers, Variable Capacitance Transducers, Magneto Strictive Transducers.

Measurement of Physical Parameters: Flow Measurement, Displacement Meters, Liquid level Measurement, Measurement of Humidity and Moisture, Velocity, Force, Pressure - High Pressure, Vacuum level, Temperature - Measurements, Data Acquisition Systems.

TEXTBOOKS:

1. Electronic Measurements and Instrumentations by K. Lal Kishore, Pearson Education - 2010.
2. Electronic instrumentation: H.S.Kalsi - TMH, 2nd Edition 2004.

REFERENCES:

1. Electronic Instrumentation and Measurements - David A. Bell, Oxford Uiv. Press, 1997
2. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbincs, W.D. Cooper: PHI, 5th Edition, 2003.
3. Electronic Measurements and Instrumentation: B. M. Oliver, J. M. Cage TMH Reprint.

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UGC AUTONOMOUS

B. Tech. ECE	**L**	**T-P-D**	**C**
IV Year – I Semester	**4**	**1-0-0**	**4**

VLSI DESIGN
(Common to ECE,ECM)

Unit-I: **Introduction**

Introduction to IC Technology-MOS, PMOS, NMOS, CMOS and BiCMOS **Basic Electric Properties** : Basic electrical Properties of MOS and BiCMOS Circuits: Ids-Vds relationships, MOS transistor threshold voltage, gm,gds,Figure of merit, pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS inverters.

Unit-II: **VLSI Circuit Design Processes**

VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and layout, 2 μm CMOS design rules for wires, Contacts and Transistors layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS Circuits.

Unit-III: **Gate Level Design**:

Logic Gates and Other complex gates, Switch logic, alternate gate circuits , time delays, driving large capacitive loads, wiring capacitance, Fan-in, Fan-out, Choice of layers.

Unit-IV: **Data path Subsystems**

Subsystems Design, Shifters, Adders, ALUs, Multipliers, Parity generators, comparators, Zero/One Detectors, Counters

Array Subsystems: SRAM, DRAM, ROM, Serial Access Memories.

Unit-V: **Programmable Logic Devices**

PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, design Approach, Parameters influencing low power design.

CMOS Testing: CMOS Testing, Need for testing, Test Principles, Design Strategies for test chip level Test Techniques.

TEXT BOOKS:

1. Eessentials of VLSI circuits and systems-Kamran Eshraghian,
Eshraghian Dougles and A.Pucknell, PHI, 2005 Edition.

2. CMOS VLSI Design-A Circuits and systems perspective,Neil H.E. Weste,David Harris, Ayan Banerjee, 3rd Ed, Pearson,2009.

REFERENCE BOOKS:

1. Introduction to VLSI Systems: A Logic Circuit and system perspectives-Ming-BO Lin, CRC Press, 2011.

2. CMOS Logic circuit design –John. P.Uyemura, Springer, 2007.

3. Modem VLSI Design-Wayne Wolf, Pearson Education, 3rd Edition 1997.

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UGC AUTONOMOUS

B. Tech. ECE	**L**	**T-P-D**	**C**
IV Year – I Semester	**3**	**0-0-0**	**3**

MULTIRATE SIGNAL PROCESSING

(Elective – II)

UNIT I : SAMPLING RATE CONVERSION

Introduction – Representation of discrete signals: Discrete sampling- Polyphase representation- Modulation representation- Transformation of the signal components- Reducing the Sampling rate: Down sampling- Spectrum of the down sampled signal- Aliasing effect- Scaling of the Anti-aliasing effect- Down sampling of the polyphase components- Periodic time invariance- identities- Increasing the sampling rate: Up sampling- Spectrum of the up sampled signal- Interpolation considered in the frequency domain-Scaling of the Anti-imaging filter- identities- Cascaded sampling rate conversion.

UNIT II: FIR FILTERS AND ITS STRUCTURES

Transversal structures– Direct form and transposed direct form for the general impulse response- symmetrical impulse response-Lattice structures: standard lattice structures- QMF lattices- Symmetry properties and linear phase-Linear phase FIR filters- Half band filters- zero phase half band low pass filters- causal half band low pass filters.

UNIT III: DECIMATION AND INTERPOLATION

Decimation with transversal filters– convolution with subsequent down sampling- Interpolation with transversal filters- Up sampling with subsequent convolution- Decimation with polyphase filters- representation of polyphase decimation in the time domain- Intepolation with polyphase filters- polyphase interpolation in the time domain- Decimation and interpolation with rational sampling factors- Highly efficient converter structures- Dual sampling rate converter.

UNIT IV: TWO-CHANNEL FIILTER BANKS

Analysis and synthesis of filter banks: Two- channel analysis filter banks- Two-channel synthesis filter banks- Quadrature Mirror Filter (QMF) banks- Two channel sub-band coding filter banks- Standard QMF banks- Optimal FIR QMF banks- Filter banks with perfect reconstruction- Condition for perfect reconstruction- Conjugate Quadrature filters- Paraunitary filter banks- Biorthogonal and linear phase filter banks with perfect reconstruction.

UNIT V: APPLICATIONS

Digital Audio Systems – Sub band coding of speech and image signals – Analog Voice privacy

System – Timing recovery in a digital demodulator – FM Receiver and Demodulator.

TEXT BOOKS:

1. Fliege N J, "Multirate Digital Signal Processing", John Wiley and sons, 1994.
2. Vaidyanathan P P, "Multirate Systems and Filter Banks", Prentice Hall Inc., 1993.

REFERENCE:

1. Ifeachor E C & Jervis B.W “Digital Signal Processing” Pearson Education, 2002.
2. Proakis J G and Manolakis D G, "Digital Signal Processing Principles, Algorithms and Applications", Prentice Hall of India, 2002.
3. Sanjit K Mitra, "Digital Signal Processing-A Computer Based Approach", Tata McGraw Hill, 2003.

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B. Tech. ECE	**L**	**T-P-D**	**C**
IV Year – I Semester	**3**	**0-0-0**	**3**

SPREAD SPECTRUM COMMUNICATIONS

(Elective – II)

UNIT –I: Introduction to Spread Spectrum Systems: Fundamental Concepts of Spread Spectrum Systems, Pseudo Noise Sequences, Direct Sequence Spread Spectrum, Frequency Hop Spread Spectrum, Hybrid Direct Sequence Frequency Hop Spread Spectrum, Code Division Multiple Access. Binary Shift Register Sequences for Spread Spectrum Systems: Introduction, Definitions, Mathematical Background and Sequence Generator Fundamentals, Maximal Length Sequences, Gold Codes.

UNIT -II: Code Tracking Loops: Introduction, Optimum Tracking of Wideband Signals, Base Band Delay-Lock Tracking Loop, Tau-Dither Non- Coherent Tracking Loop, Double Dither Non-Coherent Tracking Loop.

UNIT -III: Initial Synchronization of the Receiver Spreading Code: Introduction, Problem Definition and the Optimum Synchronizer, Serial Search Synchronization Techniques, Synchronization using a Matched Filter, Synchronization by Estimated the Received Spreading Code.

UNIT -IV: Cellular Code Division Multiple Access (CDMA) Principles: Introduction, Wide Band Mobile Channel, The Cellular CDMA System, Single User Receiver in a Multi User Channel, CDMA System Capacity, Multi-User Detection in CDMA Cellular Radio: Optimal Multi-User Detection, Linear Suboptimal Detectors, Interference Combat Detection Schemes, Interference Cancellation Techniques.

UNIT -V: Performance of Spread Spectrum Systems in Jamming Environments: Spread Spectrum Communication System Model, Performance of Spread Spectrum Systems without Coding. Performance of Spread Spectrum Systems with Forward Error Correction: Elementary Block Coding Concepts, Optimum Decoding Rule, Calculation of Error Probability, Elementary Convolution Coding Concepts, Viterbi Algorithm, Decoding and Bit-Error Rate.

TEXT BOOKS:

1. Rodger E Ziemer, Roger L. Peterson and David E Borth - "Introduction to Spread Spectrum Communication- Pearson, 1st Edition, 1995.

2. Mosa Ali Abu-Rgheff – "Introduction to CDMA Wireless Communications." Elsevier Publications, 2008.

REFERENCE BOOKS:

1. George R. Cooper, Clare D. Mc Gillem - "Modern Communication and Spread Spectrum," McGraw Hill, 1986.

2. Andrew j. Viterbi - "CDMA: Principles of spread spectrum communication," Pearson Education, 1st Edition, 1995.

3. Kamilo Feher - "Wireless Digital Communications," PHI, 2009. 4. Andrew Richardson - "WCDMA Design Handbook," Cambridge University Press, 2005. 5. Steve Lee - Spread Spectrum CDMA, McGraw Hill, 2002.

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B. Tech. ECE	**L**	**T-P-D**	**C**
IV Year – I Semester	**3**	0-0-0	**3**

OPTICAL COMMUNICATIONS
(Elective – II)

UNIT I: Overview of optical fiber communication

Historical development, The general system, advantages of optical fiber communications. Optical fiber wave guides- Introduction, Ray theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew rays. Cylindrical fibers- Modes, Number, Mode coupling, Step Index fibers, Graded Index fibers.

Single mode fibers- Cut off wavelength, Mode Field Diameter, Effective Refractive Index. Fiber materials — Glass, Halide, Active glass, Chalgenide glass, Plastic optical fibers. Signal distortion in optical fibers- Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses.

UNIT II: Information capacity determination, Group delay, Types of Dispersion: Material dispersion, Wave-guide dispersion, Polarization mode dispersion, Intermodal dispersion. Pulse broadening. Optical fiber Connectors- Connector types, Single mode fiber connectors, Connector return loss. Fiber Splicing- Splicing techniques, Splicing single mode fibers. Fiber alignment and joint loss- Multimode fiber joints, single mode fiber joints.

UNIT III: Optical sources

LEDs, Structures, Materials, Quantum efficiency, Power, Modulation, Power bandwidth product. Injection Laser Diodes- Modes, Threshold conditions, External quantum efficiency,Laser diode rate equations,Resonant frequencies. Reliability of LEDandILD.

Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling.

UNIT IV: Optical detectors

Physical principles of PIN and APD, Detector response time, Temperature effect on Avalanche gain, Comparison of Photodetectors. Optical 124 receiver operation- Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit, Analog receivers.

UNIT V: Optical system design

Considerations, Component choice, Multiplexing. Point-to- point links, System considerations, Link power budget with examples, Overall fiber dispersion in Multi mode and Single mode fibers, Rise time budget with examples.

Transmission distance, Line coding in Optical links, WDM, Necessity, Principles, Types of WDM, Measurement of Attenuation and Dispersion, Eye pattern.

TEXT BOOKS :

1. Optical Fiber Communications – Gerd Keiser, TMH, 4th Edition, 2008.
2. Optical Fiber Communications – John M. Senior, Pearson Education, 3rd Edition, 2009.

RERFERENCES :

1. Fiber Optic Communications – D.K. Mynbaev , S.C. Gupta and Lowell L. Scheiner, Pearson Education, 2005.
2. Text Book on Optical Fibre Communication and its Applications – S.C.Gupta, PHI, 2005.
3. Fiber Optic Communication Systems – Govind P. Agarwal , John Wiley, 3rd Ediition, 2004.

J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
UGC AUTONOMOUS

B. Tech. ECE	**L**	**T-P-D**	**C**
IV Year – I Semester	**3**	**0-0-0**	**3**

SATELLITE COMMUNICATIONS
(Elective – III)

UNIT I: Introduction

Origin of Satellite Communications, Historical Back-ground, Basic Concepts of Satellite Communications, Frequency allocations for Satellite Services, Applications, Future Trends of Satellite Communications. Orbital Mechanics and Launchers: Orbital Mechanics, Look Angle determination, Orbital perturbations, Orbital determination, Launches and Launch vehicles, Orbital effects in communication systems performance.

UNIT II: Satellite Subsystems

Attitude and Orbit control system, Telemetry, Tracking, Commanding and Monitoring, Power Systems, Communication Subsystems, Satellite antennas, Equipment reliability and Space qualification.

UNIT III: Multiple Access

Frequency Division Multiple Access (FDMA), Intermodulation, calculation of C/N. Time Division Multiple Access (TDMA), Frame structure, Examples. Satellite Switched TDMA Onboard processing, DAMA, Code Division Multiple Access (CDMA), Spread Spectrum Transmission and Reception.

UNIT IV: Satellite Link Design

Basic transmission theory, system noise temperature and G/T ratio, Design of down links, Uplink design, Design of satellite links for specified C/N, System design examples. Earth Station Technology: Introduction, Transmitters, Receivers, Antennas, Tracking systems, Terrestrial Interface, Primary Power test methods.

UNIT V: Low Earth Orbit and Geo-Stationary Satellite Systems

Orbit considerations, Coverage and Frequency Consideration, Delay and Throughput considerations, Systems considerations, Operational NGSO Constellation Designs. Satellite Navigation and Global Positioning System: Radio and Satellite Navigation, GPS Position Location principles, GPS Receivers and Codes, Satellite Signal Acquisition, GPS Navigation Message, GPS Signal Levels, GPS Receiver Operation, GPS C/A code accuracy, Differential GPS.

TEXT BOOKS

1. Satellite Communications- Timothy Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley Publications, 2nd Edition, 2003.
2. Satellite Communications Engineering- Wilbur L. Pritchard, Robert A Nelson and Henri G. Suyderhoud, 2nd Edition, Pearson Publications, 2003.

REFERENCE

1. Satellite Communications: Design Principles- M. Richharia, B S publications, 2nd Edition, 2003.
2. Satellite Communication- D.C Agarwal, Khanna Publications, 5th Edition.
3. Fundamentals of Satellite Communications- K.N. Raja Rao, PHI, 2004

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B. Tech. ECE	**L**	**T-P-D**	**C**
IV Year – I Semester	**3**	**0-0-0**	**3**

CELLULAR AND MOBILE COMMUNICATIONS
(Elective – III)

(Common to ECE,ECM)

Unit I: Introduction To Cellular Mobile Radio Systems

Limitations of conventional mobile telephone systems, Basic Cellular Mobile System, First, second, third and fourth generation cellular wireless systems, Uniqueness of mobile radio environment-Long term fading, Factors influencing short term fading, Parameters of mobile multipath fading-Time dispersion parameters, Coherence bandwidth, Doppler spread and coherence time, Types of small scale fading.

Unit II: Fundamentals Of Cellular Radio System Design

Concept of frequency reuse, Co-channel interference, Co-channel Interference reduction factor, Desired C/I from a normal case in a Omni directional antenna system, system capacity, Trunking and grade of service, Improving coverage and capacity in cellular systems- Cell splitting, Sectoring, Microcell zone concept. Measurement of real time Co-Channel interference, Design of antenna system, Antenna parameters and their effects, Diversity techniques-Space diversity, Polarization diversity, Frequency diversity, Time diversity. Adjacent channel interference, Near end far end interference, Cross talk, Effects on coverage and interference by power decrease, Antenna height decrease, Effects of cell site components, UHF TV interference

Unit III: Cell Coverage for Signal and Traffic

Signal reflections in flat and hilly terrain, Effect of human made structures, Phase difference between direct and reflected paths, Constant standard deviation, Straight line path loss slope, General formula for mobile propagation over water and flat open area, Near and long distance propagation, Path loss from a point to point prediction model in different conditions, merits of Lee model .

Unit IV: Cell Site and Mobile Antennas

Sum and difference patterns and their synthesis, Coverage-omni directional antennas, Interference reduction- directional antennas for interference reduction, Space diversity antennas, Umbrella pattern antennas, and Minimum separation of cell site antennas, mobile antennas.

Unit-V: Frequency Management and Channel Assignment& Handoffs

Numbering and grouping, Setup access and Paging channels, Channel assignments to cell sites and mobile units, Channel sharing and Borrowing, Sectorization, Overlaid cells, Non fixed channel assignment, Handoff initiation, Types of handoff, Delaying handoff, Advantages of handoff, Power

difference handoff, Forced handoff, Mobile assisted and soft handoff. Intersystem handoff, Introduction to dropped call rates and their evaluation.

TEXT BOOKS:

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Mc Graw Hill, 2nd Edn., 1989.
2. Wireless Communications - Theodore. S. Rapport, Pearson education, 2nd Edn., 2002.

REFERENCES

1. Principles of Mobile Communications – Gordon L. Stuber, Springer International, 2nd Edn., 2001.
2. Modern Wireless Communications-Simon Haykin, Michael Moher,Pearson Eduction, 2005.
3. Wireless communications theory and techniques, Asrar U. H .Sheikh, Springer, 2004

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UGC AUTONOMOUS

B. Tech. ECE	**L**	**T-P-D**	**C**
IV Year – I Semester	**3**	**0-0-0**	**3**

WIRELESS COMMUNICATIONS AND NETWORKS

(Elective – III)

Unit I: Introduction To Wireless Communication Systems

Evolution of mobile radio communications, Examples of wireless communication systems, Paging systems, Cordless telephone systems, Comparison of various wireless systems. **Modern Wireless Communication Systems**: Second generation cellular networks, Third generation wireless networks, Wireless in local loop, Wireless local area networks, Blue tooth and Personal area networks.

Unit II: Cellular System Design Fundamentals

Spectrum Allocation, Basic Cellular System, Frequency reuse, Channel assignment strategies, Handoff Strategies, Interference and system capacity, Trunking and grade off service, Improving coverage and capacity, cell splitting.

Multiple Access Techniques For Wireless Communication: Introduction to multiple access, FDMA, TDMA, Spread spectrum multiple access, Space division multiple access, Packet radio, Capacity of a cellular systems.

Unit III: Wireless Networking

Difference between wireless and fixed telephone networks, Development of wireless networks, Fixed network transmission hierarchy, Traffic routing in wireless networks, Wireless data services, Common channel signaling.

Unit IV: Wireless WAN

Mechanism to support a mobile environment, Communication in the infrastructure, IS-95 CDMA forward channel, IS – 95 CDMA reverse channel, Packet and frame formats in IS – 95, IMT – 2000, Forward channel in W-CDMA and CDMA 2000, Reverse channels in W-CDMA and CDMA-2000, GPRS and higher data rates, Short messaging service in GPRS mobile application protocols.

Unit V: Wireless Lan

Historical overviews of the LAN industry, Evolution of the WLAN industry, Wireless home networking, IEEE 802.11. The PHY Layer, MAC Layer, wireless ATM, HYPER LAN, HYPER

LAN – 2.

Orthogonal Frequency Division Multiplexing: Basic Principles of Orthogonality, Single Versus Multi channel Systems, OFDM Block Diagram and its explanation, OFDM Signal mathematical representation.

TEXT BOOKS:

1. Theodore S. Rappaport , ―Wireless Communications and Applictions,‖ Pearson Education - 2003.
2. Upen Dalal, ―Wireless Communications,‖ Oxford University Press, 2010.

REFERENCES:

1. P.Nicopolitidis, M.S.Obaidat, G.I. papadimitria, A.S. Pomportsis, ―Wireless Networks,‖ John Wiley & Sons, 2003.
2. X.Wang and H.V.Poor, ―Wireless Communication Systems,‖ Pearson education, 2004.
3. Dr.Sunil Kumar S. Manvi, Mahabaleshwar S. Kakkasageri,‖Wireless and Mobile Networks: concepts and Protocols,‖ Wiley India, 2010.

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UGC AUTONOMOUS

B. Tech. ECE	**L**	**T-P-D**	**C**
IV Year – I Semester	**3**	**0-0-0**	**3**

RADAR SYSTEMS

(Elective – III)

UNIT I: Fundamentals of RADAR

Introduction, Maximum Unambiguous Range, Simple form of radar Equation, Radar block Diagram and Operation, Radar Frequencies and Applications. Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise, Modified Radar Range Equation, SNR, Envelope Detector False Alarm Time and Probability, Integration of Radar Pulses, Radar Cross Section of Targets (simple targets - sphere, cone-sphere), Transmitter Power, PRF and Range Ambiguities, System Losses (qualitative treatment), Illustrative Problems.

UNIT II: CW and FM-CW Radar

Doppler Effect, CW Radar Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar. FM-CW Radar, Range and Doppler Measurement, Block Diagram and Characteristics, (Approaching/ Receding Targets), FM-CW altimeter, Multiple Frequency CW Radar**.** Illustrative Problems.

UNIT III: MTI and Tracking Radar

Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers Filter Characteristics, Blind Speeds, Double Cancellation, Staggered PRFs. Range Gated Doppler Filters. MTI Radar Parameters, Limitations to MTI Performance, MTI versus Pulse Doppler Radar.Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar Amplitude Comparison Monopulse (one- and two-coordinates), Phase Comparison Monopulse, Tracking in Range, Acquisition and Scanning Patterns, Comparison of Trackers**.**

UNIT IV: Detection of Radar Signals in Noise

Introduction, Matched Filter Receiver Response Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.

UNIT V: RADAR Receivers

Noise Figure and Noise Temperature, Displays- types, Duplexers, Branch type and Balanced type, Circulators as Duplexers. Introduction to Phased Array Antennas- Basic Concepts, Radiation Pattern, Beam steering and Beam Width Changes, Applications, Advantages and limitations

TEXT BOOKS:

1. Introduction to Radar Merill I. Skolnik, TMH Special.,systems Indian Edition,2nd 2007.
2. Introduction to Radar Merrill I. Skolnik, 3rd ed.,Systems TMH,2001.

REFERENCES BOOKS:

1. Radar: Principles, Technology_Byron Edde, Pearson Applications Education,2004, Radar Peebles, Jr.,P.Z.,Wiley, New York.

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UGC AUTONOMOUS

B.Tech. ECE	**L**	**T-P-D**	**C**
IV Year – I Semester	**4**	**0-0-0**	**4**

COMPUTER NETWORKS

(Common to ECE,ECM)

UNIT I: Introduction

Introduction to networks, internet, protocols and standards, the OSI model, layers in OSI model, TCP/IP suite, Addressing, Analog and digital signals.

UNIT II: Transmission Switching & Control

Digital transmission, multiplexing, transmission media, circuit switched networks, Datagram networks, virtual circuit networks, switch and Telephone network. Data link layer: Introduction, Block coding, cyclic codes, checksum, framing, flow and error control, Noiseless channels, noisy channels, HDLC, point to point protocols, IPV6.

UNIT III: MAC Layer and Back bone Network

Random access, controlled access, channelization, IEEE standards, Ethernet, Fast Ethernet, Ethernet, wireless LANs, Bluetooth. Connecting LANs, backbone networks and virtual LANs, Wireless WANs, SONET, frame relay and ATM.

UNIT IV: Network Layer & Transport Layer

Logical addressing, internetworking, tunneling, address mapping, ICMP, IGMP, forwarding, uni-cast routing protocols, multicast routing protocols. Process to process delivery, UDP and TCP protocols, SCTP, data traffic, congestion, congestion control, QoS, integrated services, differentiated services, QoS in switched networks.

UNIT V: Application Layer

Domain name space, DNS in internet, electronic mail, FTP, WWW, HTTP, SNMP, multi-media, network security

TEXT BOOKS:

1. Data Communications and Behrouz A, Forouzan, Fourth Edition networking TMH, 2006.
2. Computer Networks Andrew S Tanenbau, 4th Edition, pearson Education.

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks S. Keshav, 2nd Edition. Pearson Education
2. Understanding communications and Networks , 3rd Edition, W.A.Shay, Cengage Learning.
3. Computer and Communication Networks, Nader F.Mir, Internet F.Kurose, K.W.Ros Pearson Education. Networkin Top Approac Featurin.

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UGC AUTONOMOUS

B. Tech. ECE	**L**	**T-P-D**	**C**
IV Year – I Semester	**0**	**0-3-0**	**2**

VLSI LAB

- Note: Minimum of 10 programs from Part –I and 2 programs from Part -II are to be conducted.

Design and implementation of the following CMOS digital/analog circuits using Cadence / Mentor Graphics / Synopsys / Equivalent CAD tools. The design shall include Gate-level design, Transistor-level design, Hierarchical design, Verilog HDL/VHDL design, Logic synthesis, Simulation and verification.

Part –I: VLSI Front End Design programs:

Programming can be done using any complier, and obtain the simulation, synthesis, place and route and implement into FPGA/CPLD boards. The performance testing may be done using pattern generator (32 channels) and logic analyzer apart from verification by simulation with any of the front end tools.

Experiment:1. HDL code to realize all the logic gates

Experiment:2. Design and Simulation of adder

Experiment:3. Design of encoders and decoders

Experiment:4. Design of multiplexer and de-multiplexer

Experiment:5. Design of code converters and comparators

Experiment:6. Design of flip flops: SR, D, JK, T

Experiment:7. Design of register using latches and flip flops

Experiment:8.Design of shift register of serial- in serial –out, serial in parallel out, parallel in serial out and parallel in parallel out.

Experiment:9.Design of synchronous and asynchronous counter

Experiment:10. Design of Sequence Detector (Finite State Machine- Mealy and Moore Machines).

Part –II: VLSI Back End Design programs:

Design and implementation of the following CMOS digital/analog circuits using Cadence tools. Layout, physical verification (DRC, LVS) DC/transient analysis, for complex design of the

following:

Experiment 11. Introduction to layout design rules

Experiment 12. Layout, physical verification, Layout, for complex design of the following:

- Basic logic gates
- CMOS inverter
- CMOS NOR/NAND gates
- CMOS XOR
- CMOS MUX gates

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IV Year – I Semester	**0**	**0-3-0**	**2**

DIGITAL IMAGE PROCESSING LAB

Experiment:1.Display of grayscale images

Experiment:2.2-D DFT & DCT

Experiment:3.Image smoothing

Experiment:4.Image sharpening

Experiment:5.Image Enhancement –Histogram

Experiment:6.Image Segmentation

Experiment:7.Point Detection

Experiment:8.Line Detection

Experiment:9.Edge Detection

Experiment:10.Display of color Images

Experiment:11.DWT of Images

Experiment:12.Image Data compression

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B. Tech. ECE	**L**	**T-P-D**	**C**
IV Year – I Semester	**0**	0-3-0	**2**

SOFT SKILLS LAB-I
(Common to all Branches)
Activity Based

Activity/Experiment

KNOW YOURSELF/ SELF DISCOVERY and SOFT SKILLS

1. Introduction—Importance of Knowing Yourself

   Process of knowing yourself—SWOT analysis

   Benefits of SWOT analysis---Using SWOT analysis

   SWOT analysis grid—questions to complete the grid
2. Introduction –What are soft skills?—importance of soft skills

   Selling your skills—Attributes regarded as soft skills—Soft Skills

   Social Soft Skills—Thinking Soft Skills—Negotiating –Exhibiting your Soft Skills
3. Identifying your soft skills—Improving your soft skills –Train Yourself

   Top 60 soft skills—Practicing soft skills—Measuring Attitudes

Time and Stress Management

4. Introduction—The 80-20 rule—take a good look at the people around you—Examine your work

   Sense of time management –around you—examine your work—sense of time management
5. Time is money—features of time—three secrets of time management

   Time management matrix—analysis of time matrix—effective scheduling

   Grouping of activities—five steps to successful time management

   Difficulties in time management—evils of not planning—interesting facts about time

   Deal say of spending a day—time wasters—time savers—realizing the value of time

   Time circle planner.

   Introduction –Meaning—Effects , Kinds , and Sources of Stress

   Case study—spotting stress—stress management tips

Developing Positive Attitude

6. Introduction—meaning –features of attitudes—attitude and human behavior : Passive, Aggressive and Behavior

   Formation of attitudes—change of attitudes—what can you do to change attitude?

   Ways of changing attitude in a person—attitude in a workplace

   Features of a good team player

7. The power of positive attitude—developing positive attitude

   Obstacles in developing positive attitude—staying negative—examples of negative attitude

   Overcoming negative attitude—negative attitude and its results.

Body Language

8. Introduction –body talk—Voluntary and involuntary body language

   Forms of body language—parts of body language—origin of body language

   Uses of body language—Body language in building interpersonal relations

9. Body language in building interpersonal relations—reasons to study body language Improving your body language –types of body language—gender differences

   Body language—shaking hands

   Interpreting body language

Practice in Presentation Skills

10. Types of Presentations

    Do's and Don'ts of Presentation Skills

11. Body language in presentation skills
12. Examples—Aspects, etc

Textbooks:

1. Soft Skills: Know Yourself and Know the World—Dr. K. Alex-S. Chand Publising-2010
2. Managing Soft skills: K.R. Lakshminarayanan & Murugavel, Scitech Publications-2010

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UGC AUTONOMOUS

B.Tech. ECE	**L**	**T-P-D**	**C**
IV Year – II Semester	**4**	0-0-0	**4**

MANAGEMENT SCIENCE FOR ENGINEERS

(Common to all branches)

UNIT-I

Introduction to Management: Concepts of Management and Organization—Nature, Importance and Functions of Management, System Approach to Management--Taylor's Scientific Management Theory, Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor. Theory of Motivation -- Leadership Styles, Social responsibilities of Management.

Designing Organisational structures: Basic concepts related to Organization—Departmentation and Decentralization, Types and Evaluation of Mechanistic and organic structures of organization and suitability.

UNIT-II

Operations Management: Principles and Types of Plant Layout – Methods of production (Job, batch and Mass Production), Work study- Basic procedure involved in Method Study and Work measurement – Business Process Reengineering (BPR)--Statistical Quality control :control charts of variables and attributes (Simple problems) and Acceptance sampling, Deming's contribution to quality. Objectives, Need for inventory control, EOQ, ABC Analysis, purchase

procedure, Stores management and stores records- Supply chain management.

Objectives of inventory control, EOQ, ABC Analysis, purchase procedure, Stores management and stores records- JIT system, Supply Chain Management.

Functions of Marketing, Marketing mix, marketing strategies based on product life cycle, channels of distribution.

UNIT-III

Human Resources management(HRM): 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 – Capability Maturity Model (CMM) Levels – Performance Management System.

UNIT-IV

(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 cost analysis, project crashing, (simple problems).

UNIT-V

Strategic Management: Mission Goals, Objectives, Policy, Strategy, Programmes , Elements of Corporate planning process, Environmental Scanning, SWOT analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

TEXTBOOK:

1. Stoner, Freeman, Gilbert, Management, 6th Edition, Pearson Education, 2009.
2. P. Vijaya Kumar, N. Appa Rao and Ashima B. Chhalill, Cengage Learning India Pvt Ltd., 2012.

REFERENCE BOOKS:

1. Kotler Philip & Keller,Kevin Lane: Marketing Management PHI. 2009.
2. Koontz. Weihrich, & Aryasri: Principles of Management, TMH, 2009.
3. Thomas N.Duening & John Mivancevich Management--Principles and Guidelines. Cengage, 2009.

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UGC AUTONOMOUS

B.Tech. ECE	**L**	**T-P-D**	**C**
IV Year – II Semester	**3**	1-0-0	**3**

EMBEDDED SYSTEMS DESIGN

(Elective – IV)

UNIT-I: Introduction to Embedded Systems Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT-II: Typical Embedded System: Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

UNIT-III: Embedded Firmware: Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

UNIT-IV: RTOS Based Embedded System Design:

Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

UNIT-V: Task Communication: Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

TEXT BOOKS:

1. Introduction to Embedded Systems- Shibu K.V, Mc Graw Hill.

2. Embedded Systems -Raj Kamal, TMH.

REFERENCE BOOKS:

1. Embedded System Design-Frank Vahid, Tony Givargis, John Wiley.

2.Embedded Systems –Lyla, Pearson, 2013

3. An Embedded Software Primer-David E. Simon, Pearson Education.

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B.Tech. ECE	**L**	**T-P-D**	**C**
IV Year – II Semester	**3**	1-0-0	**3**

LOW POWER VLSI DESIGN

(Elective – IV)

UNIT –I: Fundamentals: Need for Low Power Circuit Design, Sources of Power Dissipation – Switching Power Dissipation, Short Circuit Power Dissipation, Leakage Power Dissipation, Glitching Power Dissipation, Short Channel Effects –Drain Induced Barrier Lowering and Punch Through, Surface Scattering, Velocity Saturation, Impact Ionization, Hot Electron Effect.

UNIT –II: Low-Power Design Approaches: Low-Power Design through Voltage Scaling – VTCMOS circuits, MTCMOS circuits, Architectural Level Approach –Pipelining and Parallel Processing approaches. **Switched Capacitance Minimization Approaches:** System Level Measures, Circuit Level Measures, Mask level Measures.

UNIT –III: Low-Voltage Low-Power Adders: Introduction, Standard Adder Cells, CMOS Adder's Architectures – Ripple Carry Adders, Carry Look-Ahead Adders, Carry Select Adders, Carry Save Adders, Low-Voltage Low-Power Design Techniques–Trends of Technology and Power Supply Voltage, Low-Voltage Low-Power Logic Styles.

UNIT –IV: Low-Voltage Low-Power Multipliers: Introduction, Overview of Multiplication, Types of Multiplier Architectures, Braun Multiplier, Baugh-Wooley Multiplier, Booth Multiplier, Introduction to Wallace Tree Multiplier.

UNIT –V: Low-Voltage Low-Power Memories: Basics of ROM, Low-Power ROM Technology, Future Trend and Development of ROMs, Basics of SRAM, Memory Cell, Precharge and Equalization Circuit, Low-Power SRAM Technologies, Basics of DRAM, Self-Refresh Circuit, Future Trend and Development of DRAM.

TEXT BOOKS:

1. CMOS Digital Integrated Circuits – Analysis and Design – Sung-Mo Kang, Yusuf Leblebici, TMH, 2011.

2. Low-Voltage, Low-Power VLSI Subsystems – Kiat-Seng Yeo, Kaushik Roy, TMH Professional Engineering.

REFERENCE BOOKS:

1. Introduction to VLSI Systems: A Logic, Circuit and System Perspective – Ming-BO Lin, CRC Press, 2011

2. Low Power CMOS Design – Anantha Chandrakasan, IEEE Press/Wiley International, 1998.

3. Low Power CMOS VLSI Circuit Design – Kaushik Roy, Sharat C. Prasad, John Wiley & Sons, 2000.

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B.Tech. ECE	**L**	**T-P-D**	**C**
IV Year – II Semester	**3**	1-0-0	**3**

ARTIFICIAL NEURAL NETWORKS

(Elective – IV)

UNIT-I: Introduction: what is a neural network? Human brain , Models of a Neuron, Neural networks viewed as Directed graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks, Learning process –Error Correcting learning, Memory based learning , Hebbian learning Competitive, Boltzmann learning, Credit assignment problem, Memory , Adaption, Statistical nature of the learning process.

UNIT-II: Single layer perceptrons-Adaptive filtering problem, unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perception-convergence theorem, Relation between perceptron and Bayes classifier for a Gaussian Environment.

UNIT-III: Multilayer Perceptron-back propagation and algorithm XOR problem, Heuristics, Output representation and decision rule, Computer experiment, feature detection.

UNIT-IV: Back propagation-back propagation and differentiation, Hessian matrix, Generation, Cross validation, Network pruning techniques, Virtues and limitations of back propagation learning, Accelerated convergence, supervised learning.

UNIT-V: Self Organization Maps-Two basic feature mapping models, self organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive patter classification, Neuro Dynamics-Dynamical systems, stability of equilibrium states, attractors, neurodynamical models, manipulation of attractors as a recurrent network paradigm, Hopfield Models-Hopfield models, computer experiment.

TEXT BOOKS:

1. Neural Networks comprehensive foundations, Simon Hykines, PHI edition.

2. Artificial neural networks-B.Vegnanarayana prentice Hall of India P Ltd 2005.

REFERENCES:

1.Neural networks in computer intelligence, Li Min Fu TMH 2003

2. Neural networks James A Freeman David M S Kapura pearson education 2004.

3. Introduction to Artificial Neural Systems Jack M.Zurada, JAICO Publishing House Ed.2006.

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UGC AUTONOMOUS

B.Tech. ECE	**L**	**T-P-D**	**C**
IV Year –II Semester	**3**	1-0-0	**3**

RF CIRCUIT DESIGN

Unit-I: Introduction: Importance of radiofrequency design, Dimensions and units, frequency spectrum. • RF behavior of passive components: High frequency resistors, capacitors and inductors. • Chip components and Circuit board considerations: Chip resistors, chip capacitors, surface mounted inductors.

Unit-II: Transmission Line Analysis: Two-wire lines, Coaxial lines and Microstrip lines. Equivalent circuit representation, Basic laws, Circuit parameters for a parallel plate transmission line. • General Transmission Line Equation: Kirchhoff voltage and current law representations, Traveling voltage and current waves, general impedance definition, Lossless transmission line model. • Microstrip Transmission Lines. • Terminated lossless transmission line : Voltage reflection coefficient, propagation constant and phase velocity, standing waves. • Special terminated conditions: Input impedance of terminated lossless line, Short circuit transmission line, Open circuit transmission line, Quarter wave transmission line. • Sourced and Loaded Transmission Line: Phasor representation of source, Power considerations for a transmission line, input impedance matching, return loss and insertion loss.

Unit-III: The Smith Chart : • Reflection coefficient in Phasor form, Normalized Impedance equation, Parametric reflection coefficient equation, graphical representation, Impedance transformation for general load, Standing wave ratio, Special transformation conditions. • Admittance Transformations: Parametric admittance equation, Additional graphical displays. • Parallel and series Connections : Parallel connections of R and L connections, Parallel connections of R and C connections, Series connections of R and L connections, Series connections of R and C connections, Example of a T Network.

Unit-IV: RF Filter Design : • Filter types and parameters, Low pass filter, High pass filter, Bandpass and Bandstop filter, Insertion Loss. • Special Filter Realizations : Butterworth type filter, Chebyshev type filters, Denormalization of standard low pass design. • Filter Implementation : Unit Elements, Kuroda's Identities and Examples of Microstrip Filter Design. • Coupled Filters : Odd and Even Mode Excitation, Bandpass Filter Design, Cascading bandpass filter elements, Design examples.

Unit-V: Active RF Components: Semiconductor Basics : Physical properties of semiconductors, PN-Junction, Schottky contact. • Bipolar-Junction Transistors: Construction, Functionality, Temperature behaviour, Limiting values. • RF Field Effect Transistors: Construction, Functionality, Frequency response, Limiting values. • High Electron Mobility

Transistors: Construction, Functionality, Frequency response. 6. Active RF Component Modeling: • Transistor Models : Large-signal BJT Models, Small-signal BJT Models, Large-signal FET Models, Small-signal FET Models.

• Measurement of Active Devices: DC Characterization of Bipolar Transistors, Measurements of AC parameters of Bipolar Transistors, Measurement of Field Effect Bipolar Transistors Transistor Parameters.

TEXT BOOK

1.RF Circuit Design Theory & Applications – prentice hall publisher (2^{nd}).

2.RF Circuit Design: Theory & Applications, 2nd Edition

REFERENCE BOOKS

1.RF Circuit Design: Theory and Applications by Reinhold Ludwig

J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY

UGC AUTONOMOUS

B.Tech. ECE	**L**	**T-P-D**	**C**
IV Year – II Semester	**3**	1-0-0	**3**

DSP PROCESSORS AND ARCHITECTURES
(Elective – V)

UNIT I

Introduction to DSP Processors: Digital Signal Processors, various architectures: VLIW Architecture, Multiprocessor DSPs, SHARC, SIMD, MIMD, RISC and CISC. Execution Control and Pipelining: Hardware looping, Interrupts, Stacks, Relative Branch support, Pipelining and Performance, Pipeline Depth, Interlocking, Branch effects, Interrupt effects, Pipeline Programming models.

UNIT II

Typical real-time DSP systems: Data representations and arithmetic, Analog -to –digital conversion process, Uniform and non-uniform quantization and encoding, Oversampling in A/D conversion, Digital to analog conversion process: signal recovery, the DAC, Anti-imaging filtering, Oversampling in D/A conversion, Analog I/O interface for real-time DSP systems, sources of errors in DSP implementation, real time implementation considerations.

UNIT III

Fixed-Point DSP processors: Architecture of TMS 320C 5X, C54X Processors, addressing modes, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline operation of TMS320C54XX Processors, speed issues.

UNIT IV

Memory and I/O Interfacing: External bus interfacing signals, Memory interface, Parallel I/O interface: Programmed I/O, Interrupts and I/O, Direct memory access (DMA). Hardware interfacing, Multichannel Buffered Serial Port (McBSP), McBSP Programming, CODEC interface circuit.

UNIT V

Implementation of DSP algorithms: The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, PID Controller, Adaptive Filters, 2-D Signal Processing. An FFT Algorithm for DFT Computation, A Butterfly Computation, Overflow and scaling, Bit-Reversed index generation, An 8-Point FFT implementation on the TMS320C54XX.148.

TEXT BOOKS

1. Digital Signal Processing –Avtar Singh and S. Srinivasan, Thomson Publications, 2004.

2. Digital Signal Processing A Practical approach, Second Edition, Emmanuel C.I feachor, Barrie W Jervis, Pearson Publications. 2002.

REFERENCES

1. Digital Signal processors Architectures, implementations and Applications-Sen M.Kuo, Woon-Seng S.Gan, Pearson Publications,

2009.

2. Digital Signal Processors, Architecture, Programming and Applications –B. Venkata Ramani and M. Bhaskar,TMH, 2004.

3. Digital Signal Processing –Jonatham Stein, John Wiley, 2005.

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UGC AUTONOMOUS

B.Tech. ECE	**L**	**T-P-D**	**C**
IV Year – II Semester	**3**	1-0-0	**3**

BIOMEDICAL SIGNAL PROCESSING

(Elective - V)

UNIT I: Discrete and continuous Random variables, Probability distribution and density functions. Gaussian and Rayleigh density functions, Correlation between random variables. Stationary random process, Ergodicity, Power spectral density and autocorrelation function of random processes. Noise power spectral density analysis, Noise bandwidth, noise figure of systems.

UNIT II: Data Compression Techniques: Lossy and Lossless data reduction Algorithms. ECG data compression using Turning point, AZTEC, CORTES, Hoffman coding, vector quantisation, DCT and the K L transform. Cardiological Signal Processing: Pre-processing. QRS Detection Methods. Rhythm analysis. Arrhythmia detection Algorithms. Automated ECG Analysis. ECG Pattern Recognition. Heart rate variability analysis.

UNIT III: Adaptive Noise Canceling: Principles of Adaptive Noise Canceling. Adaptive Noise Canceling with the LMS daptation Algorithm. Noise Canceling Method to Enhance ECG Monitoring. Fetal ECG Monitoring.

UNIT IV: Signal Averaging, polishing–mean and trend removal,. Linear prediction. Yule–walker(Y–W) quations. Neurological Signal Processing: Modeling of EEG Signals. Detection of spikes and spindles Detection of Alpha, Beta and Gamma Waves. Auto Regressive(A.R.) modeling of seizure EEG. Sleep Stage analysis. Inverse Filtering. Least squares and polynomial modeling.

UNIT V: Original Prony's Method. Prony's method, Prony's Method based on the Least Squares Estimate. Analysis of Evoked Potentials.

TEXT BOOKS:

1. Rangaraj M. Rangayyan – Biomedical Signal Analysis. IEEE Press, 2001.
2. D.C.Reddy, Biomedical Signal Processing- principles and techniques, Tata McGraw-Hill, 2005.

REFERENCE BOOKS:

1. Weitkunat R, Digital Bio signal Processing, Elsevier, 1991.

2. Akay M , Biomedical Signal Processing, Academic: Press 1994

3. Cohen.A, Biomedical Signal Processing -Vol. I Time & Frequency Analysis, CRC Press, 1986.

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UGC AUTONOMOUS

B.Tech. ECE	**L**	**T-P-D**	**C**
IV Year – II Semester	**0**	0-3-0	**2**

SOFT SKILLS LAB II
(Common to all Branches)

Activity/Experiment

Group Discussion

1. Dynamics of Group discussion—tips for Group Discussion—Traits tested in GD
2. Non-verbal Communication in GD
3. Body language in GD

Interview Skills

4. Introduction—types of Interview
5. FAQ's in Interview
6. reasons for rejecting a candidate
7. On the day of interview
8. common mistakes in interview
9. post interview etiquette
10. Dress code and tips for job seekers at interview
11. Body language in Interview skills

Mock Interview

12. Parameters to evaluate students' performance

Textbooks:

1. Soft Skills: Know Yourself and Know the World—Dr. K. Alex-S. Chand Publising-2010
2. Managing Soft skills: K.R. Lakshminarayanan & Murugavel, Scitech Publications-2010