ACADEMIC REGULATIONS

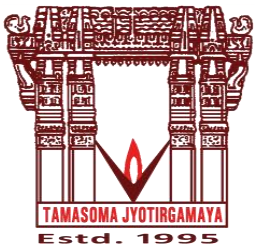
COURSE STRUCTURE AND

DETAILED SYLLABUS

Electronics and Communication Engineering

B.TECH. FOUR YEAR DEGREE COURSE

(Applicable for the batches admitted from 2012-2013)



VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

An Autonomous Institute
Approved by AICTE & Affiliated to JNTUH
NAAC Accredited-'A' Grade

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VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY
HYDERABAD
An Autonomous Institute
Approved by AICTE, New Delhi and Govt. of A.P & Affiliated to JNTUH

ACADEMIC REGULATIONS FOR B.TECH. DEGREE COURSE
(Applicable for Students admitted from the academic year 2012-2013)

1. Courses of study

The following courses of study are offered at present for specialization 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.
10	Electronics and Instrumentation Engineering
12	Information Technology
24	Automobile Engineering

1.1 Eligibility Criteria for Admission

The eligibility criteria for admission into engineering programmes shall be as mentioned below:

The candidate shall be an Indian National / NRI

The candidate should have completed 16 years of age as on 31st December of the academic year for which the admissions are being conducted.

The Candidate should have passed the qualifying examination (10+2) or equivalent as on the date of admission.

Seats in each programme in the Institution are classified into **Category** A and **Category** B as per the G.Os.

1.1.1 Category – A Seats

These seats will be filled through counseling as per the rank at the Common Entrance Test (EAMCET) conducted by the State Government and as per other admission criteria laid down in the G.Os.

1.1.2 Category - B Seats

These seats will be filled by the institute as per the G.Os Issued by State Government from time to time.

1.1.3 Category: Lateral Entry

The candidate shall be admitted into the Third Semester, based on the rank secured by the candidate at Engineering Common Entrance Test (ECET(FDH)) by the Convener, ECET.

2. Distribution and Weightage of Marks

i. The performance of a student in each Semester shall be evaluated subject – wise with **a maximum of 100 marks for theory and 100 marks for practical subjects.** In addition, an Industry oriented mini-project, Seminar, Comprehensive viva-voce, and Project Work shall be evaluated for **50, 50, 50 and 200 marks** respectively.

ii. For theory subjects the distribution shall be **30 marks for Mid Semester Evaluation** and **70 marks for the End-Examination**.

For theory subjects, Two mid examinations will be conducted in each Semester as per the academic calendar. Each mid examination is evaluated for 25 marks.

Two assignments are to be given to students covering the syllabus of first Mid and second Mid examinations and are evaluated for 5 marks each. .

The first assignment shall be submitted before first mid examinations and second Assignment should be submitted before second mid examination.

At the end of the Semester, Internal Marks (Maximum 30) for the respective subject is assigned as follows:

(a) 25 marks: 80% from the best performed Mid examination and 20% from the other Mid examination.

(b) 5 marks: Average of the two assignment marks

iii. For practical subjects there shall be a continuous evaluation during the Semester for 30 **marks and 70 marks for end examination**. Out of the 30 marks, **day-to-day work in the laboratory shall be evaluated for 10 marks**, and 10 marks for practical examination (two practical examinations will be conducted and the average of the two examinations will be taken into account) and 10 marks for laboratory record.

NOTE: A student who is absent for any assignment/Mid term examination for any reason what so ever shall be deemed to have secured 'zero' marks in

the test/examination and no makeup test/examination shall be conducted.

iv For the subjects having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing, Production Drawing Practice, and Estimation etc.,) the distribution shall be 30 **marks for internal evaluation (15 marks for day-to-day work and 15 marks for Mid examination (**the average of the two examinations will be taken into account**) and 70 marks for end semester examination.** There shall be **two Mid examinations** in a Semester.

V There shall be an **industry-oriented mini-Project**, in collaboration with an industry of their specialization, to be taken up during the a summer vacation after III year II Semester examination. The **mini project shall be evaluated during the IV year I Semester.** The industry oriented mini project shall be submitted in report form and should be presented before a committee, which shall be evaluated for **50 marks.** The committee consists of Head of the Department, the supervisor of mini project and a senior faculty member of the department. There shall be **no Midterm assessment for industry oriented mini project. However, attending the shadow engineering program is a pre – requisite for evaluating industry – oriented mini project**. Students should submit a report on learning outcomes of the shadow engineering. Every student should attend shadow engineering programming an industry for a week days during second year I or II semester.

vi. There shall be a **Seminar presentation in IV year II Semester**. For the Seminar, the student shall collect the information on a specialized topic other than the project topic and prepare a technical report, showing his understanding of the topic, and submit to the department, which shall be evaluated by a Departmental committee consisting of the Head of the department, Seminar supervisor and a senior faculty member. **The seminar will be awarded 50 marks in which 40 marks will be evaluated for seminar report and 10 marks for MTP Record by the committee.**

vii. There shall be a **Comprehensive Viva-Voce in IV year II Semester**. The Comprehensive Viva-Voce will be conducted by a Committee consisting of the Head of the Department and three Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the student's understanding in various subjects studied during the B.Tech. course of study. The Comprehensive Viva-Voce is evaluated **for 50 marks** by the Committee. There will be **no Midterm assessment for the Comprehensive viva-voce.**

viii. The Project work shall be started by the student in the beginning of the IV year I Semester. Out of a total of **200 marks** for the project work, **60 marks shall be for Midterm Evaluation** and **140 marks for the Semester end Examination**. The viva-voce shall be conducted by a committee comprising of an external examiner, Head of the Department and the project supervisor and one senior faculty. The evaluation of project work shall be conducted at the end of the IV year II Semester. **The Midterm Evaluation shall be on the basis of three Seminars conducted during the IV year II Semester for 30 marks by the committee consisting of Head of the Department, project supervisor and senior faculty member of the Department and for 30 marks by the supervisor of the project.**

3. Semester end Examination

(a) Theory Courses

Each course is evaluated for 70 marks. Examination is of 3 hours duration.

(b) Practical Courses

Each lab course is evaluated for 70 marks. The examination shall be conducted by the laboratory teacher and another senior teacher concerned with the subject of the same/other department/Industry. One examiner may be appointed by the Chief Superintendent in consultation with HOD as and when required.

(c) Supplementary Examinations

Supplementary examinations will be conducted along with regular Semester end examinations.

(During even Semester regular examinations: supplementary examinations of odd Semester

and during odd Semester regular examinations: supplementary examinations of even Semester will be conducted).

4. Attendance Requirements

i. A student shall be eligible to appear for the Semester end examinations if he acquires a **minimum of 75% of attendance in aggregate of all the subjects** for Semester.

ii. Condonation of shortage of attendance in aggregate **up to 10% (65% and above and below 75%)** in a Semester may be granted by **Institute Academic Committee.**

iii. A student will not be permitted to write the end examination and not promoted to the next Semester unless he satisfies the attendance requirement of the present Semester, as applicable. He may seek re-admission for that Semester when offered next.

iv. Shortage of Attendance **below 65% in aggregate** shall in **NO case be condoned.**

v. Students whose shortage of attendance is not condoned in any Semester are not eligible to take their end semester examination of that Semester.

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

5. Minimum Academic Requirements

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item No.**4.**

i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical design or drawing subject or project, if he secures **not less than 35% (25 out of 70 marks)** of **marks in the end examination and a minimum of 40% of marks in the sum total of the Midterm evaluation and end semester examination taken together.**

ii. A student shall be **promoted from II to III year** only if he fulfils the academic requirement of **37 credits from the following examinations,**

- Two regular and one supplementary examinations of I year I Semester
- One Regular and One Supplementary exam of I year II Semester
- one regular examination of II year I Semester irrespective

iii. A student shall be **promoted from III year to IV year** only if he fulfils the academic requirements of total **62 credits from the following examinations,**

- Three regular and Two supplementary examinations of I B Tech I Semester.
- Two regular and two Supplementary examinations for I B Tech II Semester
- Two regular and one supplementary examinations up to the end of II year I Semester.
- One regular and one supplementary examinations of II year II Semester.
- One regular examination of III year I Semester.

iv. A student shall register and put up minimum academic requirement in all 200 credits and earn the 200 credits. Marks obtained in all 200 credits shall be considered for the calculation of Cumulative Grade Point Average **(CGPA)**.

v. In addition to the above 200 credits the student must complete the non credit courses also. The non-credit courses awarded with a grade of satisfactory or not satisfactory based on the attendance of the student. Minimum attendance for the non-credit course is 75%.

vi. The student should also register and complete any two value added courses offered by the Institute.

vii. Students who fail to earn 200 credits as indicated in the course structure **within eight academic years** from the year of

their admission shall **forfeit their seat** in B.Tech. course and their **admission stands cancelled.**

6. Course pattern

i. The entire course of study is of four academic years. **All the I, II, III and IV years are of Semester pattern .**

ii. A student eligible to appear for the end semester examination in a subject, but absent or has failed in the end semester examination may reappear for that subject at the supplementary examination whenever conducted.

iii. When a student is detained due to shortage of attendance in any Semester, he may be re-admitted into that Semester when it is offered next, **with the academic regulations of the batch into which he gets readmitted.**

iv. When a student is detained due to lack of credits in any year, he may be eligible to be promoted or for promotion into the next year after fulfillment of the academic requirements, **with the academic regulations of the batch into which he gets admitted**

Award of B.Tech. Degree and Class

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

i) Pursued **a course of study for not less than four academic years and not more than eight academic years.**

ii) Registered for **200 credits** and secured **200 credits and other Academic Requirements .**

iii) complete the non-credit courses and value added courses as per their course structure.

NOTE: Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech. Course.

7. CGPA System:

Method of awarding absolute grades and grade points:

The **absolute grading method** is followed, based on the total marks obtained in internal and external examinations. Grades and grade points are assigned as per the Table given below

B.Tech Program: The Absolute Grading Method is followed, based on the total marks obtained in internal and external examinations. Grades and Grade points are assigned as given below

Marks Obtained	Grade	Description of Grade	Grade Points(GP) Value Per Credit
>=90	O	Outstanding	10.00
>=80 and <89.99	A+	Excellent	9.00
>=70 and <79.99	A	Very Good	8.00
>=60 and <69.99	B	Good	7.00
>=50 and <59.99	C	Fair	6.00
>=40 and <49.99	D	Pass	5.00
<40	F	Remedial	
Not Appeared the Exam(s)	N	Absent	

The student is eligible for the award of the B.Tech degree with the class as mentioned in the Table.

CGPA	CLASS
>= 7.5	First Class with Distinction
>= 6.5 and <7.5	First class
>= 5.5 and < 6.5	Second Class
>=5.0 and < 5.5	Pass class

Calculation of Semester Grade Points Average (SGPA):

The performance of each student at the end of the each semester is indicated in terms of SGPA. The SGPA is calculated as below:

$$SGPA = \frac{Total\ Earned\ Weighted\ Grade\ Points\ for\ that\ Semester}{Total\ Credits\ for\ the\ Semester}$$

$$SGPA = \frac{\sum_{i=1}^{P} Ci * Gi}{\sum_{i=1}^{P} Ci}$$

Where ‘Ci’ = Number of Credits allotted to particular subject ‘I’

‘Gi’ = Grade Point corresponding to the letter grade awarded in that subject ‘i”

‘i”= 1,2,…..P represent the number of subjects for that particular semester

* **SGPA is calculated and awarded for the candidates who pass all the courses in a semester.**

Calculation of Cumulative Grade Point Average (CGPA) for Entire Programme.

The CGPA is calculated as below:

Assessment of the overall performance of a student is obtained by calculating Cumulative Grade Point Average (CGPA), which is weighted average of the grade points obtained in all subjects during the course of study.

$$CGPA = \frac{\sum_{i=1}^{m} Ci * Gi}{\sum_{i=1}^{m} Ci}$$

Where Ci= Number of credits allotted to a particular subject ‘I”

Gi = Grade Point corresponding to the letter grade awarded in that subject ‘i”

I= 1,2,….m represent the number of subjects of the entire program.

Grade lower than D in any subject is not considered for CGPA calculation. The CGPA is awarded only when the student acquires the required number of credits prescribed for the program.

Grade Card

The grade card issued shall contain the following:

a) The credits for each subject offered in that semester
b) The letter grade and grade point awarded in each subject
c) The **SGPA/CGPA**
d) Total number of credits earned by the student up to the end of that semester.
e) Award list indicating the marks awarded to the student.

8. Withholding of Results

If the student has not paid dues to College, or if any case of indiscipline is pending against him, the result of the candidate may be withheld and he will not be allowed to go into the next higher Semester. The award or issue of the Degree may also be withheld in such cases.

9. **Transitory Regulations**

Students who have discontinued or have been detained for want of attendance or any other academic requirements, may be considered for readmission as and when they become eligible. They have to take up Equivalent subjects, as substitute subject in place of repetition of subjects as decided by the Institute Academic Committee.

10. Minimum Instruction Days

The minimum instruction days for each Semester shall be **90 instruction days.**

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

12. The decision of the Institute Academic Committee will be final in respect of equivalent subjects for those students who are transferred from other colleges. The procedure for permitting students to transfer from other colleges will be decided by the principal / Institute Academic Committee keeping the Government Rules in view.

13. General

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

ii. The academic regulations should be read as a whole for the purpose of any interpretation.

iii. In the case of any discrepancy/ambiguity/doubt arises in the above rules and regulations, the decision of the Principal shall be final.

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

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

(Applicable for students admitted from the academic year 2013-2014)

(i) A student shall register for all 150 credits and earn all the 150 credits. Marks obtained in all 150 credits shall be considered for the calculation of the class.

(ii) A student who fails to earn 150 credits as indicated in the course structure within **six** academic years from the year of their admission shall forfeit their seat in B.Tech. programme and their admission stands cancelled.

(iii) The same attendance regulations are adopted as that of B.Tech. Four year degree course.

(iv) A student shall be promoted from third year to fourth year only on fulfilling the academic requirements of securing 37 credits from the following examinations.

a. Two regular and one supplementary examination of II year I Semester

b. One regular and one supplementary examination of II year II Semester

c. One regular examination of III year I Semester.

In case of getting detained for want of credits the student may make up the credits through supplementary exams of the above exams before the date of commencement of class work for IV year I Semester.

(v) All other regulations as applicable to B.Tech. four year degree course will hold good for B.Tech. (Lateral Entry Scheme).

15. Malpractice Rules

Disciplinary Action for Malpractices/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.
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 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	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 are also debarred and forfeit their seats. In case of outsiders, they will be handed over to the police

	whether by words, either spoken or written or by signs 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.	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 University 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.	If the student belongs to the college, 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.
12.	If any malpractice is detected which is not covered in the above clauses 1	

	to 11 shall be reported to the academic council of the Institute for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

Punishments to the candidates as per the above guidelines.

Malpractice identified at Spot center during valuation

The following procedure is to be followed in the case of malpractice cases detected during valuation, scrutiny etc. at spot center.

1) Malpractice is detected at the spot valuation. The case is to be referred to the malpractice committee. Malpractice committee will meet and discuss/question the candidate and based on the evidences, the committee will recommend suitable action on the candidate.
2) A notice is to be served to the candidate(s) involved through the Principal to his address and to the candidate(s) permanent address regarding the malpractice and seek explanations.
3) The involvement of staff who are in charge of conducting examinations, invigilators valuing examination papers and preparing / keeping records of documents relating to the examinations in such acts (inclusive of providing in correct or misleading information) that infringe upon the course of natural justice to one and all concerned at the examinations shall be viewed seriously and recommended for award of appropriate punishment after thorough enquire.
4) Based on the explanation and recommendation of the committee action may be initiated.
5) **Malpractice committee:**
   i. Controller of Examinations — Chairman
   ii. Assistant controller of Evaluation — Member
   iii. Chief Examiner of the subject/subject expert — Member
   iv. Concerned Head of the Department — Member

VNR Vignana Jyothi Institute of Engineering & Technology

B. TECH ELECTRONICS AND COMMUNICATION ENGINEERING

Regulations- R12

I YEAR I SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
MTH1101	Mathematics – I	3	1	3
MTH1102	Mathematics- II	3	1	3
PHY1101	Engineering Physics	3	1	3
ENG1101	English	3	0	3
CSE1101	Computer Programming	3	0	3
MED1105	Engineering Drawing	2	4	4
ENG1203	English Language Communication Skills Lab	0	3	2
CSE1201	Computer Programming Laboratory	0	3	2
MED1202	Workshop Practice	0	3	2
Total		**17**	**16**	**25**

VNR Vignana Jyothi Institute of Engineering & Technology

B. TECH ELECTRONICS AND COMMUNICATION ENGINEERING

I YEAR II SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
EEE1101	Circuit Theory	4	0	4
MTH1104	Numerical analysis and Linear Programming	3	1	3
PHY1103	Advanced Engineering Physics	3	1	3
CHE1101	Engineering Chemistry	3	0	3
ITD1102	Data Structures	3	0	3
ECE1101	Electronic Devices and circuits	3	1	3
ITD1202	Data Structures Laboratory	0	3	2
EPC1201	Engineering Physics & Engineering Chemistry Laboratory	0	3	2
ECE1201	Electronic Devices and circuits Laboratory	0	3	2
Total		**19**	**12**	**25**

*** T/P/D: Tutorial/Practical/Drawing Practice**

VNR Vignana Jyothi Institute of Engineering & Technology

B. TECH ELECTRONICS AND COMMUNICATION ENGINEERING

II YEAR I SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
MTH1105	Applied Mathematics	4	1	4
ECE1102	Probability Theory and Stochastic Processes	4	1	4
EIE1101	Signals and Systems	4	1	4
EEE1154	Principles of Electrical Engineering	3	1	3
ECE1103	Electronic Circuit Analysis	4	1	4
NCC1101	Human Values and Professional Ethics	2	**Non Credit Audit Course**	
ECE1202	Basic Simulation Laboratory	0	3	2
ECE1203	Electronic Circuit Analysis Laboratory	0	3	2
EEE1252	Electrical Engineering Laboratory	0	3	2
Total		**21**	**14**	**25**

VNR Vignana Jyothi Institute of Engineering & Technology

B. TECH ELECTRONICS AND COMMUNICATION ENGINEERING

II YEAR II SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
EEE1105	Control Systems	3	1	3
ECE1104	Switching Theory and Logic Design	4	0	4
ECE1105	Electromagnetic Theory and Transmission Lines	4	1	4
EIE1104	Pulse and Digital Circuits	3	1	3
CED1105	Environmental Studies	3	1	3
ECE1106	Analog Communications	4	1	4
ECE1204	Analog Communications Laboratory	0	3	2
EIE1202	Pulse and Digital Circuits Laboratory	0	3	2
Total		**21**	**11**	**25**

*** T/P/D: Tutorial/Practical/Drawing Practice**

VNR Vignana Jyothi Institute of Engineering & Technology

B. TECH ELECTRONICS AND COMMUNICATION ENGINEERING

III YEAR I SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
ITD1104	Computer Organization	4	0	4
EIE1106	Linear and Digital IC Applications	4	0	4
ECE1107	Digital Communications	3	1	3
ECE1108	Antennas and Wave Propagation	4	0	4
CMS1101	Business Economics and Financial Analysis	4	0	4
NCC1102	Soft Skills and Personality Development	2	**Non Credit Audit Course**	
ENG1204	Advanced English Communication Skills Laboratory	0	3	2
EIE1204	Linear and Digital IC Applications Laboratory	0	3	2
ECE1205	Digital Communications Laboratory	0	3	2
Total		**21**	**10**	**25**

VNR Vignana Jyothi Institute of Engineering & Technology

B. TECH ELECTRONICS AND COMMUNICATION ENGINEERING

III YEAR II SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
EIE1124	Electronic Measurements and Instrumentation	3	1	3
CMS1102	Management Science	4	0	4
ECE1109	Microprocessors and Microcontrollers	4	0	4
ECE1110	Digital Signal Processing	3	1	3
ITD1105 ITD1122 EEE1127	**Open Elective -1** Object Oriented Programming through JAVA Cloud Computing Renewable Energy Sources	3	0	3
ECE1111	Microwave Engineering	4	0	4
ECE1206	Microprocessors and Microcontrollers Laboratory	0	3	2
ECE1207	Digital Signal Processing Laboratory	0	3	2
Total		**21**	**8**	**25**

*** T/P/D: Tutorial/Practical/Drawing Practice**

VNR Vignana Jyothi Institute of Engineering & Technology

B. TECH ELECTRONICS AND COMMUNICATION ENGINEERING

IV YEAR I SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
ECE1112	VLSI Design	3	0	3
ITD1106	Computer Networks	4	0	4
ECE1113 ECE1114 EEE1119	**Elective – I** Digital Image Processing Optical Communications Artificial Neural Networks and Fuzzy Logic	3	0	3
MED1164 CED1147 ITD 1107	**Open Elective -2** Elements of Nano Technology Disaster Management Operating Systems	3	0	3
ECE1115 CSE1130 ECE1116	**Elective – II** RADAR Systems Relational Data Base Management Systems Speech Processing	3	0	3
ECE1117 ECE1118 ECE1119	**Elective – III** DSP Processors and Architectures Telecommunication Switching Systems Satellite Communications	3	0	3
ECE1208	Microwave Engineering Laboratory	0	3	2
ECE1209	ECAD and VLSI Laboratory	0	3	2
ECE1301	Industry Oriented mini – Project	0	6	2
Total		**19**	**12**	**25**

***Major Project initiated in I.Sem and Evaluated in II.Sem**

* T/P/D: Tutorial/Practical/Drawing Practice

VNR Vignana Jyothi Institute of Engineering & Technology

B. TECH ELECTRONICS AND COMMUNICATION ENGINEERING

IV YEAR II SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
ECE1120	Cellular and Mobile Communications	3	1	3
	Elective –IV			
ECE1121	Spread Spectrum Communications			
ECE1122	Digital Design through Verilog	3	0	3
CSE1112	Cryptography and Network Security			
ECE1123	Television and Video Engineering			
	Elective – V			
ECE1124	Embedded Real Time Operating Systems			
ECE1125	Adhoc Wireless Networks	3	0	3
EIE1107	Bio-Medical Instrumentation			
ECE1126	CPLD and FPGA Architectures			
ECE1302	Technical Seminar	0	3	2
ECE1303	Comprehensive Viva	0	3	2
ECE1304	Project work	0	18	12
Total		**9**	**22**	**25**

* T/P/D: Tutorial/Practical/Drawing Practice

Note: All End Examinations (Theory and Practical/ Drawing) are of three hours duration.

VNR Vignana Jyothi Institute of Engineering & Technology

I Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(MTH1101) MATHEMATICS – I
(Advanced Calculus)

Pre-requisites: Calculus

Course Objectives

- Understand Taylor's theorem and its application to maxima and minima of f(x,y)
- Understand the process of curve sketching
- Understand multiple integrals and its applications
- Apply the integral theorems of vector calculus.

Course Outcomes

After going through this course the student will be able to

- Solve problems involving the maxima and minima of f(x,y).
- Apply the curve tracing concepts to find arc length of curves, surface area, volume of solids of revolution.
- Evaluate the multiple integrals using appropriate change of variables.
- Verify the integral theorems.

UNIT I

Differential Calculus

Mean value theorems - Rolle's theorem, Lagrange's theorem, Cauchy's theorem, and generalized mean value theorem (Taylor's Theorem) (statements only), Curvature and Radius of curvature, Curve tracing – Cartesian, polar and parametric curves(standard curves only)

UNIT II

Functions of Several Variables

Partial differentiation; Euler's theorem, Functional dependence; Jacobian; Maxima and Minima of functions of two variables with constraints and without constraints.

UNIT III

Improper integrals and Multiple intehgrals

Improper Integrals; Beta, Gamma, and Error integrals - Properties and simple applications. Applications of integration to lengths, volumes and surface areas in cartesian and polar coordinates. Multiple integrals - double and triple integrals, change of variables (Cylindrical and Spherical polar coordinates) and change of order of integration.

UNIT IV

Vector calculus

Introduction to vector and scalar functions; gradient, curl, divergence, and their related properties of sums and products; Laplacian and second order operators; Vector integration - line integral, work done, potential function; Area, surface, and volume integrals; Statements of Vector integral theorems and their verification (without proofs) - Green's theorem, Stoke's theorem, and Gauss divergence theorem.

UNIT V

Elementary analysis

Sequences and series - convergence and divergence, ratio test, comparison test, integral test, Cauchy's root test, Raabe's test (statements only for the tests), and absolute and conditional convergence.

TEXT BOOKS

1. Calculus and Analytic Geometry by Thomas and Finney, 9th edition; Publisher: Pearson Education.
2. Higher Engineering Mathematics – by Dr. B. S. Grewal, 40th edition, Publisher: Khanna Publishers.
3. Schaum's Outline of Vector Analysis by Murray R. Spiegel (2011); 2nd edition; Publisher: Tata McGraw Hill.

REFERENCES

1. Elementary Analysis: The Theory of Calculus by Kenneth Ross; Publisher: Springer
2. Advanced Engineering Mathematics by Erwin Kreyszig, 8th edition; Publisher: John Wiley.

VNR Vignana Jyothi Institute of Engineering & Technology

I Year B. Tech ECE I Sem	L	T/P/D	C
	3	1	3

(MTH1102) MATHEMATICS – II

(Linear Algebra and Ordinary Differential Equations)

Pre-requisites: Basic Algebra

Course Objectives

- Understand the Echolen form and Normal form of a matrix and its applications in solving linear system of equations.
- Understand the methods of solving first order differential equations and learn about its applications to L-R and R-C circuits.
- Apply the convolution theorem to evaluate Laplace Transform of the functions.
- Apply Z-Transforms in solving the difference equations.

Course Outcomes

After going through this course the student will be able to

- Find the rank using Echolen form and Normal form.
- Solve the problems in first order and second order differential equations.
- Learn Laplace Transform as a tool.
- Evaluate the Z-Transform of the given function.

LINEAR ALGEBRA

UNIT I

Solution of linear systems

Matrices and linear systems of equations - elementary row transformations, Rank, row Echelon form, and normal form; Solution of linear systems - direct methods - LU decomposition, LU decomposition from Gauss elimination, and solution of Tri-diagonal systems by Thomas algorithm; Eigen values, eigen vectors, and their properties - Liner dependence and independence; Cayley-Hamilton theorem (without proof) - inverse and powers of a matrix by Cayley-Hamilton theorem, diagonalization of a matrix, calculation of powers of a matrix; Modal and spectral matrices.

UNIT II

Linear transformations

Real matrices - symmetric, skew symmetric, and orthogonal linear transformation; Complex matrices - Hermitian, Skew-Hermitian and unitary matrices; Quadratic forms - reduction of quadratic form to canonical form, rank, positive, negative definite, semi definite, index, signature, Sylvester law, and singular value decomposition.

ORDINARY DIFFERENTIAL EQUATIONS

UNIT III

Ordinary differential equations and their applications

Differential equations of first order and first degree - Linear, Bernoulli and exact differential equation; Applications of differential equations of first order and first degree - Newton's law of cooling, Law of natural growth and decay, Orthogonal trajectories, and basic circuits.

UNIT IV

Differential equations of higher order and their applications

Differential equations of higher order - homogeneous and non-homogenous type, differential equations of second order and higher order with constant coefficients with right hand side term of the type e^{ax}, sin (ax), cos (ax), polynomials in x, e^{ax} V(x), x V(x), and method of variation of parameters and Euler-Cauchy's 2^{nd} order differential equations, applications to mechanical systems and Simple harmonic motion.

UNIT V

Laplace transform and application to ODE

Laplace transform of standard functions; Inverse transform-first shifting theorem; Dirac's delta function; Convolution theorem; Periodic function; Differentiation and integration of transforms; Application of Laplace transforms to ordinary differential equations.

TEXT BOOKS

1. Differential Equations, with Applications and Historical Notes by George F. Simmons and John S. Robertson (2008) 2^{nd} Edition; Publisher: Tata McGraw Hill.
2. A First Course in Differential Equations by Dennis G. Zill; Publisher: Brooks Cole.
3. Advanced Engineering Mathematics by Dennis G. Zill, Warren S. Wright, and Michael R. Cullen, 4^{th} edition; Publisher: Jones & Bartlett Learning.

REFERENCES

Advanced Engineering Mathematics by Erwin Kreyszig, 8^{th} edition; Publisher: John Wiley.

1. Advanced Engineering Mathematics by Peter V. O'Neil, 9^{th} Edition; Publisher: Cengage Learning.
2. Elementary Differential Equations and Boundary Value Problems by William E. Boyce and Richard C. Diprima; Publisher: Wiley.
3. Linear Algebra and its applications by David C Clay; Publisher: Pearson Education.

VNR Vignana Jyothi Institute of Engineering & Technology

I B.TECH ECE I Sem	L	T/P/D	C
	3	1	3

(Common for all Branches)

(PHY1101) ENGINEERING PHYSICS

Pre-requisites: Intermediate Physics

Course Objectives

- To learn essential concepts in Optics as light interacts with matter.
- To learn basic principles and working of LASERS and Double refracting crystals.
- To describe structural classification and bonding in crystals.
- To know various crystal defects and crystal analysis with X-rays.
- To understand surface phenomenon and size dependent properties of solids.

Course Outcomes

After going through this course the student will be able to

- Realize importance of diffraction in optical elements and interference of light in thin films.
- work with different wave plates to obtain desired polarization and to distinguish LASER light from ordinary light.
- Describe types of crystal systems and bonds in crystals.
- illustrate the importance of X-rays in crystal studies and identify various crystal defects.
- Identify importance of Nano-dimensional materials.

UNIT I

INTERFERENCE

Superposition principle, resultant amplitude, coherence, methods to obtain coherent sources, interference, Young's double slit experiment, interference in thin films by reflection, Newton's rings Experiment

DIFFRACTION-I:

Distinguish between Fraunhofer and Fresnel diffraction, diffraction at single slit (Qualitative and Quantitative (Phasors approach)).

UNIT II

DIFFRACTION-II

Diffraction at double slit, circular aperture, and multiple slits (grating)(Qualitative Approach), Resolution of spectral lines, Rayleigh criterion, and resolving power of grating.

POLARIZATION

Polarization phenomenon, Brewster's Law and Malus law, examples, types of polarization, double refraction, Nicol prism, Quarter and Half wave plates

UNIT III

LASERS:

Characteristics of Lasers – Spontaneous and Stimulated Emission of radiation, meta stable state, population inversion, lasing action, Einstein's coefficients and relation between them –– Ruby Laser – Helium-Neon Laser –Semiconductor Laser – Applications of lasers.

FIBER OPTICS:

Principle of optical fiber and properties – Acceptance angle and acceptance cone – Numerical aperture –Types of fibers and refractive index profiles – Qualitative analysis of attenuation in optical fibers –Application of optical fibers.

UNIT IV

ELEMENTS OF STATISTICAL MECHANICS:

Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics (non-mathematical treatment); Photon gas, Planck's law of black body radiation; Deduction of Wien's law and Rayleigh-Jeans law from Plank's law.

PRINCIPLES OF QUANTUM MECHANICS:

Waves and particles – De Broglie hypothesis - Matter waves - Davisson and Germer experiment –Heisenberg's uncertainty principle - Schrodinger Wave Equation – Wave function and its Physical Significance - Particle in one dimensional potential box(wave functions, probability densities and energy states).

UNIT V

FREE ELECTRON FERMI GAS:

Energy levels in one dimension, Effect of temperature on the Fermi-Dirac distribution, Free electron gas in three dimensions, electrical conductivity & Ohm's law, Electrical Resistivity of Metals (Qualitative).

BAND THEORY OF SOLIDS:

Electron in a periodic potential; Bloch Theorem; Kronig-Penney model (non-mathematical treatment); Origin of energy band formation in solids; Classification of materials into conductors, semiconductors & Insulators; and Concept of effective mass of an electron.

TEXT BOOKS

(1) Physics vol.2, by Halliday, Resnick and Krane; John Wiley & Sons
(2) Concepts of Modern physics by Arthur Beiser, McGraw Hill Inc.
(3) Introduction to Solid State Physics by Charles Kittel : John Wiley & Sons

REFERENCE BOOKS

(1) Engineering Physics by R.K.Gaur and S.L.Gupta; Dhanpat Rai and Sons
(2) Applied Physics by P.K.Mittal, IK International Publishing House (P) Ltd.
(3) Optics by Ghatak and Thyagarajan, Tata Mc Graw
(4) Engineering Physics by G Sahashra Buddhe; University Press
(5) Elements of Solid State Physics by J.P.Srivatsva, PHI Publishers
(6) Engineering Physics by Dr M Chandra Shekar and Dr P. Appala Naidu, VGS Book links.
(7) Introduction to Optical Communication by G. Keiser
(8) Quantum Mechanics by Gupta Kumar Sharma

VNR Vignana Jyothi Institute of Engineering and Technology

I Year B.Tech ECE- I Sem	L	T/P/D	C
	3	0	3

(ENG1101) ENGLISH

Introduction

This is the age of information and communication technologies. Engineers and technical professionals need to convey technical information in English for various purposes.

Besides learning general English as an international language, engineering students need to be equipped with adequate writing ability so that they can communicate technical information clearly on at least a basic level. A good English writing proficiency can be a contributing factor to professional recognition and career prospects. This course teaches those writing strategies that scientists, engineers, and others will need in order to write successfully on the job. It initiates the students into Technical Writing. The purposes of technical writing are to inform and persuade. This program aims to train students in writing clear, concise and effective English.

This Syllabus is therefore, a Pragmatic English Writing Program for engineering students with intermediate proficiency. The program covers a syllabus outline and instructional approaches on basic writing skills with particular reference to technical writing.

Pre-requisites: Intermediate English

Course Objectives:

- To equip the students with all the LSRW skills for academic writing and speaking.
- To equip the students with basic grammar, infrastructural patterns and grammatical constructions required in technical writing as well as oral communication.
- To acquaint the students with the writing process in preparation for academic and workplace writing.
- Equip the students with the concept of coherence and cohesion for meaningful and coherent communication.

Course Outcomes:

After going through this course the student will be able to

- Comprehend technical writing produced in the engineering profession
- Understand the writing process and create logical paragraphs
- Use infrastructural patterns in writing and speaking

- Communicate coherently orally and in writing.

Objectives:

i) To equip the students with all the LSRW skills for advanced writing and speaking.
ii) To equip the students with basic grammar, infrastructural patterns and grammatical constructions required of in technical writing.
iii) To acquaint the students with the writing process, beginning with paragraph writing. This would prepare them for academic and workplace writing.
iv) Equip the students with Oral Communication Skills.

Methodology

A Task-based, process oriented methodology will be used by the teachers to give a practical orientation to the teaching of language. An inductive approach will be used to demonstrate the use of language in context. This should enable the students to internalize the language structures and vocabulary used in context. Students will be exposed to numerous examples and ample practice will be given in the contextual use of language structures.

Syllabus Outline

Unit I : Review of Grammar

i) Common Errors
ii) Subject-Verb Agreement
iii) Adverbs
iv) Transitional elements
v) Use of Articles and Prepositions
vi) Conjunctions
vii) pronoun reference

Unit II : Prose 1

1. Heaven's Gate by Pico Iyer
2. The Connoisseur by Nergis Dalal

Unit III Reading and Writing Skills

i) Reading Comprehension -- Skimmimg & scanning
ii) Reading Comprehension -- Intensive reading
iii) Reading Comprehension -- Critical Analysis
iv) Paragraph Writing
v) Letter Writing
vi) Memo Writing

Unit IV : Prose 2

1. The Cuddalore Experience by Anu George
2. The Odds Against Us by Satyajit Ray

Unit V : Advanced Writing Skills

1. Comparison and Contrast Pattern

2. Cause and Effect Pattern
3. Classification
4. Analogy
5. Problem-Solution Pattern

Prescribed Text Books

1. **Enjoying Everyday English** by A. Ramakrishna Rao
2. **Effective Technical Communication** by Ashraf Rizvi
3. **Technical Writing Process and Product** by Gerson Sharon J. and Steven Gerson. 3rd edition, New Jersey: Prentice Hall 1999

References

1. M. Raman and S. Sharma, 2004; Technical Communication : Principles and Practices, OUP, (Indian Edition)
2. Blanton, L.L. 1993; Composition Practice, Book 4 ,Second Edition, Heinle & Heinle Publishers, pp. 54
3. Georges, T.M. 1996; A course in Analytical Writing for Science and Technology, http://www.mspiggy.etl.noaa.gov/write/
4. Neufeld, J.K. 1987; A Handbook for Technical Communication, Prentice-Hall, Inc. pp.20,65-68
5. Yalden, J. 1987; Principles of Course Design for Language Teaching, Cambridge University Press
6. David F. Beer and David McMurrey**,** Guide to Writing as an Engineer, 2nd ed., Wiley, 2004, ISBN: 0471430749.
7. Greaney, G.L. 1997; Less is More: Summary Writing and Sentence Structure in the Advanced ESL Classroom, The Internet TESL Journal, Vol.III, No.9 http://iteslj.org/Techniques/Greaney-Writing.html

VNR Vignana Jyothi Institute of Engineering and Technology

I Year B. Tech ECE – I Sem	L	T/P/D	C
	3	0	3

(CSE1101) COMPUTER PROGRAMMING

Pre-requisites: Basic computer Knowledge

Course Objectives

- Discuss the fundamentals concepts of C programming.
- Identify the appropriate decision making and branching statements to solve the problem.
- Understand different derived data types and the concepts of files
- Usage of different c concepts in problem solving.

Course Outcomes

After going through this course the student will be able to

- Understand the fundamentals of C programming.
- Choose the loops and decision making statements to solve the problem.
- Usage of different derived data types and the concepts of files
- Implement different c concepts in problem solving.

UNIT I

Computer fundamentals-Hardware, software, computer language , translators, Program Development steps-Algorithms, Pseudo code, flow charts, Introduction to C Language – History, Simple 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.

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

Preprocessor Directives, Dynamic Memory Allocation

File I/O – Basic concepts, text files and binary files, file input / output operations, file status functions (error handling), C programming examples, Command-Line Arguments.

TEXT BOOKS

1. C programming A Problem-Solving Approach by Behrouz A.Forouzan,E.V.Prasad,Richard F.Gilberg
2. C How to Program Paul Deitel and Harvey Deitel , PH
3 Computer Programming and Data Structures by E Balagurusamy, Tata McGraw Hill.

REFERENCES

1. Let Us C Yashavant kanetkar BPB
2. The C Programming Language by Brian W. Kernighan, Dennis M. Ritchie
3. Absolute beginner's guide to C, Greg M. Perry, Edition 2,Publisher: Sams Pub.,1994

VNR Vignana Jyothi Institute of Engineering and Technology

I Year B. Tech ECE – I Sem	L	T/P/D	C
	2	4	4

(MED1105) ENGINEERING DRAWING
(Common to EEE, ECE, EIE, CSE & IT)

Pre-requisites: Geometrical constructions

Course Objectives:

- Remember the conventions of Engineering Drawing and Auto Cad software commands
- Remember the importance of engineering curves
- Know the importance of orthographic projections for points, lines, planes and solids
- Know the various types of projections- orthographic to isometric and vice-versa

Course Outcomes:

After going through this course the student will be able to

- Interpret the concepts of curves and Solve the problems as per the drawing conventions in Auto Cad
- Solve the problems on Projections for points,lines, planes and solids in Auto Cad
- Apply the concepts of isometric projections and solve the problems in Auto CAD
- Apply the concepts of orthographic projections and solve the problems in Auto CAD

UNIT I

Introduction to engineering graphics – construction of ellipse, parabola and hyperbola – cycloidal curves.

UNIT II

Orthographic projections of points, lines and planes – axis inclined to one planes and inclined to both the planes.

UNIT III

Orthographic projections of solids:

Cylinder, cone, prism, pyramid and sphere positions and axis inclined to both the planes.

UNIT IV

Isometric Scale, Isometric drawing and Isometric projections of lines, planes and simple solids.

UNIT V

Conversion of orthographic views into isometric views for simple objects. Construction of orthographic projections for given isometric projections.

TEXT BOOKS

1. Engineering drawings By N.D.Bhatt.
2 Engineering graphics By K.L. Narayana and P.Kannayya.

REFERENCES

1. Engineering drawing and graphics: Venugopal/ New age
2. Engineering drawing : Johle / TMH

VNR Vignana Jyothi Institute of Engineering & Technology

I Year B. Tech ECE – I Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(ENG1203) ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY

The English language Communication Skills Lab aims to provide practice in all the four skills of LSRW, with a special emphasis on listening and speaking skills.

Pre-requisites: Intermediate English, Intermediate level LSRW skills

Course Objectives

- Provide ample practice in LSRW skills and train the students in oral presentations, public speaking, role play and situational dialogue.
- Provide practice in vocabulary usage, grammatical construction, structural patterns, and improve comprehension abilities in the students.
- Train students to use neutral pronunciation through phonetic sounds, symbols, stress and intonation.
- Enable students to transfer information from verbal to graphic representation and vice versa

Course Outcomes

After going through this course the student will be able to

- Comprehend spoken and written discourse.
- Speak fluently with neutral pronunciation and exhibit interpersonal skills.
- Write accurately, coherently and lucidly making appropriate use of words depending on context and present data clearly.
- Introduce oneself to people and be able to speak extempore.

Syllabus for Lab Sessions

UNIT I

Multimedia Lab

1. Grammar : Nouns and Pronouns; Articles; The Present Tense
2. Vocabulary Lesson 1
3. Listening Comprehension

Communication Skills Lab: Introduction of Self and others

UNIT II

Multimedia Lab

1. Grammar : Concord; Adjectives; The Past Tense
2. Vocabulary Lesson 2
3. Listening Skills

Communication Skills Lab: Seeking and Giving Information, Giving and Taking Instructions

UNIT III

Multimedia Lab

1. Grammar --- adverbs, conjunctions, Prepositions; The Future Tense
2. Vocabulary Lesson 3
3. Telephoning Skills

Communication Skills Lab: Role Play/ Situational Dialogues

UNIT IV

Multimedia Lab

1. Grammar ---- Active and Passive Voice; Language Analysis
2. Vocabulary : Lesson 4
3. Listening Comprehension

Communication Skills Lab: **i)** JAM/ Short Talk ii) Information Transfer

a) Data Analysis
b) Interpretation of Graph

UNIT V

Multimedia Lab

1. Introduction to Technical Writing

A. Definition of a Technical Term
B. Description of a Mechanism
C. Description of a Technical Process

2. Vocabulary : Lesson 5

Communication Skills Lab : Presentation Skills : Oral Presentation

Multimedia Lab Requirements

The English Language Lab shall have two parts:

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

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

System Requirement (Hardware component):

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

iv) P – IV Processor

a) Speed – 2.8 GHZ
b) RAM – 512 MB Minimum
c) Hard Disk – 80 GB
v) Headphones of High quality

5. Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

Suggested Software:

- **Clarity Pronunciation Power** – part II
- **Oxford Advanced Learner's Compass**, 7th Edition
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE** (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

Multimedia Lab Requirements

Minimum Requirement:

The English Language Lab shall have two parts:

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

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

System Requirement (Hardware component):

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

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- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE** (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

VNR Vignana Jyothi Institute of Engineering and Technology

I Year B.Tech ECE – I Sem	**L**	**T/P/ D**	**C**
	0	**3**	**2**

(CSE1201) COMPUTER PROGRAMMING LABORATORY

Pre-requisites: Basic computer Knowledge

Course Objectives

- Discuss about different linux commands.
- Understand the basic structure of C Programming.
- List different decision making and branching statements, derived data types to solve the given problem
- Usage of different c concepts in problem solving.

Course Outcomes

After going through this course the student will be able to

- Able to write, compile and debug programs in C language using both Linux and windows environment
- Implement appropriate decision making statements and derived data types to solve a given problem.
- Implement different concept s of files to solve real world examples.
- Implement different c concepts in problem solving.

Week 1

a. Basic Linux commands
b. Simple C programs -to implement basic arithmetic operations – sum, average, product, smallest, largest of the numbers, difference, quotient and remainder of given numbers etc.

Week 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.

Week 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.

Week 4

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

Week 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, continue.

Week 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.

Week 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.

Week 8

1. Programs on String handling functions-Copying, reverse, substring, concatenation.
2. Programs on structure and unions.

Week 9

Midterm exam

Week 10

Programs using pointers- pointer basic operations, pointers and functions etc

Week 11

Programs on pointers and structures, Pointers and arrays, pointers and strings.

Week 12

Programs on files-Implementation of file handling functions.

Week 13

a. Programs on files error handling.
b. Programs on Dynamic memory allocation

Week 14

Programs on command line arguments.

Week 15

Programs on preprocessor directives

Week 16

Internal Lab Exam

VNR Vignana Jyothi Institute of Engineering and Technology

I Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(MED1202) WORKSHOP PRACTICE
(Common to CE, EEE, ECE, EIE, CSE & IT)
(8 + 8 Weeks)
TRADES FOR EXCERCISES

Pre-requisites: Basic Knowledge of Maths, English, Physics

CourseObjectives:

- To study/demonstrate the concepts of computer w.r.t. its hardware, operating system, assembling and disassembling.
- To conduct the experiments related to production engineering technology.
- To demonstrate the usage of power tools
- To get the knowledge of machine shop for different exercises

Course Outcomes

After going through this course the student will be able to

- To identify, assemble, dissemble, install and write commands for a given configuration of a computer.
- To create components using the techniques of Carpentry, Tin Smithy, Welding and Fitting etc. listed in trades for exercises.
- To evaluate the jobs prepared in different trades with the models prepared using various machine tools.
- To evaluate the performance of different Power Tools.

Any eight exercises from the following trades (at least one exercise from each)

1. Carpentry
2. Fitting
3. Welding
4. Electrical Wiring
5. Lathe Operations

IT WORK SHOP EXCERCISES

Any eight exercises from the following :

1. Computer Hardware: Identification of Peripherals
2. Assembling and disassembling of a PC

3. Simple diagnostic exercises – Related to hardware
   Installation of Windows Operating System
4. Installation of Linux Operating System
5. Linux Basic Commands
6. Simple diagnostic exercises –Related to Operating System

TEXTBOOKS

1. Work shop Manual - P.Kannaiah/ K.L.Narayana, Scitech Publishers.
2. Workshop Manual by Venkat Reddy.
3. Engineering Workshop Practice – V Ramesh Babu, VRB Publishers Pvt. Ltd.
4. IT Essentials PC Hardware and Software Companion Guide Third Edition by Davis Anfinson and Ken Quamme – CISCO Press, Pearson Education.
5. PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft)

VNR Vignana Jyothi Institute of Engineering and Technology

I Year B.Tech ECE – II Sem	L	T/P/D	C
	4	0	4

(EEE1101) CIRCUIT THEORY

Pre-requisites: Mathematics, Physics

Course Objectives

- To analyze transient response of circuits with dc excitation
- To understand two port network parameters, filters and attenuators
- To know about performance of DC machines
- To understand the operation of transformers and AC machines

Course Outcomes

After going through this course the student will be able to

- Analyze transient response of circuits
- Evaluate two port parameters and design simple filters
- Appreciate the working of DC machines
- Understand the operation of transformers and AC machines.

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.

UNIT II 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

UNIT III 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.

UNIT IV Locus diagrams and 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 V Network topology and Network theorems

Definitions – Graph – Tree, Basic cutset and Basic Tieset matrices for planar networks – Nodal analysis, Mesh analysis, Super Node and Super Mesh analysis of Networks with Independent and Dependent voltage and current sources - Duality and Dual networks.

Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Tellegen's, Millman's and Compensation theorems for d.c. and a.c. excitations.

TEXT BOOKS

1. Engineering circuit analysis - William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6th Edition.
2. Network Analysis - A. Sudhakar, Shyammohan Palli, Mc Graw Hill Company,
3. Circuit Theory - A. Chakrabarti, Dhanipat Rai and Co., 6th Edition.

REFERENCES

1. Network Analysis by M. E Van valkenburg, PHI.
2. Linear circuit analysis (time domain phasor, and Laplace transform approaches) by RAYMOND A.DECARLO and PEN-MIN-LIN, Oxford University Press. 2nd Edition 2004.
3. Network Theory: - N.C. Jagan and C.Lakshminarayana, B.S Publications.
4. Electrical Circuit theory by K. Rajeswaran, Pearson Education 2004.
5. Basic Circuit analysis by D.R, Cunningham and J.A Stuller, Jaico Publications.

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I Year B. Tech ECE – I Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(MTH1104) NUMERICAL ANALYSIS AND LINEAR PROGRAMMING
NUMERICAL ANALYSIS

Pre-requisites: Integration, Differentiation

Course Objectives

- Understand the numerical methods for non linear systems, evaluating definite integrals and ordinary differential equations.
- Understand various methods of interpolation.
- Understand the simplex method and methods to solve the transportation problem.

Course Outcomes

After going through this course the student will be able to

- Apply the numerical methods to find a root of algebraic and transcendental equations.
- Apply the numerical methods to find the solutions of ordinary differential equations.
- Use simplex method procedure to optimize a linear function.
- Solve transportation problems.

UNIT I Solutions of non-linear systems

Introduction; Mathematical preliminaries; Solution of algebraic and transcendental equations – the bisection method, the method of false position, the iteration method, Newton - Raphson method, and their order of convergence.

UNIT II Interpolation

Introduction; Errors in polynomial interpolation; Finite differences; Forward differences; Backward differences; Central differences; Symbolic relations and separation of symbols; Differences of a polynomial; Newton's formulae for interpolation; Central difference interpolation formulae; Gauss's central difference formulae; Lagrange and Hermit interpolation formulae; Cubic spline interpolation.

UNIT III Numerical Integration

Trapezoidal rule, Simpson's 1/3 rule, and Simpson's 3/8 rule.

Numerical solutions of ordinary differential equations

Solution of initial value problems by Taylor's series - Picard's method of successive approximations, Euler's method, and Runge - Kutta methods; Predictor Corrector methods - Adams Moulton method, and Milne's method.

UNIT IV Numerical solutions of partial differential equations (PDE)

Introduction; Classification of second order PDE; Approximation of derivatives by finite difference method; Solution of Laplace equation - Jacobi's method, Gauss-Seidal (Leibmann's) method, Solution of parabolic equations by explicit and crank Nicolson implicit scheme method; Solution of hyperbolic equations.

LINEAR PROGRAMMING

UNIT V Linear programming

linear programming - Basic concepts; -problem formulation, graphical method, canonical and standard forms of LPP simplex method, Artificial variables techniques- M method, Transportation problems: Balanced transportation problem-North-West corner rule, Least cost method, Vogel's approximation method and MODI method.

TEXT BOOKS

1. Elementary Numerical Analysis – an algorithmic approach by Samuel D. Conte and Carl De Boor (2006); 3rd edition; Publisher: Tata McGraw Hill.
2. Elementary Numerical Analysis by Dr. B.S.Grewal, 4th edition, Publisher: Khanna Publishers
3. Operations Research: Theory and Applications by Kanthi Swaroop, 4th edition, Macmillan Publishers India Ltd.

REFERENCES

1. Advanced Engineering Mathematics by Erwin Kreyszig, 8th Edition; Publisher: John Wiley and Sons.
2. Advanced Engineering Mathematics by Peter V. O'Neil, 9th Edition; Publisher: Cengage Learning

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I Year B. Tech ECE – II Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(PHY1103) ADVANCED ENGINEERING PHYSICS

Pre-requisites: Intermediate Physics

Course Objectives

- To learn basic concepts that lead to the development of Quantum Mechanics.
- To study behavior of electrons in metals.
- To describe the principles of conduction of charges in semiconductor.
- To learn the classification and behavior of magnetic materials and super conductors.
- To study dielectric properties of material.

Course Outcomes

After going through this course the student will be able to

- Distinguish fermions and bosons, recognize wave nature of particles and one dimensional behavior of a particle quantum mechanically.
- Illustrate periodic motion of electrons in solids that leads to classification of solids into conductors, semiconductors and non conductors.
- Estimate the concentration of charge carriers in semiconductors and realize the importance of principle of in P-n junction which is the fundamental for many semiconductor devices.
- Distinguish magnetic materials, especially ferrites and realize the importance of super conducting materials.
- Understand the dielectric behavior of materials under application of electric fields.

UNIT I

SEMICONDUCTOR PHYSICS:

Fermi level in Intrinsic and Extrinsic semiconductors - Intrinsic semiconductor and carrier concentration – Extrinsic semiconductor and carrier concentration – Equation of continuity – Direct and indirect band gap semiconductors - Hall Effect.

PHYSICS OF SEMICONDUCTOR DEVICES:

Formation of p-n junction – open circuit p-n junction – Energy diagram of diode – i/v characteristics of p-n junction diode – p-n diode as a rectifier – Diode equation – Introduction to LED, BJT and FET.

UNIT II

CRYSTAL STRUCTURES:

Space lattice – Unit cell – Lattice parameter – Crystal systems – Bravais lattices Atomic radius – Co-ordination number - Structures and Packing fractions of Simple Cubic – Body Centered Cubic – Face Centered Cubic crystals – Hexagonal closed packed crystals - Structures of diamond, NaCl.

BONDING IN SOLIDS

Force and energy between two approaching atoms, primary and secondary bonds, binding energy and cohesive energy, Madelung constant, cohesive energy and Madelung constant for NaCl crystal

UNIT III

DIRECTIONS, PLANES AND X-RD:

Miller Indices for Crystal planes and directions – Inter planar spacing of orthogonal crystal systems –Diffraction of X-rays by crystal planes and Bragg's law– Laue method – Powder method – Applications of X-ray diffraction

DEFECTS IN SOLIDS:

Imperfections in crystals – Point defects (Vacancies, Interstitial and Impurities) Schottky and Frenkel defects – (with mathematical treatment)- Line imperfections – Edge and Screw dislocation – Burger vector – Surface defects and volume defects (Qualitative Treatment).

UNIT IV

MAGNETIC PROPERTIES OF MATERIALS:

Permeability, Field intensity, magnetic field induction, Magnetization and Magnetic susceptibility – Origin of magnetic moment, Bohr magneton – Classification of magnetic materials (Dia, Para and Ferro)- Domain theory of ferromagnetism, Hysteresis curve – Soft and Hard magnetic materials – Ferrites and their applications.

UNIT V

DIELECTRIC PROPERTIES:

Electric dipole, Dipole moment, Dielectric constant, Electronic, Ionic and Orientation Polarization – Calculation of Polarizibilities – Internal fields – Claussius – Mossotti equation –Piezo and Ferro electricity

SUPERCONDUCTORS

Experimental survey and superconductivity phenomenon, – Meissner effect – Critical fields and Persistent currents, Type I and Type II superconductors - London equations-flux quantization-BCS Theory- Josephson Effect, Applications of Superconductors.

TEXT BOOKS

1. Introduction to Solid State Physics by Charles Kittel , Publishers: John Wiley & Sons
2. Applied Physics by P.K.Mittal, IK International Publishing House (P) Ltd
3. Electronic Devices and circuits by Milliman and Halkias

References

1. Solid State Physics by A.J.Dekker; Macmillan Publishers India Ltd.
2. Engineering Physics by Dr M Chandra Shekar and Dr P. Appala Naidu, VGS Book links.
3. Engineering Physics by G Sahashra Buddhe; University Press
4. Elements of Solid State Physics by J.P.Srivatsva, PHI Publishers
5. Engineering Physics by M.R.Srinivasan, New Age Publishers
6. Solid State Physics by M.A. Wahab.

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I Year B. Tech ECE – II Sem	**L**	**T/P/D**	**C**
	3	**0**	**3**

(CHE1101) ENGINEERING CHEMISTRY

Prerequisite: General Chemistry

Course Objectives

- Understand electrochemistry which deals with the utilization of electrical energy of an external source for bringing about a physical or chemical change.
- Knowledge of "Corrosion engineering education" and Usage of polymers in modern world as an integral part of every human's life.
- Knowledge of purification techniques and various applications of soft water in industries.
- Usage of nano-materials as emerging scientific components with amazing potential applications in various fields.

Course Outcomes

After going through this course the student will be able to

- Visualize the chemical applications of electricity.
- Prevention of corrosion of metals and applications of polymers from domestic articles to sophisticated scientific and medical instruments.
- Benefits of treated water as source in steam generation and other fields like production of steel, paper, textiles, atomic energy etc.
- The applicability and greater efficiency of using a material at nanoscale in different engineering fields.

UNIT I

Electrochemical cells and batteries

Conductance-factors effecting conductance, conductometric titrations; cells: types of cells, cell representation, electrode potential; Standard electrode potential; Electrochemical series; Nernst equation; Reference electrodes – hydrogen, calomel electrode; Ion selective electrodes (glass electrode & flouride electrode); Numerical problems.

Batteries

Primary and secondary cells (lead-acid cell; Ni-Cd cell; lithium cells); Applications of batteries; Fuel cells – methanol – oxygen fuel cells, advantages of fuel cells; Solar cells - principle, and applications.

UNIT II

Corrosion and its control

Introduction; Causes and effects of corrosion; Different types of corrosion; Theories of corrosion – chemical, electrochemical corrosion (reactions); Factors affecting corrosion – nature of metal (galvanic series; over voltage; purity of metal; nature of oxide film; nature of corrosion product), and nature of environment (effect of temperature; effect of pH; humidity; effect of oxidant).

Corrosion control methods – cathodic protection, sacrificial anode, and impressed current cathode;

Surface coatings – methods of application on metals (hot dipping; galvanizing; tinning; cladding; electroplating), and organic surface coatings (paints - constituents and functions).

UNIT III

III a) Polymers

Introduction**;** Types of polymerization; Plastics - thermoplastic resins, and thermoset resins; Compounding & fabrication of plastics; Preparation, properties, and engineering applications of polyethylene, PVC, PS, Teflon, bakelite, nylon.

III b) Rubber

Natural rubber- processing, vulcanization; Elastomers (Buna-s; Butyl rubber; Thiokol rubbers); Fiber reinforced plastics (FRP) and their applications.

UNIT IV

Water

Introduction; Hardness - causes, expression of hardness, units, types of hardness, estimation of temporary & permanent hardness of water, and numerical problems; Boiler troubles – scale & sludge formation, caustic embrittlement, corrosion, priming & foaming; Softening of water (Internal & external treatment - lime soda, zeolite, ion exchange process, and numerical problems); Reverse osmosis and Electro dialysis (desalination processes).

UNIT V

Nanomaterials

Introduction; Preparation and applications of nanomaterials with special reference to carbon nanotubes.

Insulators

Classification of insulators; characteristics of thermal & electrical insulators and their applications; Superconductors - Nb-Sn alloy, $YBa_2\ Cu_3\ O_{7-x}$; Applications of superconductors.

TEXT BOOKS

1. Engineering Chemistry by Y.Bharathi Kumari, Jyotsna Cherukuri; Publisher: VGS Book Links.
2. Engineering Chemistry by P.C.Jain & Monica Jain, Publisher: Dhanpatrai
3. Publishing Company.

REFERENCES

1. Engineering Chemistry by S.S. Dhara & Mukkanti; Publisher: S.Chand & Co.
2. Engineering Chemistry by O G Palanna
3. Engineering Chemistry by R.Gopalan, D.Venkappayya, Sulochana Nagarajan; Publisher: Vikas Publishers.
4. Engineering Chemistry by R.P.Mani, S.N. Mishra, B.Rama Devi ,Cengage Learning Publications.

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I Year B. Tech ECE – II Sem	**L**	**T/P/D**	**C**
	3	**0**	**3**

(ITD1102) DATA STRUCTURES

Prerequisites: 'C' Programming language

Course Objectives

- List various linear data structures and non linear data structures.
- Understand various operations of linear data structures and non linear data structures
- List the application of linear data structures.
- Identify basic and advanced sorting and searching techniques

Course Outcomes

After the completion of the course students will be able to

- Explore and analyze the working of linear data structures like list, stack and variations of queue in both static and dynamic implementation.
- Relate and demonstrate the application of linear data structures.

Illustrate and Implement basic non linear data structures like trees, graphs and their operations

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, Double 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.

UNIT III

Queues-operations, array and linked representations. Circular Queue operations, Dequeues, applications of queue.

UNIT IV

Trees – Definitions, Binary tree representation, Binary search tree, binary tree traversals.

Graphs – Definitions, Graph representations, Graph traversals

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. 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

REFERENCES

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.
4. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
5. C& Data structures – E V Prasad and N B Venkateswarlu, S. Chand&Co.

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I Year B. Tech ECE – II Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(ECE1101) ELECTRONIC DEVICES AND CIRCUITS

Pre-requisites: Semiconductor physics

Course Objectives

- To learn principle of operation, construction and characteristics of various electronic devices.
- To study operation and characteristics of Rectifiers with filters.
- To understand the analysis of small signal low frequency amplifiers.
- To provide the concepts involved in design of electronic Circuits.

Course Outcomes

After going through this course the student will be able to

- Understand the operation and characteristics of various electronic devices.
- Develop few applications of devices.
- Understand the importance of biasing and stabilization.
- Analyze small signal model for BJTand FETamplifiers

UNIT I

p-n Junction Diode and Applications : Review of Semi Conductor Materials, Theory of p-n Junction, p-n Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of V-I characteristic, Ideal and Practical Diode Equivalent Circuits, Static and Dynamic Resistance levels , Transition and Diffusion Capacitances.

The p-n diode 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 Regulation Characteristics of different Filters, Breakdown Mechanisms in Semi Conductor Diodes, Zener Diode Characteristics, Shunt Voltage Regulation using Zener Diode.

UNIT II

Transistors, Biasing and Stabilization : The Bipolar Junction Transistor(BJT), Transistor Current Components, Transistor Construction, BJT Operation, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation, Transistor as an Amplifier, BJT Specifications, Principle of series voltage regulators.

The DC and AC Load lines, Quiescent operating Point, 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 $V_{BE,}$ β_1 and I_{CO}. Bias Compensation using Diodes, Thermistors and Sensistors, Thermal Runway, Thermal Stability.

UNIT III

Small signal low frequency BJT Amplifiers: Small signal low frequency transistor amplifier circuits: h-parameter representation of a transistor, Analysis of single stage transistor amplifiers CE, CC, CB configurations using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of CB, CE, CC configurations in terms of A_I, R_i, A_V, R_O.

UNIT IV

FET, Biasing and Amplifiers : Construction and operation of Junction Field Effect Transistor (JFET), Volt-Ampere characteristics - Drain and transfer Characteristics, FET as Voltage Variable Resistor, Biasing FET, The JFET Small Signal Model, FET Common Source Amplifier, Common Drain Amplifier, Construction and operation of MOSFET , MOSFET Characteristics in Enhancement and Depletion modes. Comparison of BJT and FET amplifiers.

UNIT V

Special Purpose Electronic Devices : Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram), Varactor Diode and schotky barrier diode. Principle of Operation and Characteristics of UJT, UJT Relaxation Oscillator. Principle of Operation of SCR, Schockley diode Diac and Triac. Principle of Operation of Semiconductor Photo Diode, PIN Diod, Photo Transistor ,LED and LCD.

TEXT BOOKS

1. Electronic Devices and Circuits – J.Millman, C.C.Halkias, and Satyabratha Jit, Tata McGraw Hill, 2nd Edition, 2007.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 11th Edition, 2006.
3. Electronic Devices and Circuits – David A Bell, Oxford University Press, 5th edition (2008)

REFERENCES

1. Integrated Electronics - J.Millman and Christos.C.Halkias, and Satyabratha, Jit Tata McGraw Hill, 2nd Edition, 2008.
2. Electronic Devices and Circuits – T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, 6th Edition, 2004.
3. Electronic Devices and Circuits- S. S Salivahanan, N. Sursh Kumar, A. Vallava Raju,2nd Edition., TMH, 2010.

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I Year B. Tech ECE – II Sem

L	T/P/D	C
0	3	2

(ITD1202) DATA STRUCTURES LABORATORY

WEEK1

1. Write a program for creation, Search and Traversal of Single Linked List
2. Write a program to perform insertion and deletion operations in Single Linked List
3. Write a program to merge two single linked lists

WEEK2

1. Write a program for creation, Search and Traversal of Circular Linked List
2. Write a program to perform insertion and deletion operations in Circular Linked List

WEEK 3

1. Write a program for creation, Search and Traversal of Double Linked List
2. Write a program to perform insertion and deletion operations in Double Linked List

WEEK 4

1. Write a program to implement stack using Arrays
2. Write a program to implement stack using Linked List

WEEK 5

1. Write a program to convert infix expression to postfix expression using stack
2. Write a program to evaluate postfix expression

WEEK 6

1. Programs using recursion
2. Write a program to convert infix expression to prefix expression using stack

WEEK 7

1. Write a program to implement Linear queue using Array
2. Write a program to implement Linear queue using Linked List

WEEK 8

1. Write a program to implement insertions and deletions in a circular Queue
2. Write a program to perform search and count operations in a circular queue

WEEK 9

1. Write a program to implement insertions and deletions in a Dequeue
2. Write a program to perform search and count operations in Dequeue

WEEK 10: Midterm Exam

WEEK 11

1. Write a program to implement Linear search
2. Write a program to implement Binary Search

WEEK 12

1. Write a program to implement Selection sort
2. Write a program to implement Bubble sort
3. Write a program to implement Insertion sort

WEEK 13

1. Write a program to implement Merge sort
2. Write a program to implement Quick sort

WEEK 14

1. Implementation of a binary tree representation using Arrays
2. Write a program to implement tree traversals.
3. **WEEK 15**
1. Implementation of a Graph representation using Adjacency Matrix
2. Write a program to implement graph traversals.

WEEK 16: Final Internal Lab Exam

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I Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(EPC1201) ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LABORATORY

Course Objectives

- To practically learn interaction of light with matter through physical phenomena like
  interference, diffraction and dispersion.
- To understand the periodic motion and formation of standing waves and to know the characteristics of the capacitors and resistors.
- To compare the experimental results with the class room learning.

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Course Outcomes

After the completion of the course students will be able to

- Demonstrate the optical phenomena with formation of Newton Rings, and formation of spectra with a grating and a prism.
- Illustrate periodic motion by measuring rigidity modulus of a material and formation of standing waves by Melde's apparatus and also discharging of a capacitor.
- Correlate the experimental results with the class room learning

Any Eight Experiments from the following

1. Dispersive Power of the material of a Prism using Spectrometer
2. Diffraction Grating (both with Laser and non-laser source)
3. Single Slit with laser light
4. Newton's Rings
5. Finding thickness of a thin wire or sheet by forming a wedgeshaped film
6. Energy gap of a Semiconductor material
7. Torsional Pendulum Expt. to determine the rigidity modulus of material of a wire
8. Melde's experiment
9. Sonometer Experiment
10. Numerical Aperture and Acceptance angle of an optical fiber cable
11. Stewart Gee's experiment

12. Characteristics of LED.
13. Photo cell/ Solar Cell
14. AC frequency of sonometer method.
15. Attenuation and bending losses in opptical fiber.

Book: Essential Practical Lab Manual of Physics - P. Raghavendra Rao

ENGINEERING CHEMISTRY LABORATORY

LIST OF EXPERIMENTS:

1. **Titrimetry**
   a) Estimation of hardness of water by EDTA method.
2. **Instrumental methods**

(i). Conductometry

Conductometric titration of strong acid Vs Strong base

(ii). Colorimetry

A. Estimation of copper by colorimetric method

(iii). Potentiometry

A. Titration of strong acid Vs Strong base by potentiometry

3. Physical properties

a) Determination of viscosity of sample oil by Redwood viscometer.

4. Preparation of organic compounds

a) Preparation of aspirin or Thiokol rubber

TEXT BOOKS

1. Laboratory Manual on Engineering Chemistry - S.K.Bhasin and Sudha Rani,Dhanpat Rai Publishing Company.
2. Laboratory Manual on Engineering Chemistry - Y.Bharathi Kumari, Jyotsna Cherukuri, VGS Book Links, Vijayawada.

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I Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(ECE1201) ELECTRONIC DEVICES AND CIRCUITS LABORATORY

Pre-requisites: Semiconductor physics, Electronic Devices and Circuits Concepts

Course Objectives

- To identify various components and testing of active devices.
- To study and operation of multimeters, function generators ,regulated power supplies and CRO
- To know the characteristics of various active devices.
- To study frequency response Amplifier.

Course Outcomes

After going through this course the student will be able to

- Calculate various parameters of devices from characteristics.
- Use of devices in real time applications.
- Calculate h-parameters of BJT under various configurations.

Compute frequency response of various amplifiers

Part A: (Only for viva-voce Examination)

ELECTRONIC WORKSHOP PRACTICE(in 3 lab sessions):

1. Identification, Specification, testing of R,L,C components (color codes), Potentiometers (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Board, PCB's
1. Identification, Specification, testing of Active devices : Diodes, BJT, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
2. Study and operation of :
   - Multimeters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies
   - CRO

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

1. Forward and Reverse Bias V-I characteristics of PN junction Diode.
2. Zener diode V-I characteristics and Zener diode as voltage regulator.
3. Half Wave, and Full wave with and without filters.
4. Characteristics of a BJT under CE configuration and calculation of h-parameters.

5. Characteristics of a BJT under CC configuration and calculation of h-parameters.
6. Characteristics of a BJT under CB configuration and calculation of h-parameters.
7. FET characteristics under CS configuration.
8. Frequency response of CE Amplifier.
9. Frequency response of CC Amplifier.
10. Frequency response of CS FET Amplifier.
11. SCR characteristics.
12. UJT characteristics and Relaxation Oscillator.

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II YEAR I SEM	**L**	**T/P/D**	**C**
	4	**1**	**4**

(MTH1105) APPLIED MATHEMATICS
(SPECIAL FUNCTIONS AND COMPLEX ANALYSIS)

Pre-requisites: Calculus

Course Objectives

- Identify the difference of power series and Frobenius method and
- Obtain the solutions of Bessel and Legender equations.
- Distinguish Cauchy's integral theorem and Cauchy's integral formula.
- Apply Taylor's Series and Laurent series to expand the function.
- Understand the idea of a conformal mapping

Course Outcomes

After going through this course the student will be able to

- Solve Second order D.E's with variable coefficients.
- Use the Cauchy-Riemann equations to obtain the derivative of complex functions
- Use residues to evaluate contour integrals
- Calculate the image of the given curve under the given transformation.

SPECIAL FUNCTIONS

UNIT I

Special functions

Series solutions of second order Ordinary Differential Equations , Regular point , Regular singular point, Frobineous Method ,Bessel functions properties. Recurrence relations, Orthogonally. Legendre polynomials , Properties, Rodrigue's formula, Recurrence relations and Orthogonal properties.

COMPLEX ANALYSIS

UNIT II

Functions of a complex variable: Functions of a complex variable Continuity,Differentiability, Analyticity, Properties, Cauchy-Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions,Milne – Thompson method.

UNIT III

Elementary functions and Integration of complex function

Exponential, trigonometric, hyperbolic functions and their properties. z^c and Logz, principal value. Line integral, evaluation along a path and by indefinite integration. Cauchy's integral theorem ,Cauchy's integral formula.

UNIT IV

Power series and Residues

Radius of convergence , Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point, Isolated singular point, pole of order m , essential singularity. Residues – Evaluation of residue by formula and by Laurent Series, Residue theorem, Evaluation of Improper real integrals .

UNIT V

Conformal mapping

Transformation of e^z , lnz, z^n, (n positive integer), Sin z, cos z, z + a/z. Basic transformations Translation, rotation, inversion. Bilinear transformation , fixed point , cross ratio , properties , invariance of circles , determination of bilinear transformation mapping three given points.

TEXT BOOKS

1. Higher Engineering Mathematics – B. S. Grewal
2. Complex Variables & Its Applications- Churchill and Brown, (1996), International Edition, McGraw Hill.

REFERENCES

1. Advance Engineering Mathematics - Peter O'Neil,(2000),5th Edition, Cengage Learning
2. Schaum's Outline Of Complex Variables - Murray.R.Spiegel, (2011), 2nd Edition, Tata McGraw Hill.

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II Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
	4	**1**	**4**

(ECE1102) PROBABILITY THEORY AND STOCHASTIC PROCESSES

Pre-requisites: Basics of Mathematical and Probability Concepts

Course Objectives

- To describe and interpret the basic concepts of probability and stochastic processes.
- To Describe and interpret the discrete time and continuous time stochastic processes.
- To learn spectrum of Random process
- To learn noise sources and their characteristics

Course Outcomes

After going through this course the student will be able to

- Apply the concepts of probability to experiments that have Random outcomes and to recognize a random variable of single, multiple variables and its properties
- Apply the concepts of statistical estimations to the random variables
- Characterize the stochastic process and its response applying to linear systems
- Estimate and eliminate noise in communication systems

UNIT I

Overview of Probability Theory: Definitions, Scope and history, sets, sample space and events, Axioms of Probability, Discrete, Continuous and Conditional Probabilities, Independence, Total probability, Baye's Rule and Applications.

Random Variables: Definition of Random Variable, classification of Random Variables, Probability mass function, CDF and PDF of Random Variables and their properties (Single and Multiple Random variables), Conditional distribution and densities, properties.

Functions of a Random variables, Functions of two random variables, Sum of Two Independent Random variables. Some Special Random variables: Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh.

UNIT II

Operations on Single and Multiple Random Variables: Mean, Variance, Skew and Moments of Random Variables- Raw and Central Moments, Joint Moments, Marginal

distribution and density functions. Characteristic Function, Moment Generating Function, Operations on distribution and density functions of special Random variables.

UNIT III

Random Processes: Concept and classification of Random Process; Probabilistic structure of a random process; Concept of Stationary Random Process, Wide Sense Stationary, Time Averages, Ergodicity, Auto Correlation, Cross Correlation and Covariance of Random Processes.

UNIT IV

Spectral Characteristics of Random Process: Power Spectrum-Properties, Relation between PSD and Autocorrelation function of a Random Process, Cross spectral Density and its relation with Cross Correlation function.

Random signal Response of Linear Systems: System Response-Convolution, Mean and Mean-squared value of system Response, autocorrelation Function of Response, Cross-Correlation Functions of input and output, Spectral Characteristics of System Response; Power Density Spectrum of Response, Cross Power Density Spectrums of Input and Output.

UNIT V

System Noise: Mathematical Modeling of Various system Noise sources, White Noise and colored noise, Effective Noise Temperature, Noise Figure, Average Noise Figure of Cascaded networks.

TEXT BOOKS

1. Probability, Random Variables and Random Signal Principles - Peyton Z Peebles 4th Edidtion,TMH, 2001.
2. Probability, Random Variables and Stochastic Processes- Athanasios Papoulis and S. Unnikrishnan Pillai,4th Edition, TMH
3. Principles of Communication Systems – H.Taub, Donald L. Schiling, Goutham Saha, 3rd Edition,TMH,2007.

REFERENCES

1. Theory of probability and stochastic Processes – pradip Kumar Gosh University press.
2. Probability and Random processes with application to signal processing – Henry Stark and John W, Woods, 3rd Edition, PE.
3. Probability Methods of Signal and System Analysis – George R.Cooper, Clave D.Mc Cillem, 3rd Edition,Oxford, 1999.
4. Statistical Theory of communication – S.P.Eugene Xavier, New age Publications, 1997.

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II Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
	4	**1**	**4**

(EIE1101) SIGNALS AND SYSTEMS

Pre-requisites: Basics of mathematical concepts

Course Objectives

- To understand various fundamental characteristics of signals and systems.
- To study the importance of transform domain.
- To analyze and design various systems.
- To study the effects of sampling.

Course Outcomes

After going through this course the student will be able to

- Design solutions for complex input signals
- Analyze statistical parameters of a given signal.
- Apply the knowledge in modeling of LTI systems
- Create new systems

UNIT I

Representation of Signals: Continuous signals, Classification of Signals – Periodic and aperiodic, even and odd, energy and power signals, deterministic and random signals, complex exponential and sinusoidal signals. Concepts of Impulse function, Unit step function, Signum function. Various operations on Signals.

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

UNIT II

Fourier Series Representation of Periodic Signals : 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, Gibb's Phenomenon.

Fourier Transforms : Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signals, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and Signum function.

UNIT III

Laplace Transforms: Concept of region of convergence (ROC) for Laplace transforms. Properties of ROC. Relation between Laplace Transforms and Fourier transform of a signal. Introduction to Hilbert Transform.

Signal Transmission through Linear Systems: Classification of Continuous time and discrete time Systems, impulse response, Response of a linear 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, Properties of Convolution, Concepts of correlation, properties of correlation. 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

Representation of discrete time signals. Classification of Signals, Properties of discrete time complex exponential signals

Sampling Theorem: Representation of continuous time signals by its samples - Sampling theorem – Reconstruction of a Signal from its samples, aliasing – discrete time processing of continuous time signals, sampling of band pass signals.

Z –Transforms: Basic principles of z-transform, region of convergence, properties of ROC, Properties of z-transform ,Poles and Zeros. Inverse z-transform using Contour integration, Residue Theorem, Power Series expansion and Partial fraction expansion. Distinction among Fourier transform, Laplace Transform and Z - Transforms.

TEXT BOOKS

1. Signals, Systems and Communications - B.P. Lathi, BS Publications, 2009.
2. Signals and Systems – Alan V.Oppenheim, Alan S.Willsky and S.Hamid Nawab,2nd Edition, PHI.

REFERENCES

1. Signals and Systems- A.Anand Kumar, 2nd Edition, PHI ,2012
2. Signals and Systems -Simon Haykin and Barry Van Veen, 2nd Edition, John Wiley.
3. Signals and Systems- Cengage Learning, Narayana Iyer, 2011.
4. Signals, Systems and Transforms –C.L.Philips,J.M Parr and Eve A. Riskin,3rd Edition, Pearson, 2004 .
5. Signals and Systems Schaum's Outlines - HWEI P. HSU , Tata Mc Graw Hill, 2004.

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II Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(EEE1154) PRINCIPLES OF ELECTRICAL ENGINEERING

Pre-requisites: Circuit Theory, Mathematics

Course Objectives

- To analyze transient response of circuits with dc excitation
- To understand two port network parameters, filters and attenuators
- To know about performance of DC machines
- To understand the operation of transformers and AC machines

Course Outcomes

After going through this course the student will be able to

- Analyze transient response of circuits
- Evaluate two port parameters and design simple filters
- Appreciate the working of DC machines
- Understand the operation of transformers and AC machines

Unit I

Transient Analysis (First and Second Order Circuits) : Transient Response of RL, RC and RLC Circuits for DC excitations, Initial Conditions, Solution using Differential Equations approach and Laplace Transform Method.0

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 and Symmetrical Attenuators : Classification of Filters, Classification of Pass band and Stop band, Characteristic Impedance in the Pass and Stop Bands, Constant-k and m-derived filters-Low Pass Filter and High Pass Filters (both qualitative and qunatitaive treatment); Band Pass filter and Band Elimination filters (qunatitaive treatment only), Illustrative Problems. Symmetrical Attenuators – T-Type Attenuator, p-Type Attenuator, Bridged T-type Attenuator, Lattice Attenuator.

Unit IV- DC Machines

DC Generators: Principles of Operation of DC Machine, construction, EMF equation, Types of Generators, Magnetization, Internal and external 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 Transformers and AC Machines

Transformers and Their Performance : Principle of Operation of Single Phase transformer, Types, Constructional Features, Phasor Diagram on No Load and Load, Equivalent Circuit, Losses, Efficiency and Regulation of Transformer, OC and SC Tests, Predetermination of Efficiency and Regulation, Simple Problems.

AC Machines

Three Phase Induction Motor : Principle of operation of three phase induction motors- Slip ring and Squirrel cage motors –Slip_Torque characteristics.

Alternators: Principle of operation –Types - EMF Equation- Predetermination of regulation by Synchronous Impedance Method- OC and SC tests.

TEXT BOOKS

1. Principles of Electrical Engineering- A.Sudhakar, Shyammohan S.Palli, TMH publications
2. Introduction to Electrical Engineering – M.S.Naidu and S. Kamakshaiah, TMH publications.
3. Network analysis and Synthesis- C L Wadhwa, New Age International Publishers.

REFERENCE BOOKS

1. Networks, Lines, and Fields – John.D.Ryder, PHI publications.
2. Engineering Circuit Analysis – W.H.Hayt and J.E Kemmerly and S.M.Durbin, TMH publications.
3. Circuit Theory by Chakrabarti, Dhanpat Rai and Co.
4. Network Analysis – N.C.Jagan and C.Lakshmi Narayana, BS publications.
5. Network Analysis – A.Sudhakar, Shyammohan S.Palli, TMH publications.

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II Year B. Tech ECE – I sem	**L**	**T/P/D**	**C**
	4	**1**	**4**

(ECE1103) ELECTRONIC CIRCUIT ANALYSIS

Pre-requisites: Electronic Devices and Circuits

Course Objectives

- To explain the operation, design and Analysis of multistage amplifiersusing BJT and MOSFET.
- Design high frequency BJT amplifiers and analysis of MOS amplifiers.
- Understand the concepts of feedback amplifiers and Oscillators
- Design large signal and tuned amplifiers.

Course Outcomes

After going through this course the student will be able to

- Apply the knowledge of BJTs and MOSFETs to design practical amplifier circuits.
- Design electronic sub systems such as feedback amplifiers, oscillators.
- Design various power amplifiers to meet the required specifications.
- Apply the knowledge of Tuned amplifiers to design practical amplifier circuits.

UNIT I

Multistage Amplifiers

Introduction, Methods of inter-stage coupling, n-stage cascaded amplifier, Equivalent circuits, Miller's Theorem, Frequency effects, Amplifier analysis, High input resistance Transistor Circuits, Darlington Pair, CE- CC amplifier, Cascode amplifier, Two-stage RC-coupled JFET amplifier (in Common Source configuration), Difference Amplifier.

UNIT II

BJT Frequency Response of Amplifiers

Frequency response of BJT amplifier, Analysis at low and high frequencies, Effect of coupling and bypass capacitors, Hybrid-π Common Emitter transistor model, CE short circuit gain, CE current gain with resistive load, Single-stage CE transistor amplifier response, Gain-Bandwidth Product, Emitter follower at higher frequencies.

MOS Amplifiers

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 III

Feedback Amplifiers and Oscillators

Concept of feedback, Classification of feedback amplifiers, general characteristics of negative feedback amplifiers, Effect of feedback on amplifier characteristics, voltage series, voltage shunt, current series and current shunt feedback configurations, Illustrative problems.

Classification of oscillators, Conditions for oscillations, RC phase shift oscillator, Wien bridge oscillator, Generalized analysis of LC oscillators – Hartley and Colpitts oscillators, Piezoelectric crystal oscillator, Stability of oscillators.

UNIT IV

Power Amplifiers

Classification of power amplifiers, Class A large-signal amplifiers, Series-fed and transformer-coupled Class A audio power amplifier, Efficiency of Class A amplifier , Class B amplifier, Transformer-coupled Class B push-pull amplifier, Complementary-symmetry Class B push-pull amplifier, Efficiency of Class B amplifier, Distortion in power amplifiers, Thermal stability and Heat sinks

UNIT V

Tuned Amplifiers

Introduction, Small signal single tuned amplifiers, Double-tuned amplifiers , Effect of cascading single and double tuned amplifiers on bandwidth, Stagger-tuned amplifiers, Class-C tuned amplifiers. Power supply requirements, Introduction and classification of Power Supplies.

TEXT BOOKS

1. **Integrated Electronics** - Jacob Millman and Christos C. Halkias, , Tata McGraw-Hill Education, 2008.
2. **Electronic Circuit Analysis** - S. Salivahanan, N. Suresh Kumar, , Tata McGraw-Hill Education, 2nd edition, 2012.
3. **Design of Analog CMOS Integrated Circuits** - Behzad Razavi, Tata McGraw-Hill Education , 2008.

REFERENCE BOOKS

1. **Electronic Devices and Circuit Theory -** Robert L.Boysted , Louis Nashelisky, Pearson Education , 9th edition, 2008. (ISBN: 978-81-219-2450-4)
2. **Introductory Electronic Devices and Circuits**, Robert T. Paynter, Pearson Education, 7th edition, 2010.
3. **Micro Electronic Circuits** – Sedra and Smith, Oxford University Press, 5th edition, 2009.

VNR Vignana Jyothi Institute of Engineering and Technology

II Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
	2	**0**	**0**

(NCC1101) HUMAN VALUES & PROFESSIONAL ETHICS

Course Description

Objectives

To develop the ability to distinguish between what is of value and what is superficial in life.

To develop the ability to face difficult situations in life boldly and resolve them confidently.

To enable students to progress from discrimination to commitment.

To Encourage the students to understand values in life.

Syllabus

1. Self-confidence
2. Peer Pressure-Irregular life style
3. The Power of Self- determination
4. Human relationship—trust and respect- resolving conflict
5. Anger-A sign of helplessness
6. Interaction and ragging
7. Right Utilization of physical facilities
8. Unhappiness -Unfulfilled expectations
9. Setting goals- long term and short term goals-handling responsibilities
10. Dealing with people while coordinating work
11. Coping with stress-Identifying one's interests and strengths
12. Time Management-Planning and aligning with one's goals
13. Skills and Values
14. The role of values in Society

Course Book

The resource material that has been prepared by IIIT can be used apart from material that is available in the websites. Later text books can be identified for the facility of the students.

Evaluation

This course would only have a pass/ fail grade. Participation in discussions, submission of assignments and weekly reports and a final report will be used in evaluation.

Outcome

At the end of the course the students would become sensitive towards human values. They would understand commitment and responsibility. They would be able to bring harmony in the society they live.

TEXT BOOKS

1. Mike Martin and Roland Schinzinger, “Ethics in Engineering”, McGraw -Hill, New York 1996.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, “Engineering Ethics”, Prentice Hall of India, New Delhi, 2004

REFERENCES

1. Charles D. Fleddermann, “Engineering Ethics”, Pearson Education / Prentice Hall, New Jersey, 2004 (Indian Reprint now available).
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, “Engineering Ethics–Concepts and Cases”, Wadsworth Thompson Leatning, United States, 2000 (Indian Reprint now available)
3. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi, 2003.
4. Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford University Press, Oxford, 2001.
5. Naagarazan, R.S. ‘A Textbook on Professional Ethics and Human Values’ 2006.

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II Year B. Tech ECE – I Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(ECE1202) BASIC SIMULATION LABORATORY

Pre-requisites: Basic concepts of Mathematics and Signal and systems

Course Objectives

- To learn basic Operations on Matrices
- To model generation of various signals
- To simulate operations on signals and systems.
- To simulate various random variables' generation and processes

Course Outcomes

After going through this course the student will be able to

- Apply signal generation in different areas.
- Apply the knowledge of random variables and processes in fields of communications.
- Analyze the systems for various properties.
- Create or design various systems and analyze sampling effects

1. Basic Operations on Matrices
2. Generation of various signals and sequences (Periodic and Aperiodic), such as unit Impulse step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
3. Operations on signals and sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
4. Finding the Even and Odd parts of Signal / Sequence and Real and imaginary parts of Signal.
5. Convolution between Signals and Sequences.
6. Auto Correlation and Cross Correlation between Signal of a given Sequences.
7. Verification of Linearity and Time Invariance Properties of a given Continuous / Discrete System.
8. Computation of Unit sample, Unit step and sinusoidal responses of the given LTI system and verifying its Physical realiazability and stability properties.
9. Gibbs Phenomenon.
10. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
11. Waveform Synthesis using Laplace Transform.

12. Locating the Zeros and Poles and Plotting the Pole-Zero maps in S plane and Z-Plane for the given transfer function.
13. Generation of Gaussian noise (Real and Complex), Computation of its mean, M.S. Value and its Skew, Kurtosis and PSD, Probability Distribution Function.
14. Sampling theorem Verification.
15. Removal of noise by Autocorrelation / Cross correlation.
16. Extraction of Periodic Signal, masked by noise using Correlation.
17. Verification of Weiner – Khinchine Relations.
18. Checking a Random Process for Stationarity in Wide sense

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II Year B. Tech ECE – I Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(ECE1203) ELECTRONIC CIRCUIT ANALYSIS LABORATORY

Pre-requisites: Semiconductor physics, Electronic Devices and Circuits Concepts

Course Objectives

- To identify various components and testing of active devices.
- To study and operation of multimeters, function generators ,regulated power supplies and CRO
- To know the characteristics of various active devices.
- To study frequency response Amplifier.

Course Outcomes

After going through this course the student will be able to

- Calculate various parameters of devices from characteristics.
- Use of devices in real time applications.
- Calculate h-parameters of BJT under various configurations.
- Compute frequency response of various amplifiers

Design and simulation of the following circuits using simulation software and implementation through hardware.

1. Common Emitter Amplifier with & without emitter bypass capacitor.
2. Common source Amplifier.
3. Two stage RC coupled BJT Amplifier.
4. Darlington pair.
5. Current shunt and voltage series feedback amplifier.
6. Cascode amplifier.
7. Wien bridge Oscillator using transistors
8. RC phase shift Oscillator using transistors.
9. Hartley and colpitt's Oscillator using transistors.
10. Class A power Amplifier (Transformer less and with transformer load).
11. Class B Complementary Symmetry Amplifier.
12. Class C power Amplifier.
13. MOS Amplifier.

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II Year B. Tech ECE – I Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(EEE1252) ELECTRICAL ENGINEERING LABORATORY

Pre-requisites: Circuit Theory, Principles of Electrical Engineering

Course Objectives

- The theoretical concepts of KVL and KCL are verified experimentally
- The transient behavior of RLC networks are studied practically
- The network theorems are verified experimentally
- The performance and efficiency / regulation of electrical machines are determined experimentally (under various operating conditions)

Course Outcomes

After going through this course the student will be able to

- Apply the network theorems in the domain applications
- Practically study the transient behavior of the RLC networks
- Find the applications of the electrical machines with the experimental determination of the performance of the machines.
- Find the difference between Generator and Motor performance characteristics

PART- A

1. Verification of KVL and KCL.
2. Series and Parallel Resonance – Timing, Resonant frequency, Bandwidth and Q-factor determination for RLC network.
3. Time response of first order RC/RL network for periodic non-sinusoidal inputs time constant and steady state error determination.
4. Two port network parameters –Z and Y-parameters
5. Two port network parameters – ABCD and h-parameters
6. Verification of Superposition and Reciprocity theorems.
7. Verification of maximum power transfer theorem. Verification on DC and AC Excitation with resistive and Reactive loads.
8. Experimental determination of Thevenin's and Norton's equivalent circuits and verification by direct test.
9. Constant –k Low Pass Filter and High Pass Filter- Design and Test.

PART- B

1. Magnetization characteristics of D.C Shunt generator, Determination of critical field resistance.
2. Swinburne's Test on Dc shunt machine. (Predetermination of efficiency of a given Dc Shunt machine working as motor and generator)
3. Brake test on DC shunt motor. Determination of performance characteristics.
4. OC and Sc tests on Single-phase transformer (Predetermination of efficiency and regulation at given power factors and determination of equivalent circuit).
5. Load Test on single Phase Transformer.
6. Speed Control of DC shunt Motor – flux and armature voltage control methods.

Note: Any 12 of the above experiments 6 from each part to be conducted.

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II Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(EEE1105) CONTROL SYSTEMS

Pre-requisites: Basic concepts of Mathematics and Signal concepts

Course Objectives

- To understand the different ways of system representations such as Transfer function representation and state space representations and should able to assess the system dynamic response
- To assess the system performance using time domain analysis and should know how to improve it
- To assess the system performance using frequency domain analysis and should know how to improve it
- To design various controllers and compensators to improve system performance

Course outcomes

After going through this course the student will be able to

- know how to improve the system performance by selecting a suitable controller and/or compensator for a specific application
- Apply various time domain and frequency domain techniques to assess the system performance
- Apply various control strategies to different applications (example: Power systems, electrical drives etc…)
- Test system Controllability and Observability using state space representation and applications of state space representation to various 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 AND TIME RESPONSE ANALYSIS

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.

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 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. Control Systems Engineering by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.
2. Automatic Control Systems 8th edition by B. C. Kuo 2003– John wiley and son's.,

REFERENCES

1. Modern Control Engineering by Katsuhiko Ogata, Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.
2. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.
3. Control Systems Engineering. by NISE, John wiley, 3rd Edition.
4. Modelling and Control Of Dynamic Systems by Narciso F. Macia George J. Thaler, Thomson Publishers.
5. Modern control system theory by M.Gopal, New age international publishers, Revised second edition.

VNR Vignana Jyothi Institute of Engineering and Technology

II Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
	4	**0**	**4**

(ECE1104) SWITCHING THEORY AND LOGIC DESIGN

Pre-requisites: Basic Electronics

Course Objectives

- To understand the concepts of number systems, codes and design of various combinational and synchronous sequential circuits
- To learn various methods to minimize the Boolean expressions for reducing the number of gates and cost
- To realize logic networks, digital computers using PROM, PLA, PAL devices.
- To design state machines and ASM charts

Course Outcomes

After going through this course the student will be able to

- Use the concepts of Boolean Algebra for the analysis and various number systems for digital data representations
- Design combinational and sequential circuits
- Implement designs on PLDs
- Design ASM charts for digital systems

UNIT I

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

BOOLEAN ALGEBRA: Fundamental postulates of Boolean Algebra - Basic theorems and properties

UNIT II

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: Basic PLD's-ROM, PROM, PLA, PLD Realization of Switching functions using PLD's.

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.

UNIT V

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. Introduction to ASM charts, simple examples, system Design using data path and control subsystems , ASM charts for Flip Flops and Binary multiplier

TEXTBOOKS

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

REFERENCES

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

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II Year B. Tech ECE – II Sem	**L**	**T/P/D**	**C**
	4	**1**	**4**

(ECE1105) ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

Pre-requisites: Vector Calculus, Electric and Magnetic fields concepts

Course Objectives

- To provide the basic concepts of Electric and Magnetic fields.
- To understand the Maxwell's equations and applying boundary conditions to the different material interfaces.
- To conceptualize the wave propagation characteristics for different media.
- To learn the basic parameters of Transmission lines.

Course Outcomes

After going through this course the student will be able to

- Apply the basic concepts of Electric and Magnetic fields in static and time varying conditions.
- Apply Maxwell's equations to solve equations of EM fields.
- Apply wave propagation characteristics and power calculations in applications like antennas.
- Design a lossless/distortion less transmission system.

UNIT I

Electrostatics: Coulomb's law, Electric filed 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 electro static fields, energy density, Convection and Conduction currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics , Continuity equation, Relaxation time, Poisson's and Laplace equations, Capacitance –parallel plate, coaxial, spherical capacitors, Illustrative problems.

UNIT II

Magneto Statics : Biot – Savart's law, Ampere's circuital law and applications, Magnetic flux density, Magnetic scalar and vector potentials, Forces due to Magnetic fields, Amperes Force law, Inductances and Magnetic energy, Illustrative problems

UNIT III

Maxwell's Equations: Maxwell's Equations (Time Varying Fields)Faraday's law and Transformer emf, Inconsistency of the Amperes law and displacement current density, Maxwell's equations in differential forms, integral forms and word statements,

conditions at a boundary surface: Dielectric - Dielectric and Dielectric conductor interfaces – Illustrative problems.

EM wave Characteristics – I: Wave equations for conducting and perfect dielectric media. Uniform plane waves – definitions, all relations between E and H sinusoidal variations, wave propagation in loss less and conducting media, conductors and Dielectrics-characterization, wave propagation in good conductors and good dielectrics, polarization, Illustrative problems.

UNIT IV

EM Waves characteristics – II : Reflection and refraction of plane waves – normal and Oblique incidences for both perfect conductor and perfect dielectrics, Brewster angle, Critical angle and Total internal reflection, Surface Impedance, poynting vector and poynting theorem – applications, power loss in a plane conductor, Illustrative problems.

UNIT V

Transmission Lines: Types, parameters, Transmission line equations, primary and secondary constants, Expressions for characteristic impedances, propagation constant, phase and group velocities, Infinite line concepts, Loss loss/ low loss characterization, Distortion – condition for distortionless 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 Electro magnetics – Matthew N.O.Sadiku, Oxford Univ.Press, 3rd Edition, 2001.
2. Electromagnetic Waves and Radiating Systems- E.C. Jordan and K.G.Balman,PHI, 2nd Edition, 2000.
3. Transmission Lines and Networks - Umesh Sinha, Satya Prakashan, Tech.India Publications, New Delhi, 2001.

REFERENCES

1. Engineering Electromagnetics - William H.Hayt jr.and John A. Buck,TMH, 7th Edition, 2006.
2. Electromagnetic Field Theory and Transmission Lines - G.S.N. Raju, Pearson Publication, 2005.

3 Networks Lines and Fields - John D Rider 2nd Edition, PHI, 1999.

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II Year B. Tech ECE – II Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(EIE1104) PULSE AND DIGITAL CIRCUITS

Pre-requisites: Electronic Devices and Circuits

Course Objectives

- To provide knowledge of Pulse and Wave shaping circuits.
- To analyze and design BJT switching circuits
- Analyze and Design the Sweep generators for various applications.
- To Analyze and Design of the logic gates and sampling gates using discrete components.

Course Outcomes

After going through this course the student will be able to

- Design linear and non-linear wave shaping circuits.
- Apply the fundamental concepts of wave shaping circuits for various switching and logic circuits
- Design the time base circuits for various applications
- Design the sampling gates for various applications

UNIT I

LINEAR WAVESHAPING

High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. RC network as differentiator and integrator. Attenuators and its applications in CRO probe, RL and RLC circuits and their response for step input.

UNIT II

NON-LINEAR WAVE SHAPING

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

UNITIII

SWITCHING CHARACTERISTICS OF DEVICES

Diode as a switch, piecewise linear diode characteristics, Transistor as a switch, Break down voltage consideration of transistor, saturation parameters of Transistor and their variation with temperature, transistor-switching times.

MULTIVIBRATORS

Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors.

UNIT IV

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, Transistor Bootstrap time base generator, Current time base generators.

SYNCHRONIZATION AND FREQUENCY DIVISION

Principles of Synchronization, Pulse synchronization of Relaxation devices, Frequency division in sweep circuits, astable relaxation circuits, Synchronization of a sweep circuit with symmetrical signals.

UNIT V

SAMPLING GATES

Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Reduction of pedestal in gate circuits, Applications of sampling gates.

LOGIC GATES

Relaxation of logic gates Using Diodes and Transistors: AND, OR and NOT gates using Diodes, Resistor, Transistor Logic and Diode Transistor Logic.

TEXT BOOKS

1. Pulse, Digital and Switching Waveforms J. Millman and H. Taub, McGraw-Hill, 1991.
2. Pulse and Digital Circuits – A. Anand Kumar, PHI.

REFERENCES

1. Pulse and Digital circuits – M.S. Prakash Rao, Mc. Graw Hill
2. Solid State Pulse circuits - David A. Bell, PHI, 4th Edn.., 2002 .
3. Wave Generation and Shaping L. Strauss.
4. Pulse, Digital Circuits and Computer Fundamentals - R.Venkataraman.

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II Year B. Tech ECE– II Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(CED1105) ENVIRONMENTAL STUDIES

Course Objectives:

- Develop an understanding of the necessity of protection of environment
- Develop an understanding of Natural resources
- Develop an understanding of Biodiversity
- Develop an understanding of Global Environmental problems and Environmental pollution

Course Outcomes:

After going through this course the student will be able to

- Acquire the knowledge on environment
- Acquire the knowledge of various Natural Resources
- Develop skills in understanding of various environmental problems
- Develop skills to protect the Environment

UNIT-I

Introduction, Definition, scope and importance, Ecosystems: Introduction, types, characteristic features, structure and functions of ecosystems. Bio geo chemical cycle, Classification of Eco system.

UNIT-II

Natural Resources :classification of Resources, Land resources, Land as resource, Common property resources, Land degradation, Soil erosion and desertification, Effects of modern agriculture, fertilizer –pesticide problems, Forest resources, Use and over-exploitation.

Mining and dams – their effects on forest and tribal people, Water resources, Use and over- utilization of surface and groundwater, Floods, droughts, Water logging and salinity, Dams –benefits and costs, Conflicts over Water. Energy resources, Energy resources.

UNIT III

Bio-diversity and its conservation, Value of bio-diversity -consumptive and productive use, social, ethical, aesthetic and option values, Bio-geographical classification of India – India as a mega diversity habitat, Threats to bio-diversity –Hot-spots, habitat loss, poaching of wild life, loss of species, seeds, etc. Conservation of bio-diversity – Insitu and Ex-situ conservation.

UNIT IV

Environmental Pollution –Local and Global Issues, Nature of thermal pollution and nuclear hazards, Global warming, Acid rain, Ozone layer depletion., Environmental case studies:.

UNIT-V

Environmental Problems in India, Drinking water, sanitation and public health, Effects of the activities on the quality of environment, Water scarcity and groundwater depletion, Controversies on major dams – resettlement and rehabilitation of people: problems and concerns, Rain water harvesting, cloud seeding and watershed management. Economy and Environment, The economy and environment interaction, Economics of development, preservation and conservation, Sustainability: theory and practices, Limits to growth, Equitable use of resources for sustainable life styles, Environmental Impact Assessment.

TEXT BOOKS

1. Environmental studies-A.Y.Anjaneyulu
2. Environmental studies-Deeksha dave
3. Environmental sciences and management-Venugopal

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II Year B .Tech ECE – II Sem	**L**	**T/P/D**	**C**
	4	**1**	**4**

(ECE1106) ANALOG COMMUNICATIONS

Pre-requisites: Signals and Systems

Course Objectives

- To know the need for modulation in radio communication system.
- To understand the principles of various modulation and demodulation Techniques.
- To analyze various types of transmitters and receivers.
- To analyze the noise performance of Analog Modulation systems.

Course Outcomes

After going through this course the student will be able to

- Apply and relate the analog modulation techniques to real time applications like Radio Broadcasting,
  telecommunications, TV's etc.
- Compare different modulation Techniques
- Design transmitters and receivers for Analog Communication.
- Design various communication systems by including noise analysis

UNIT I

INTRODUCTION : Introduction to communication system, Need for modulation, Frequency Division Multiplexing , Amplitude Modulation, Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM wave using square law and Switching modulator, Detection of AM Waves using square law and Envelope detector.

DSB MODULATION: Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSBSC Waves using Balanced and 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. Noise in

Analog communication System, Noise in DSB and SSB System Noise in AM System

UNIT III

ANGLE MODULATION: Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM and Indirect FM, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Foster Seeley discriminator, Ratio detector, Comparison of FM and AM. Noise in Angle Modulation System, Threshold effect in Angle Modulation System, Pre-emphasis and de-emphasis

UNIT IV

TRANSMITTERS: Radio Transmitter - Classification of Transmitter, AM Transmitter, FM Transmitter – Variable reactance type and phase modulated FM Transmitter, frequency stability in FM Transmitter.

RECEIVERS : Radio Receiver - Receiver Types - Tuned radio frequency receiver, Super-heterodyne receiver, RF section, Mixer (Down Converter) and Characteristics, Frequency Synthesizer , Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.

UNIT V

PULSE MODULATION: Overview of sampling for Band pass and Band limited signals, Time Division Multiplexing, Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation and demodulation of PWM, PPM, Generation and demodulation of PPM

TEXTBOOKS

1. Principles of Communication Systems – H Taub and D. Schilling, Gautham Sahe, 3rd Edition, TMH, 2009.
2. Modern analog and digital Communication Systems – B.P. Lathi and Zhi Ding, Oxford Publication,4th Edition, 2010.
3. Communication Systems – R.P. Singh, SP Sapre, 2nd Edition,TMH, 2007

REFERENCES

1. Principles of Communication Systems - Simon Haykin, John Wiley, 2nd Edition.
2. Electronics and Communication System – George Kennedy and Bernard Davis, TMH, 2004.
3. Fundamentals of Communication Systems - John G. Proakis, Masond, Salehi PEA, 2006.
4. Communication Systems –B.P Lathi, B.S.Publication, 2006.

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II Year B. Tech ECE – II Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(ECE1204) ANALOG COMMUNICATION LABORATORY

Pre-requisites: signals and systems

Course Objectives

- To analyze various modulation techniques in communications.
- To analyze various spectrums using spectrum analyzer.
- To analyze receiver characteristics.
- To understand the importance of AGC and VCO

Course Outcomes

After going through this course the student will be able to

- Simulate all the experiments using any simulation software
- Design transmitter and receiver in analog communication system
- Perform various experiments using Teena software and ASL Kit
- Understand and Analyze various problems when implemented on DSP

The experiments are to be software simulated and implemented through Hardware.

At least Six experiments have to be implemented using DSP Processor, i.e., TMS 3206713.

1. Amplitude modulation and demodulation.
2. Diode detector characteristics.
3. Frequency Modulation and Demodulation.
4. Balanced Modulator.
5. Synchronous detector.
6. SSB system
7. Pre-emphasis and de-emphasis.
8. Characteristics of mixer.
9. Digital phase detector.
10. Phase locked loop using ASL kit
11. Spectral analysis of AM and FM signals using spectrum analyzer.
12. Squelch Circuit.
13. Frequency Synthesizer.
14. AGC Characteristics and AVC using ASL kit.
15. Receiver Measurements
16. Function generator and VCO using ASL kit.

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II Year B. Tech ECE – II Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(EIE1202) PULSE AND DIGITAL CIRCUITS LABORATORY

Pre-requisites: Electronic Devices and Circuits

Course Objectives

- To demonstrate the various wave shaping circuits.
- To demonstrate generation of various non-sinusoidal waveforms.
- To demonstrate functionality of various logic gates.
- To analyze dynamic response of electronic switch.

Course Outcomes

After going through this course the student will be able to

- Design linear and non linear wave shaping circuits .
- Generate various wave forms such as Square, Pulse and Sweep
- Design electronic switch.
- Design simple applications such as counters of flip-flops.

List of Experiments:

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

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III Year B. Tech ECE – I Sem	**L**	**T/P/D**	**C**
	4	**0**	**4**

(ITD1104) COMPUTER ORGANIZATION

Pre-requisites: Digital fundamentals

Course Objectives

- Learn basic hardware and software of computer organization.
- Know the instructions codes, formats and addressing modes of a computer.
- Learn micro programmed control unit and memory organization of a computer.
- Understand computer arithmetic, IO organization and parallel processing.

Course Outcomes

After going through this course the student will be able to

- Analyze the concepts of computer organization for several engineering applications.
- Use the fundamentals of computer organization as a tool in digital systems.
- Identify, formulate, and solve hardware and software computer engineering problems.
- Analyze IO, memory, Stack organization and parallel processing of a computer.

UNIT I

BASIC STRUCTURE OF COMPUTERS: Computer types, functional unit, basic operational concepts, bus structures, multi processors and multi computers, multi tasking.

Register Transfer Language and Micro operations: Register Transfer language, register Transfer, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, Arithmetic logic shift unit.

UNIT II

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction Codes, Computer Registers, computer instructions – instruction Cycle, memory reference instructions, input-output and interrupt. Central Processing Unit: Stack organization, instruction formats, addressing modes, data transfer and manipulation, program control, CISC and RISC.

UNIT III

MICROPROGRAMMED CONTROL: Control memory, address sequencing, micro program example, design of control unit, hardwired control, micro programmed control.

THE MEMORY ORGANIZATION: Memory hierarchy, Main Memory, Cache memory, performance considerations, virtual memory, secondary storage.

UNIT IV

COMPUTER ARITHMETIC: Addition and subtraction, multiplication algorithms, Division algorithms, floating-point arithmetic operations, Decimal arithmetic unit, Decimal arithmetic operations.

INPUT-OUTPUT ORGANIZATION: Peripheral devices, input-output interface, asynchronous data transfer, modes of transfer, priority interrupt, direct memory access.

UNIT V

PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instuction pipeline, RISC pipeline Vector Processing, Array Processors.

TEXT BOOKS

1. Computer System Architecture – M. Morris Mano, III edition, Pearson/PHI
2. Computer organization – Carl Hamacher, Zvonks Vranesic, Safeazaky, V edition, Mc Graw Hill

REFERENCES

1. Computer Organization and Architecture – William Stallings Sixth edition, Pearson/PHI
2. Fundamentals of Computer Organization and Design, Sivarama Dandamudi
3. Computer Architecture a Quantitative approach, John L. Hennessy and David A Patterson, Fourth edition Elsevier.
4. Computer Architecture Fundamentals and Principles of Computer Design, Joseph D/ Dumas II,
   BS Publication

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III Year B. Tech ECE – I Sem	**L**	**T/P/D**	**C**
	4	**0**	**4**

(EIE1106) LINEAR AND DIGITAL IC APPLICATIONS

Pre-requisites: Electronic circuits and Digital fundamentals

Course Objectives

- To study the characteristics and design concepts of operational amplifiers.
- To understand the functionality of specific ICs: 555 timer, 565, voltage regulators.
- To study the applications and design concepts of various ICs.
- To understand concepts of Digital circuits using digital ICs.

Course Outcomes

After going through this course the student will be able to

- Analyze electrical properties of Op-Amps and design various linear and nonlinear applications using Op-Amps.
- Design various applications of 555 timer, IC 565, voltage regulators.
- Understand and compare TTL and CMOS IC logic families.
- Design various combinational and sequential logic circuits using digital ICs.

UNIT I

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

OP-AMP APPLICATIONS : Basic application of Op-amp, instrumentation amplifier, ac amplifier, V to I and I to V converters, sample and hold circuits, Log and antilog amplifier, Precision rectifiers, Differentiators, Integrators, peak detectors, comparators, sample and hold circuits

UNIT II

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

UNIT III

SPECIAL ICs: 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, introduction to voltage regulators.

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

UNIT IV

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

UNIT V

COMBINATIONAL CIRCUIT DESIGN : Design using TTL-74XX series ICs - Code Converters, Decoders, De-multiplexers, Encoders, priority Encoders, multiplexers and their applications, Priority Generators, Arithmetic circuit ICs-parallel binary Adder/Subtractor circuits using 2's-Complement system, Digital comparator circuits.

SEQUENTIAL CIRCUITS : Commonly available 74XX series ICs-SR, JK, JK Master Slave, D and T Type Flip-Flops & their conversions, Design of Synchronous and Asynchronous counters, Decade counter, shift registers and applications using TTL-74XX series ICs.

TEXT BOOKS

1. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition, 2008..
2. Digital Fundamentals – Floyd and Jain, Pearson Education, 8th Edition, 2005.
3. Op-Amps and Linear ICs – Ramakanth A. Gayakwad, PHI, 1987

REFERENCES

1. Operational Amplifiers and Linear Integrated Circuits – R.F. Coughlin and Fredrick F. Driscoll, PHI, 1977.
2. Operational Amplifiers and Linear Integrated Circuits:4/e William D Stanley PEI 2009.
3. Op Amps and Linear Integrated Circuits: Concepts and Applications by James M. Fiore, Cengage/ Jaico ,2/e, 2009.
4. Operational Amplifiers and Linear Integrated Circuits by K.Lal Kishore - Pearson education, 2008.
5. Mordern Digital Electronics RP Jain 4/e TMH 2010.

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III Year B. Tech ECE – I Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(ECE1107) DIGITAL COMMUNICATIONS

Pre-requisites: Analog Communications, Probability theory

Course Objectives

- Understand various modulation techniques.
- Study the concepts of base band transmissions.
- Knowledge of information theory.
- Importance of coding theory.

Course Outcomes

After going through this course the student will be able to

- Analyze pulse digital modulation techniques.
- Compare power spectral densities of various encoding formats and know the Importance of pulse shaping.
- Apply modulation techniques to design a digital system.
- Understand source and channel coding schemes

UNIT I

PULSE DIGITAL MODULATION: Elements of digital communication systems, advantages of digital communication systems, elements of PCM: sampling, quantization and coding, quantization error, non-uniform Quantization and companding. Differential PCM systems (DPCM) and Adaptive DPCM.

DELTA MODULATION: Delta modulation, its drawbacks, adaptive Delta modulation, comparison of PCM and DM systems, noise in PCM and DM systems.

UNIT II

BASE BAND TRANSMISSION: Requirements of a line encoding format, various line encoding formats- Unipolar, Polar, Bipolar, Scrambling techniques-B8ZS,HDB3. Computation of power spectral densities of various line encoding formats.

M-ARY PULSE MODULATION: Inter symbol interference, pulse shaping to reduce ISI, Nyquist's criterion, Raised cosine filter, Equalization, Correlative level coding, Duo-binary encoding, Modified Duo-binary encoding.

UNIT III

DIGITAL MODULATION TECHNIQUES: Introduction, 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, DPSK, DEPSK.

DATA TRANSMISSION: base band signal receiver, probability of error, optimum filter, matched filter, probability of error using matched filter, probability of error for various line encoding formats, correlator receiver, Calculation of Probability Errors of ASK, FSK, BPSK.

UNIT IV

INFORMATION THEORY: Information and Entropy conditional entropy, Mutual Information, channel Capacity, Various Mathematical Modeling of Communication Channels and their Capacities, Hartley Shannon Law, Trade off between bandwidth and S/N ratio Source Coding. Fixed Length and Variable Length Source Coding Schemes.

UNIT V

LINEAR BLOCK CODES: Introduction to error control coding, Matrix description of linear block codes, error detection and error correction capabilities of linear block codes, hamming code, binary cyclic codes, algebraic structure, encoding, syndrome calculation and decoding.

CONVOLUTIONAL CODES: Introduction, encoding of convolutional codes, time domain approach, transform domain approach. General approach: state, tree and trellis diagram, decoding using viterbi algorithm, burst error correction, block interleaving and Convolutional interleaving.

TEXT BOOKS

1. Digital and Analog Communication Systems – Sam Shanmugam, John Wiley, 2005
2. Principles of Communication Systems – H. Taub and D. Schilling, Goutam Saha, 3rd Edition, McGraw-Hill, 2010.

REFERENCES

1. Digital Communications – Simon Haykin, John Wiley, 2005.
2. Digital Communications – John Proakis, TMH, 1983.
3. Communication Systems Analog and Digital – Singh and Sapre, TMH, 2004.
4. Modern Analog and Digital Communications – B.P. Lathi and Zhi Ding, International 4th Edition, Oxford University Press.

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III Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
	4	**0**	**4**

(ECE1108) ANTENNAS AND WAVE PROPAGATION

Pre-requisites: Electro Magnetic Theory concepts

Course Objectives

- To know about the fundamentals to design various types of Antennas.
- To analyze the fields associated with various types of antennas along with emphasis on their applications
- To know the measurement techniques involved in measuring antenna parameters
- To understand the concepts of radio wave propagation in the atmosphere.

Course Outcomes

After going through this course the student will be able to

- Apply the fundamentals to design various types antennas
- Quantify the fields radiated by various types of antennas
- Analyze antenna parameters measurement to assess antenna's performance
- Analyze the intricacies involved in propagation of waves in free space

UNIT I

ANTENNA FUNDAMENTALS: Introduction, Radiation Mechanism – single wire, 2 wire, dipoles, Current Distribution on a thin wire antenna . Antenna Parameters - Radiation Patterns, Patterns in Principal Planes, Main Lobe and Side Lobes, Beamwidths, Polarization, Beam Area, Radiation Intensity, Beam Efficiency, Directivity, Gain and Resolution, Antenna Apertures, Aperture Efficiency, Effective Height, illustrated Problems.

UNIT II

THIN LINEAR WIRE ANTENNAS: Retarded Potentials, Radiation from Small Electric Dipole, Quarterwave Monopole and Halfwave Dipole – Current Distributions, Evaluation of Field Components, Power Radiated, Radiation Resistance, Beamwidths, Directivity, Effective Area and Effective Hight. Natural current distributions, fields and patterns of Thin Linear Center-fed Antennas of different lengths, Radiation Resistance at a point which is not current maximum. Antenna Theorems – Applicability and Proofs for equivalence of directional characteristics, Loop Antennas : Small Loops - Field

Components, Comparison of far fields of small loop and short dipole, Concept of short magnetic dipole, D and R_r relations for small loops.

UNIT III

ANTENNA ARRAYS : 2 element arrays – different cases, Principle of Pattern Multiplication, N element Uniform Linear Arrays – Broadside, Endfire Arrays, EFA with Increased Directivity, Derivation of their characteristics and comparison; Concept of Scanning Arrays. Directivity Relations (no derivations). Related Problems. Binomial Arrays, Effects of Uniform and Non-uniform Amplitude Distributions, Design Relations. Arrays with Parasitic Elements, Yagi - Uda Arrays, Folded Dipoles and their characteristics.

NON-RESONANT RADIATORS : Introduction, Traveling wave radiators – basic concepts, Longwire antennas – field strength calculations and patterns, Microstrip Antennas-Introduction, Features, Advantages and Limitations, Rectangular Patch Antennas –Geometry and Parameters, Impact of different parameters on characteristics. Broadband Antennas: Helical Antennas – Significance, Geometry, basic properties; Design considerations for monofilar helical antennas in Axial Mode and Normal Modes (Qualitative Treatment).

UNIT IV

VHF, UHF AND MICROWAVE ANTENNAS - I : Reflector Antennas : Flat Sheet and Corner Reflectors. Paraboloidal Reflectors – Geometry, characteristics, types of feeds, F/D Ratio, Spill Over, Back Lobes, Aperture Blocking, Off-set Feeds, Cassegrainian Feeds.

Horn Antennas – Types, Optimum Horns, Design Characteristics of Pyramidal Horns; Lens Antennas – Geometry, Features, Dielectric Lenses and Zoning, Applications, Antenna Measurements – Patterns Required, Set Up, Distance Criterion, Directivity and Gain Measurements (Comparison, Absolute and 3-Antenna Methods).

UNIT V

WAVE PROPAGATION : Concepts of Propagation – frequency ranges and types of propagations. Ground Wave Propagation–Characteristics, Parameters, Wave Tilt, Flat and Spherical Earth Considerations. Sky Wave Propagation – Formation of Ionospheric Layers and their Characteristics, Mechanism of Reflection and Refraction, Critical Frequency, MUF and Skip Distance – Calculations for flat and spherical earth cases, Optimum Frequency, LUHF, Virtual Height, Ionospheric Abnormalities, Ionospheric Absorption.

Fundamental Equation for Free-Space Propagation, Basic Transmission Loss Calculations. Space Wave Propagation – Mechanism, LOS and Radio Horizon. Tropospheric Wave Propagation – Radius of Curvature of path, Effective Earth's Radius, Effect of Earth's Curvature, Field Strength Calculations, M-curves and Duct Propagation, Tropospheric Scattering.

TEXT BOOKS

1. Antennas for All Applications – John D. Kraus and Ronald J. Marhefka, 3rd Edition, TMH, 2003.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, 65PHI, 2nd Edition, 2000.

REFERENCES

1. Antenna Theory - C.A. Balanis, John Wiley and Sons, 2nd Edition, 2001.
2. Antennas and Wave Propagation – K.D. Prasad, Satya Prakashan, Tech India Publications, New Delhi, 2001.
3. Transmission and Propagation – E.V.D. Glazier and H.R.L. Lamont, The Services Text Book of Radio, vol. 5, Standard Publishers Distributors, Delhi.
4. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th Edition, 1955.
5. Antennas – John D. Kraus, McGraw-Hill, 2nd Edition, 1988.

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III Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
	4	**0**	**4**

(CMS1101) BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

Course Objectives

- To explain different forms of organizing private and public sector business enterprises and to analyze the significance of Business Economics in solving the problems of business enterprise. Also to define and analyze the concepts of Demand, Elasticity of Demand and Demand Forecasting Methods.
- To analyze the various types of costs and to determine the level of output at which there is neither profit nor loss. To estimate capital requirements and to describe various sources of mobilizing funds. Also to identify least cost combinations of inputs produce desired quantity of output.
- To describe the features of different market structure and pricing strategies.
- To explain the basic accounting concepts and conventions. To elaborate the importance of finance function for evaluating the economic status of a business unit.

Course Outcomes

After going through this course the student will be able to

- Select the suitable form of business organization which meets the requirement of selected business also perform decision – making function effectively in an uncertain frame work by applying concepts of Managerial Economics. Meet and manipulate the demand efficiently and plan the future course of action.
- Apply right kind cost to reduce cost by paying attention towards the costs which can be reduced. Take decision whether to buy or produce? Reduce the cost of capital by selecting best source of fund mobilization and select best investment opportunity which yields higher rate of return.
- Fix the right price which can best meets the predetermined objectives of the business firm under different market conditions. Able to select best combination of inputs to produce required quantity of output.

- Prepare books of accounts and know over all financial position of the business enterprise which enables the concerned to take appropriate measures to improve the situation. Also interpret the financial position from difference angles and initiates the measures/ efforts in that direction.

UNIT I

Business and new economic environment

Characteristic features of business; Features and evaluation of sole proprietorship; Partnership; Joint stock company; Public enterprises and their types; Changing business environment in post- liberalization scenario.

UNIT II

Introduction to business economics, and demand analysis

Definition; Nature and scope of managerial economics - demand analysis determinants; Law of demand and its exceptions.

Elasticity of demand and demand forecasting

Definition; Types; Measurement and significance of elasticity of demand; Demand forecasting; Factors governing demand forecasting; Methods of demand forecasting - survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, and judgmental approach to demand forecasting.

UNIT III

Cost analysis

Cost concepts - opportunity cost, fixed vs. variable costs, explicit costs vs. implicit costs, and out of pocket costs vs. imputed costs; Break-even analysis (BEA) - determination of break-even point (simple problems), managerial significance, and limitations of BEA.

Capital and capital budgeting

Capital and its significance; Types of capital; Estimation of fixed and working capital requirements; Methods and sources of raising finance.

Nature and scope of capital budgeting; Features of capital budgeting proposals; Methods of capital budgeting - payback method, accounting rate of return (ARR), and net present value method (simple problems)

UNIT IV

Theory of production

Production function - isoquants and isocosts, least cost combination of inputs, and laws of returns; Internal and external economics of scale.

Market structures

Types of competition; Features of perfect competition, monopoly, and monopolistic competition; Price-output determination in case of perfect competition and monopoly.

Pricing policies and methods

Cost plus pricing; Marginal cost pricing; Sealed bid pricing; Going rate pricing, Limit pricing, Market skimming pricing, Penetration pricing, Two-part pricing, Block pricing, Bundling pricing, Peak load pricing, Cross subsidization.

UNI T V

Introduction to financial accounting

Double-entry book keeping; Journal; Ledger; Trial balance; Final accounts - trading account, profit and loss account, and balance sheet with simple adjustments.

Financial analysis through ratios

Computation; Analysis and interpretation of liquidity ratios - current ratio, and quick ratio; Activity ratios - inventory turnover ratio, and debtor turnover ratio; Capital structure ratios – debt-equity ratio, and interest coverage ratio; Profitability ratios - gross profit ratio, net profit ratio, operating ratio, P/E ratio, and EPs.

TEXT BOOK

1. Managerial Economics and Financial Analysis by Aryasri, 2009; Publisher: Tata McGraw Hill.
2. Managerial Economics by Varshney & Maheswari, 2009; Publisher: Sultan Chand.

REFERENCES

1. Financial Accounting for Management: An analytical perspective by Ambrish Gupta, 2010; Publisher: Pearson Education.
2. Managerial Economics by H. Craig Peterson & W. Cris Lewis; Publisher: Prentice Hall of India.

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III Year B.Tech I Sem	**L**	**T/P/D**	**C**
	2	**0**	**0**

(NCC1102) Soft Skills and Personality Development

Introduction

In an era of Technological advances and competition in the job market, it is necessary for students to possess soft skills and effective personal skills in addition to technical skills. It is essential that students possess the ability to convey technical ideas in a sound and simple manner. Planning and execution are the two important activities required for them. It is the execution that requires the soft skills as it most of the times deals with people. This course on “Soft Skills and Personality Development” is aimed at enhancing students’ career prospects.

This course uncovers the principles of soft skills and personality skills, the ways to integrate them in different phases of career that require personal and interpersonal skills. It focuses on transforming the way of one’s thinking and reacting to the environment. It equips the students with self analysis and gain self- control through stress management and conflict management. It also helps students with study skills. It helps students overcome their barriers and achieve excellence in performance and succeed in their chosen field of work.

Objectives

enable students to convert the conceptual understanding of communication into everyday

practice

train students to ground concepts/ideas in their own experience enable students to exercise control over language use

sensitise students to the nuances of the four basic communication skills – Listening, Speaking, Reading and Writing

enable students to understand the concept and components of personality, so as to apply the

acquired knowledge and march towards excellence in their academic careers.

train students to become aware of their thinking styles and to enable them to convert thinking

into performance

prepare students to evolve mental models for intra-personal and inter-personal transactions

make students reflect and improve their use of body language – posture, gesture, facial expression, tone

sharpen memory skills and other study skills, which are vital for academic excellence.
bring outthe creativity and latent talents of students through goal setting
train students for positive thinking to keep them in good stead at the time of crisis.

SYLLABUS

Unit I: Introduction to Personality Development

1. Definition and Basics of personality
   - Determinants of Personality- biological, psychological and socio- cultural factors
   - Need for personality Development
2. Analyzing strengths and Weaknesses
3. Corporate theories on Personality development
4. Increasing vocabulary
5. Body Language
6. Preparation of Self Introduction
7. Motivation
   - Self-analysis through SWOT
   - Techniques and strategies for self-motivation

Unit II : Techniques in Personality Development Stage I

1. Communication Skills
2. Listening
3. Communication Barriers
4. Overcoming these Barriers
5. Importance of Self Esteem -- Building Self-esteem& Self Confidence
6. Working on attitudes – aggressive, assertive and submissive
7. Goal Setting
8. Leadership and Team Building Skills
9. Group Discussion

Unit III: Techniques in Personality Development Stage II

1. Interpersonal relationships
   - Analysis of ego states, Transactions, Strokes and Life Positions
2. Stress Management
   - Concept, Nature and Dimensions of Stress
   - Causes, Impact and Managing Stress
   - Relaxation Techniques
3. The Power of positive thinking
   - Nurturing creativity, decision-making and problem solving
   - Goals and techniques for positive thinking
   - Enhancement of concentration through positive thinking
4. Projecting a Positive Social Image
   - Grooming & Social Etiquette

- Voice Modulation
- Public Speaking

Unit IV: Techniques in Personality Development Stage III

- Conflict Management
- Introduction to Conflict Management
- Levels of Conflict
- Managing Conflict
- Time Management
- Concept
- Importance and Need
- Steps towards better Time Management

Unit V:Memory and Study Skills

- Definition and importance of memory
- Causes of forgetting
- How to forget (thought stopping), how to remember (techniques for improving memory)
- The technique of passing exams-Management of examination fear.

PRACTICAL TRAINING

The course would include the following practical exercises.

- Ice- breaking. Brainstorming and simulation exercises. Thought stopping. Memory and study skills training
- Role play and record work

REFERENCES

1. Mile, D.J (2004). Power of positive thinking. Delhi: Rohan Book Company.
2. Pravesh Kumar (2005). All about self- Motivation. New Delhi: Goodwill Publishing House.
3. Dudley, G.A. (2004). Double your learning power. Delhi: Konark Press. Thomas Publishing Group Ltd.
4. Lorayne, H. (2004). How to develop a super power memory. Delhi: Konark Press. Thomas Publishing Group Ltd.
5. Hurlock, E.B (2006). Personality Development, 28th Reprint. New Delhi: Tata Mc Graw Hill.
6. Windshuttle, Keith and Elizabeth Elliot.1999. Writing, Researching and Communicating: Communication Skills for the Information Age. 3rd Reprint. Tata McGraw-Hill. Australia
7. Dignen, Flinders and Sweeney. English 365. Cambridge University Press
8. Goleman, Daniel. 1998. Working with Emotional Intelligence. Bantam Books. New York
9. Jones, Leo and Richard Alexander. 2003. New International Business English. Cambridge University Press

10. Lucas, Stephen.2001. Art of Public Speaking. Mc-Graw Hill.
11. Tamblyn, Doni and Sharyn Weiss. 2000. The Big Book OF Humorous Training Games. 2004 Edition. Tata McGraw-Hill. New Delhi
12. Personality Development by Rajiv K. Mishra. Rupa & Co.
13. Powell. In Company. Macmillan
14. Cotton, et al. Market Leader. Longman
15. Pease, Allan. 1998. Body Language: How to Read Others Thoughts by their Gestures. Sudha Publications. New Delhi
16. Gardner, Howard. 1993. Multiple Intelligences: The Theory in Practice: A Reader. Basic Books. New York
17. De Bono, Edward. 2000. Six Thinking Hats. 2nd Edition. Penguin Books.
18. De Bono, Edward. 1993. Serious Creativity. Reprint. Harper Business.
19. Mohan, Krishna and Meera Bannerji, 2001, Developing Communication Skills. Macmillan.
20. V. Syamala, 2002. Effective English Communication for you. Emerald Publishers, Chennai.

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	0	**3**	**2**

(ENG1204) ADVANCED ENGLISH COMMUNICATION SKILLS LABORATORY

Introduction

This course aims to offer students a practical approach to Technical Writing, and provide a relevant, contemporary and authoritative introduction to the dynamic field of technical communication that prepares them for Workplace Communication. Each unit in the syllabus is devised so as to include a writing component as well as an oral component.

Prerequisites: English Language Communication Skills laboratory

Course objectives:

- enable the students to create clear, accurate, and succinct content to write business letters, resume, SOP, Proposals and Technical Reports for academics as well as for workplace
- enable students to adjust technical content to meet the needs of a specific target audience
- groom students to speak accurately and fluently and prepare them for real world activities through behavioral skills.
- train students in soft skills through role play and group discussion to improve their EQ.

Course Outcomes:

Students will be able to:

- summarize and synthesize information and produce technical writing that is required in academics as well as in the engineering profession
- write covering letters, resume, SOP, Project Proposals and Technical Reports
- speak fluently and address a large group of audience and participate in debates and discussions.
- negotiate terms, manage complex situations through interpersonal skills, persuade people and make quick decisions

The objectives of this course are to

i) expose students to workplace writing
ii) initiate them into the Process of Technical Communication
iii) enable the students to create clear, accurate, and succinct content

iv) enable students to produce documents reflecting different types of technical communication such as Abstracts, Proposals and Technical Reports through ample practice
v) enable students to adjust technical content to meet the needs of a specific target audience
vi) groom students in behavioral skills

Methodology

Written Communication Component

A Process- Genre methodology will be used in teaching the technical genres. This method would enable students to understand the use of particular lexico-grammatical patterns required of in the context of technical writing. They would learn to use language to express the particular communicative intent that is required of in the context of writing these genres.

Objectives of Writing Component

i) enable students to write clearly and succintly
ii) equip students with the ability to write technical genres

Oral Communication Component

The objective of including Oral Communication is to impart behavioral skills and prepare students to speak to a large group or team, keeping in mind the audience, context and purpose of communication. This Oral Communication component must enable students to speak in an organized and mature way, without any inhibitions. They will be groomed to relate their speech to their audience.

Objectives of Oral Communication Component

i) equip students with Behavioral skills
ii) prepare them for Oral presentations, and Group Discussions
iii) equip them with Interview skills

Syllabus Outline

Unit I

Writing Skills 1

1. Applications and Covering letters
2. Resume Writing
3. Verbal Ability
4. **Oral Communication** :Talking About Yourself

Unit II

1. Writing an SOP
2. Summarizing and Synthesizing Information
3. Oral Communication: Making Presentations

Unit III

1. Writing Project Proposals

2. Oral Communication: Group Discussions

Unit IV

1. Writing Project Reports
2. Oral Communication: Interview Skills

Unit V.

Behavioral Skills and Personality Development

1. Building a positive attitude, building a positive personality, Motivation, goal setting & values & vision
2. Problem Solving and Decision Making; Negotiation Skills through Role Play
3. Team Building and Leadership Abilities
4. Social Etiquette

REQUIRED TEXT AND MATERIALS

1. Ashraf Rizvi, M (2005). Effective Technical Communication, Tata Mc Graw Hill Publishing Company Limited, New Delhi.
2. Anderson, Paul V. (2003). Reports. In Paul V. Anderson's Technical Communication: A Reader-Centered Approach (5th ed..) (pp. 457-473). Boston: Heinle.
3. William S. Pfeiffer, (2010) Technical Communication: A Practical Approach (7th ed.). Prentice Hall

References

1. Burnett, Rebecca. Technical Communication. 5th Ed., Heinle, 2001
2. Bolter, Jay David. (2001). The late age of print. In Robert P. Yagelski's (Ed.) Literacies and Technologies: A Reader for Contemporary Writers (135-145). New York: Longman.
3. Brandt, Deborah. (1998). Sponsors of literacy. College Composition and Communication 49.2, 165-185.
4. Gerson Sharon J. and Steven Gerson : Technical Writing Process and Product. 3rd edition, New Jersey: Prentice Hall 1999
5. Johnson-Sheehan, Richard. (2007). Starting Your Career. In Richard Johnson-Sheehan's Technical Communication Today (2nd ed.) (pp. 388-402). New York: Longman.
6. Markel, Mike**.** Technical Communication: Situations and Strategies (8th EDITION (2006-2007)
7. R. C. Sharma and K. Mohan, Business Correspondence and Report Writing, Third Edition, TMH, 2002. (Indian Edition)
8. M. Raman and S. Sharma, Technical Communication : Principles and Practices, OUP, 2004. (Indian Edition)

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(EIE1204) LINEAR AND DIGITAL IC APPLICATIONS LABORATARY

Course Objectives

- To demonstrate the characteristics and applications of Op-Amps
- To verify the functionality of specific ICs: 555 timer, IC 565, Voltage regulators
- To verify the functions of various digital ICs
- To study and build applications with ASLKV2010 Starter Kit

Course Outcomes

After going through this course the student will be able to

- Design various applications using Op-Amps
- Design various applications with specific ICs: 555 timer, IC 565, voltage regulators
- Design digital circuits using digital ICs
- Design applications using ASLKV2010 Starter Kit

Note: Minimum of 12 experiments have to be conducted (Four from each part).

List of Experiments:

PART 1: To Verify the following Functions.

1. Adder, Subtractor, Comparator using IC 741 OP-AMP.
2. Square Wave Generator and Triangular Wave Generator using OP-AMP.
3. RC Phase Shift & Wien Bridge Oscillators using IC 741 OP-AMP.
4. 4.bit Digital to Analog converter.
5. Schmitt Trigger circuits using IC 741 & IC 555.
6. Voltage Regulator using IC 723, Three terminal voltage regulators-7805, 7809, 7912.

PART -2: T0 Verify the Functionality of the following 74 Series TTL ICs.

7. D-Flip- Flop – (74LS74) and JK Master-Slave Flip- Flop (74LS73).
8. Decade Counter (74LS90) and UP-DOWN Counter (74LS192).
9. Universal Shift registers – 74LS194/195.
10. 3- 8 Decoder – 74LS138.
11. 4-bit COMPARATOR -74LS85.
12. 8X1 Multiplexer– 74151 and 2X4 De-multiplexer- 74155.

PART - 3:

Design of the Analog Systems using Analog System Lab Starter Kit (ASLKV2010 Starter Kit).

13. Negative Feedback Amplifier and Instrumentation Amplifier.
14. Regenerative Feedback system, Astable and Monostable Multivibrator.
15. Integrators and Differentiators
16. Analog Filters
17. Low Dropout (LDO)/Linear Regulator.

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	0	**3**	**2**

(ECE1205) DIGITAL COMMUNICATIONS LABORATORY

Pre-requisites: Digital communications

Course Objectives

- To analyze various modulation techniques.
- To verify the sampling theorem.
- To study the spectral characteristics of PAM and QAM
- Develop various algorithms

Course Outcomes

After going through this course the student will be able to

- Develop any real time application using digital modulation techniques.
- Knowledge of time division multiplexing and its importance in real time applications.
- Create various algorithms.

Evaluate the performance of various modulations

The Experiments should be software simulated using MatLab and implemented through Hardware.

At least Six experiments have to be implemented using DSP Processor, i.e., TMS 3206713.

1. Pulse Amplitude Modulation and demodulation.
2. Pulse Width Modulation and demodulation.
3. Pulse Position Modulation and demodulation.
4. Sampling Theorem – verification.
5. Time division multiplexing.
6. Pulse code modulation.
7. Differential pulse code modulation.
8. Delta modulation.
9. Amplitude Shift Keying (ASK)
10. Frequency shift keying.
11. Phase shift keying.
12. Differential phase shift keying.
13. Study of the spectral characteristics of PAM and QAM

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	3	**1**	**3**

(EIE1124) ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Pre-requisites: Operational Amplifier Concepts

Course Objectives

- Develop an awareness to various electronic measurement Concepts
- Explain the operation and design of different electronic instruments
- Compare different ADC and DAC techniques and explain various circuits for conversion.
- Explain the operations of frequency and time measuring instruments and transducers.

Course Outcomes

After going through this course the student will be able to

- Apply measurement and instrumentation systems for electrical and electronics engineering.
- Design signal conditioning circuits corresponding to the measurement purposes.
- Learn different types of CRO's and bridges to measure resistance, capacitance and inductance.
- Design real time applications using transducers

UNIT I

Performance characteristics of instruments, static characteristics, Accuracy, Resolution, Precision, Expected value, Errors, Sensitivity. Errors in measurement , Dynamic Characteristics , DC voltmeters. D'Arsonval Movement, DC Current meters, AC volt meters and Current Meters, Range Extension /solid state and Differential voltmeters ,AC voltmeters, Multirange extension , Thermocouple type RF ammeter , ohmmeter series type , shunt type , Specifications and design consideration of different types of Digital Voltmeters (DVMs) - Staircase Ramp- type DVM, Dual Slope integrating type DVM, Successive Approximation Type DVM.

UNIT II

Signal generators-Fixed and variable, AF oscillators, Standard and AF sine and square wave signal generators, Function Generators, Square , pulse generator , Signal

Analyzer, Logic Analyzer, Network Analyzer, Random noise generator, sweep generator , arbitrary waveform generator Wave analyzers , harmonic distortion wave analyzer , spectrum analyzers Frequency counter , time and period measurement.

UNIT III

Oscilloscopes- CRT Features, vertical amplifiers, Horizontal deflection system, sweep, trigger pulse, delay line, sync selector circuits, simple CRO, Trigger sweep CRO, dual beam CRO, Dual trace oscilloscope, sampling oscilloscope ,storage oscilloscope, measurement of amplitude and frequency, probes for CRO-active and passive , CRO Specifications, High Frequency CRO's.

UNITIV

DC bridges- Wheatstone's bridge, Kelvin's bridge, AC bridges-measurement of inductance-Maxwell's bridge, Hay's bridge, measurement of capacitance, schering bridge, wien bridge, errors and precautions in using bridges, Q-meter,different connections in Q- meter.

UNITV

Transducers-active and passive transducers-Resistance transducers , Capacitance transducers, inductance transducers, Strain gauges transducers, LVDT transducers, Piezo electric transducers, Resistance thermometers, Thermocouples, Measurement of physical parameters- flow measurement, liquid level measurement , data acquisition systems.

TEXTBOOKS

1. Electronic Measurements and Instrumentation - K.Lal Kishore, Pearson Education, 2005
2. Electronic Instrumentation, - H.S.Kalsi, 2nd Edition ,Tata McGraw Hill, 2004.
3. Modern Electronic Instrumentation and Measurement Techniques- A.D.Helfrick and W.D. Cooper, 5th Edition ,PHI, 2002.

REFERENCES:

1. Transducers and display systems - B.S.Sonde
2. Electronic measurements and Instrumentation – B. M. Oliver and J.M. Cage, TMH, 2009.
3. Electrical and Electronic measurements - Shawney, Khanna Publications.
4. Introduction to Instrumentation and measurements - Robert Northrop (CRC press)

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	4	**0**	**4**

(CMS1102) MANAGEMENT SCIENCE

Pre-requisite: Knowledge on Business Economics & Financial Analysis

Course Objectives

- Understand the principles, functions, theories and practices of different management areas and to provide them with practical exposure to cases of success/failure in business.
- Exposure with a systematic and critical understanding of organizational theory, structures and design.
- Comprehend conceptual models of strategic management and to familiarize with the tools of operations and project management.
- Gain Knowledge on the role of human relations in the management of operations and to provide basic insights into contemporary management practices.

Course Outcomes

After going through this course the student will be able to

- Function effectively in multidisciplinary teams to accomplish a common goal of organizations.
- Apply theories to improve the practice of management.
- Appreciate the management challenges associated with high levels of change in the organizations.
- Develop global vision and management skills at both a strategic level and interpersonal level.

UNIT I

Introduction to management

Concepts of management - nature, importance, and functions of management; Taylor's scientific management theory; Fayol's principles of management; Mayo's Hawthorne experiments; Maslow's theory of human needs; Douglas McGregor's theory X and theory Y; Herzberg's two-factor theory of motivation; System and contingency approach to management; Planning – meaning, significance, and types of plans; Decision making and steps in decision making process; Leadership styles; Social responsibilities of management.

Organizing - Meaning, and features; Process of organization; Principles of organization; Elements of organization; Organization chart; Span of control - Graicunas formulae; Centralisation and decentralization; Types of mechanistic and organic structures of organisation - line organization, line and staff organization, functional organization, committee organization, matrix organization, virtual organisation, cellular organisation, team structure, boundaryless organization, inverted pyramid structure, and lean and flat organization structure; Their merits, demerits and suitability.

UNIT II

Human resources management

Concepts of HRM;

Basic functions of HR manager - human resource planning (definition; objectives; process), recruitment (definition; sources; techniques), selection (definition; process), induction and orientation, training and development (definition; need; methods), employee exit process, employee relations management, employee compensation and benefits administration, job evaluation (objectives; process; methods), and performance appraisals (objectives; process; methods).

UNIT III

Strategic management

Mission; Goals; Objectives; Policy; Strategy; Programmes; Elements of corporate planning process - environmental scanning; value chain analysis, BCG matrix, generic strategy alternatives, SWOT analysis, and steps in strategy formulation and implementation; Balance score card; Capability maturity model (CMM)/ People capability maturity model (PCMM).

UNIT IV

Operations management

Plant location; Types of plant layout; Methods of production – job, batch, and mass production; Work study-basic procedure involved in method study and work measurement.

Materials management

Objectives; Need for inventory control; EOQ, ABC Analysis; Purchase procedure; Value analysis; JIT, Six sigma; TQM; Supply chain management; Stores management and stores records.

Marketing

Functions of marketing; Marketing mix, and marketing strategies based on product life cycle; Channels of distribution.

UNIT V

Project management – network analysis

Network analysis; Programme evaluation review technique - PERT (probability of completing the project within given time); Critical path method - CPM (Identifying critical path); Project cost analysis; Project crashing; Simple problems.

TEXT BOOK

1. Management Science by Aryasri; Publisher: Tata McGraw Hill, 2009.
2. Management by James Arthur, Finch Stoner, R. Edward Freeman, and Daniel R. Gilbert 6th Ed; Publisher: Pearson Education/Prentice Hall.
3. Principles and Practice of Management - L.M. Prasad; Publisher: Sultan Chand Publications, New Delhi.

REFERENCES

1. Principles of Marketing: A South Asian Perspective by Kotler Philip, Gary Armstrong, Prafulla Y. Agnihotri, and Eshan ul Haque , 2010, 13th Edition, Publisher: Pearson Education/ Prentice Hall of India.
2. A Handbook of Human Resource Management Practice by Michael Armstrong, 2010; Publisher: Kogan Page Publishers.
3. Quantitative Techniques in Management by N.D. Vohra, 4th edition, 2010; Publisher: Tata McGraw Hill.
4. Operations Management: Theory and Practice by B. Mahadevan, 2010; Publisher: Pearson Education.
5. Strategic Management by V.S.P. Rao and V. Hari Krishna, 2010; Publisher: Excel Books.

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(ECE1109) MICROPROCESSORS AND MICROCONTROLLERS

Pre-requisites: Digital fundamentals, Computer Organization

Course Objectives

- To understand characteristics and architectures of various microprocessors and microcontrollers.
- Understand basic programming concepts and software tools
- Learn various interfacing circuits necessary for various applications
- To learn various interfacing concepts.

Course Outcomes

After going through this course the student will be able to

- Demonstrate the ability to design a system, component or a process as per needs and specifications
- Select the proper architecture for the implementation of digital designs
- Write various assembly language programs for a given task using 8086, 8051 and ARM processors.
- Design and implement microprocessor and microcontroller based systems.

UNIT I

Introduction to 8085 Microprocessor, Architecture of 8086 Microprocessor, Addressing modes of 8086, Instruction set of 8086, Assembler directives, simple assembly language programs, procedures, and macros. Pin diagram of 8086-Minimum mode and maximum mode of operation.

UNIT II

Memory and I/O organization of 8086, 8255 PPI – various modes of operation and interfacing to 8086, D/A and A/D converter to 8086 using 8255, memory interfacing to 8086.

UNIT III

Serial Communication standards, serial data transfer schemes, 8251 USART architecture and interfacing, RS-232, IEEE 488 standards. Interrupt structure of 8086, Interrupt Vector Table. Need for 8259 Programmable Interrupt Controller.

UNIT IV

Introduction to Microcontrollers, 8051 Microcontroller Architecture, I/O ports, memory organization, counters and Timers, Serial data Input/Output, Interrupts. Addressing modes, Instruction set of 8051, Simple programs.

Timer, serial port and Interrupts programming: Programming 8051 timers/counters, 8051 serial port programming, programming timer interrupts, programming External hardware interrupts, programming serial communication interrupts.

UNIT V

Interfacing to 8051: A/D and D/A Converter, Stepper Motor Interface, Key Board Interfacing, LCD Interfacing.

ARM Processor: Fundamentals, Registers, current program status register, pipeline, Exceptions, Interrupt and the vector table.

.**TEXT BOOKS**

1. Microprocessors and interfacing – Douglas V. Hall, TMH, 2nd Edition, 1999.
2. The 8051 microcontrollers and Embedded systems- Mazidi and mazidi, PHI, 2000.
3. ARM System Developer's Guide: Designing and Optimizing System Software- Andrew N. Sloss, Dominic Symes, Chris Wright, Elsevier Inc., 2007

REFERENCES

1. Micro computer systems, The 8086/8088 Family Architecture, Programming and Design – Y.Liu and G.A. Gibson, PHI, 2nd edition.
2. Advanced microprocessors and Peripherals – A.K.Ray and K.M.Bhurchandi, TMH, 2000.
3. Micro Computer System 8086/8088 Family Architecture Programming and Design – By Liu and GA Gibson PHI, 2nd Edition
4. Microcontrollers and Applications, Ajay . V. Deshmukh, TMGH,2005.
5. The 8085 Microprocessor : Architecture Programming and Interfacing – K.Uday Kumar, B.S Umashankar, Pearson , 2008.

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	3	**1**	**3**

(ECE1110) DIGITAL SIGNAL PROCESSING

Pre-requisites: Signals and systems

Course Objectives

- To understand characteristics of discrete time signals and systems
- To analyze and process signals using various transform techniques
- To understand various factors involved in design of digital filters and role of Multi rate Signal Processing.
- To understand the effects of finite word length implementation.

Course Outcomes

After going through this course the student will be able to

- Analyze and process signals in the discrete domain and their transformation
- Design filters to suit specific applications
- Design multi rate signal processing of signals through systems.
- Analyze binary fixed point and floating-point representation of numbers and arithmetic operations.

UNIT I

Introduction: Introduction to Digital Signal Processing. Applications of Z-Transforms : Solution of Linear constant coefficient difference equations, Block diagram representation of LCCD equations. System function, Frequency domain representation of discrete time signals and systems.

Discrete Fourier series: DFS representation of periodic sequences, Relation between Z-transform and DFS.

UNIT II

Discrete Fourier Transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT.

Fast Fourier Transforms: Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT. Composite algorithm.

UNIT III

IIR Digital Filters: Analog filter approximations- Butterworth and Chebyshev , comparison of Butterworth and Chebyshev filters. Design of IIR Digital filters from analog filters, Step and Impulse invariance transformation techniques, Bilinear transformation method. Spectral transformations (Analog to Analog).

Realization of IIR Filters: Direct, Canonic, Cascade, Parallel, Lattice and Ladder forms.

UNIT IV

FIR Digital Filters : Characteristics of linear phase FIR filters and its frequency response. Comparison of IIR and FIR filters.

Design of FIR filters : Fourier Method, Frequency Sampling method and windowing methods: Rectangular window, Hanning window, Hamming window, Bartlett window and Kaiser window.,

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

UNIT V

Multirate Digital Signal Processing: Introduction, Down sampling, Decimation, Up sampling, Interpolation, sampling rate conversion, Implementation of sampling rate conversion, Applications of Multirate 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, D.G.Manolakis, 4th Edition, Perason/PHI, 2009.
2. Digital Signal Processing – A Pratical Approach – Emmanuel C.Ifeacher, Barrie. W. Jervis, 2nd Edition, Pearson Education, 2009.

REFERENCES

1. Discrete Time Signal Processing – A.V.Oppenheim and R.W. Schaffer, PHI, 2009
2. Digital Signal Processing- Fundamentals and Applications – Li Tan, Elsevier, 2008.
3. Fundamentals of Digital signal Processing using MatLab- Robert J.Schilling, Sandra L.Harris,Thomson , 2007.
4. Digital Signal Processing – S.Salivahanan, A.Vallavaraj, C.Gnanapriya,TMH, 2009.
5. Fundamentals of Digital Signal Processing - Loney Ludeman, John Wiley,2009.

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
Open Elective-I	**3**	**0**	**3**

(ITD1105) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Course Learning Objectives

- To produce object-oriented solutions to a range of standard programming problems
- They will be able to articulate and restructure programming objectives in the object-oriented paradigm.
- They will be informed with regard to the fundamental concepts and principles of object-oriented programming
- They will be able to apply these concepts in any programming language.

Course Outcomes

After going through this course the student will be able to

- Design/Develop Program
- Implement Program
- Test Program
- Validate Program

UNIT I

Introduction to Java

Introduction: Creation of Java, Java buzzwords, OOP Principles, Encapsulation, Inheritance and Polymorphism,

Classes and Objects: Creating and usage objects, introducing methods,constructors, usage of static with data and methods, usage of final with data, access control, this key word, garbage collection, overloading methods and constructors, parameter passing, recursion, nested classes and inner classes, String Handling

UNIT-II

Inheritance, Packages and Interfaces

Basic concepts, member access rules, usage of super key word, forms of inheritance, method overriding, abstract classes, dynamic method dispatch, using final with inheritance, the Object class.

Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT-III

Exception Handling and Multithreading

Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes, Concepts of Multithreading, differences between process and thread, thread life cycle,creating multiple threads using Thread class, Runnable interface, Synchronization, thread priorities, inter thread communication, daemon threads,deadlocks, thread groups.

UNIT-IV

Event Handling, AWT Controls

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

AWT : Concepts of components, container, panel, window, frame, canvas, Font class, Color class and Graphics, AWT Controls.

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

UNIT-V

Networking, Java Library, JDBC

Networking: Inetaddress, TCP/IP sockets, Datagrams, URL, URL connection, String handling, java.util, java.io and java.net packages.

JDBC: Different type of Drivers, Connection establishment, Retrieving and manipulation data from client and storing in data base.

Java Library: explore io, util, net, lang, sql, awt packages.

Introduction to Java APIs: what is API, discuss APIs in Java SS, Java EE, Java ME

TEXT BOOKS

1. The Complete Reference Java J2SE 5th Edition, Herbert Schildt, TMH Publishing Company Ltd, NewDelhi.
2. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons.

REFERENCES

1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
2. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
3. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
4. Beginning in Java 2, Iver Horton, Wrox Publications.
5. Java, Somasundaram, Jaico.
6. Java Networking and AWT API Super Bible, Natraj Nagaratnam, Brian Masco, Arvind Srinivasan, White Group Press

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III Year B.Tech ECE–II Sem	**L**	**T/P/D**	**C**
Open Elective - I	**3**	**0**	**3**

(ITD1122) CLOUD COMPUTING

Course Objectives

- Knowledge of Parallel computing architectures such as vector processing, symmetric multi processing
- Importance and Details of Service oriented architecture and Virtualization
- What are Limitations, Key Characteristics, challenges of cloud computing , Saas, Paas,Iaas
- Different services offered by Cloud computing and procedure involved in building the cloud networks

Course Outcomes:

Upon completion of this course, students should be able to:

- Articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing
- Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.
- Explain the core issues of cloud computing such as security, privacy, and interoperability.
- Identify problems, and explain, analyze, and evaluate various cloud computing solutions.

UNIT I

UNDERSTANDING CLOUD COMPUTING

Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage –Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services

UNIT II

DEVELOPING CLOUD SERVICES

Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds

UNIT III

CLOUD COMPUTING SECURITY ARCHITECTURE

Cloud security fundamentals-Vulnerability assessment tool for cloud- Privacy and Security in cloud computing security architecture: Architectural Considerations- General Issues- Trusted Cloud computing- Secure Execution Environments and Communications- Micro-architectures; Identity Management and Access control Identity management- Access control, Autonomic Security

UNIT IV

CLOUD COMPUTING FOR EVERYONE

Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation

UNIT V

CLOUD COMPUTING CASE STUDIES

Cloud computing case studies: Google App Engine – IBM Clouds –Windows live – Micro soft dynamic CRM- Salesforce.com CRM- App Exchange – Amazon S3 – Oracle OBIEE

Text Books:

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
2. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.
3. Cloud Computing a Practical Approach by Anthony T.Velte, Toby J.Velte Robert Elsenpeter, Tata Mc Graw Hill Edition 2010.
4. Gautam Shroff, Enterprise Cloud Computing: Technology, Architecture, applications, Cambridge University Press, 2010.
5. Ronald Krutz Russell Dean Vines, Cloud Security

REFERENCES

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
2. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.
3. Gautam Shroff, Enterprise Cloud Computing: Technology, Architecture, applications, Cambridge University Press, 2010.
4. Ronald Krutz Russell Dean Vines, Cloud Security

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III Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
Open Elective-I	**3**	**0**	**3**

(EEE1127) RENEWABLE ENERGY SOURCES

Course Objectives

- To inculcate the awareness of energy conservation in students
- To understand the use of renewable energy sources for electrical power generation
- To know different energy storage methods
- To learn about environmental effects of energy conversion

Course Outcomes

After going through this course the student will be able to

- Use different renewable energy sources to produce electrical power
- Minimize the use of conventional energy sources to produce electrical energy
- Identify the fact that the conventional energy resources are depleted
- Store energy and to avoid the environmental pollution.

UNIT I

PRINCIPLES OF SOLAR RADIATION

Role and Potential of New and Renewable source, the solar energy option, Environmental impact of solar power, Physics of the Sun, The solar constant, Extraterrestrial and Terrestrial solar radiation, Solar radiation on titled surface, Instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT II

SOLAR ENERGY COLLECTION & APPLICATIONS

Flat Plate Collectors and Concentrating Collectors, Classification of concentrating collectors, Orientation and Thermal analysis, advanced collectors, Solar ponds, Solar Energy Applications - solar heating/cooling techniques, solar distillation and drying, Photovoltaic Energy Conversion.

UNIT III

WIND ENERGY

Sources and potentials, Horizontal and Vertical axis wind mills - Types, Blade Design, Performance characteristics, Betz criteria, Induction Generators for Wind power Generation, MHD Generation.

UNIT IV

BIO-MASS & DEC

Principles of Bio-Conversion, Anaerobic/aerobic digestion, Types of Bio-gas Digesters, gas yield, Combustion characteristics of bio-gas, Utilization for cooking, Economic

aspects.Direct Energy Conversion, Need for DEC, Principles of DEC, Carnot Cycle and Limitations.

UNIT V

HARNESSING GEOTHERMAL ENERGY & OCEAN ENERGY

Resources of Geothermal Energy, Types of wells, Methods of harnessing the energy, potential in India, Ocean Thermal Energy Conversion, Principles, Utilization, Setting of OTEC plants, Thermodynamic cycles, Tidal and Wave energy: Potential and Conversion Techniques, Mini-Hydel Power plants.

COURSE OUTCOME

After completion of this course, the student will learn basic Rules for combining probabilities. Discrete and continuous distributions, Reliability evaluation of series, Parallel, series-parallel and complex systems, Marokv models, Evaluation of basic indices of generation and transmission, Distribution systems.

TEXT BOOKS

1. Non-Conventional Energy Sources by G.D.Rai, Khanna Publishers.
2. Renewable Energy Resources by Twidell and Wier, CRC Press (Taylor and Francis).
3. Non- Conventional energy resources by B.H.Khan, Tata Mc Graw-Hill, 2006.

REFERENCE BOOKS

1. Renewable Energy Resources by Tiwari and Ghosal, Narosa.
2. Renewable Energy Technologies by Ramesh and Kumar, Narosa.
3. Non-Conventional Energy Systems by K Mittal, Wheeler Publishing House.
4. Renewable Energy Sources and Emerging Technologies by D.P.Kothari, K.C.Singhal, PHI.

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

(ECE1111) MICROWAVE ENGINEERING

Pre-requisites: Electro Magnetic theory and Transmission lines

Course Objectives

- To present a cohesive overview of the required fundamentals on Transmission lines and Wave Propagation Theory in the case of Wave guides.
- To understand various coupling techniques in waveguides and the basic properties of Polarization in Ferrite based materials in the case of waveguide components.
- To introduce the multiport junction concept for splitting the microwave energy in a desired direction.
- To get exposure on Microwave components in building a Microwave test bench setup for measurements.

Course Outcomes

After going through this course the student will be able to

- Understand the basics of wave propagation inside waveguides
- Analyze the ferrite based microwave components
- Apply the scattering parameters calculation in characterizing microwave junctions
- Analyze various types of Microwave measurements using a Microwave test bench

UNIT I

Microwave Transmission Lines

Introduction, Microwave Spectrum and Bands, Applications of Microwaves.

Rectangular Waveguides: Solution of Wave Equations in Rectangular coordinates. TE/TM mode Analysis, Expression for fields, Characteristic Equation and Cut-off Frequencies. Filter characteristics, Dominant and Degenerate Modes, Mode Characteristics: Phase and Group Velocities, Wavelengths and Impedance Relations. Power Transmission and Power Losses in Rectangular Waveguides. **Microstrip Lines**- Introduction, Z_0 Relations, Effective Dielectric Constant, Q Factor and Losses. Illustrative Problems

UNIT II

Waveguide components-I

Cavity Resonators: Introduction, Rectangular Cavities, Dominant Modes and Resonant Frequencies,Q factor and Coupling Coefficients, Illustrative Problems.**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.

UNIT III

Waveguide components-II:

Ferrite materials –Composition and Characteristics, Faraday Rotation, Ferrite Components -Isolator, Circulator, Gyrator.

Scattering Matrix: Significance, Scattering Parameters, Formulation and Properties of S Matrix.

Waveguide Multiport Junctions: E- plane, H-Plane and Magic Tee; Directional coupler –two hole, Bethe Hole types. S matrix calculations of Two port and Multiport Junctions.

UNIT IV

Microwave Tubes: Limitations of Conventional tubes at Microwave frequencies, Microwave Tubes- Classifications, 2 cavity Klystrons –Structure, Velocity Modulation process and Applegate diagram, Bunching process, Power output and efficiency. Reflex Klystrons-Structure, Velocity Modulation, Applegate diagram and Principle of Working, Mode Characteristics, Power Output and Efficiency, Oscillating Modes and output characteristics.

Traveling Wave tubes: Significance, Types of Slow wave structures, Amplification Process, Gain considerations (Qualitative analysis only)

Microwave crossed field tubes: Classification, Cylindrical Magnetron-Structure and characteristics, PI mode operation. Illustrative problems.

UNIT V

Microwave Solid State Devices:

Transferred Electronic Devices: Introduction, Gunn Diode-Principle, Two valley theory, High field domain, Basic modes of operation. Avalanche transit time devices : Introduction, Avalanche multiplication. IMPATT, TRAPATT -Principle of Operation.

Microwave Measurements:

Description of Microwave Bench – Different Blocks and their Features, Microwave power measurement- Bolometer Method. Measurement of Attenuation, Frequency, VSWR, Cavity Q and Impedance Measurements.

TEXT BOOKS

1. Microwave Devices and Circuits – by 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.
3. Foundations for Microwave Engineering – R.E. Collin, IEEE Press, John Wiley, 2nd Edition, 2002.

REFERENCES

1. Microwave Circuits and Passive Devices – M.L. Sisodia and G.S.Raghuvanshi, Wiley Eastern Ltd., New Age International PublishersLtd., 1995.
2. Microwave Engineering Passive Circuits – Peter A. Rizzi, PHI, 1999.
3. Microwave Engineering – A.Das and S.K.Das, TMH, 2nd Edition, 2009.

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

(ECE1206) MICROPROCESSORS AND MICROCONTROLLERS LABORATORY

Pre-requisites: Programming concepts, Instruction sets

Course Objectives

- Introducing assembly language and the required tools for programming microprocessors and microcontrollers .
- Provide knowledge required to interface various peripherals to microprocessors and microcontrollers
- Design and develop both the hardware and software for microprocessor /microcontroller based systems.

Course Outcomes

After going through this course the student will be able to

- Develop the basic skills on choosing the suitable CPU and the required peripherals for a given application
- learnt and apply various software development tools for programming the microprocessors and microcontrollers
- design and develop microprocessor based general purpose computer systems
- design and develop special purpose systems used in various engineering disciplines based on microcontrollers.

1. Programs for 16 bit arithmetic operations for 8086 (using Various Addressing Modes).
2. Program for sorting an array for 8086.
3. Program for searching for a number or character in a string for 8086.
4. Program for string manipulations for 8086.
5. Program for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086 / 8051.
7. Interfacing stepper motor to 8086 / 8051.
8. Programming using arithmetic, logical and bit manipulation instructions of 8051.
9. Program and verify Timer/ Counter in 8051.
10. Program and verify Interrupt handling in 8051
11. UART Operation in 8051.
12. Communication between 8051 kit and PC.
13. Interfacing LCD to 8051.
14. Interfacing Matrix / Keyboard to 8051.

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

(ECE1207) DIGITAL SIGNAL PROCESSING LABORATORY

Pre-requisites: Digital Signal Processing concepts

Course Objectives

Simulation and implementation on DSP processor

- To verify properties of a discrete system.
- To learn various transforms on digital signals.
- To understand the design of digital filters.
- To verify basic properties of multi rate systems.

Course Outcomes

After going through this course the student will be able to

- To apply knowledge of digital filter design for various applications.
- To analyze various signals in transform domain
- To apply multirate concepts in different areas
- To perform real time experiments on processors such as audio and speech processing.

The following experiments are to be performed using MATLAB

1) Circular Convolution
2) Discrete Fourier Transform / Inverse Discrete Fourier Transform
3) Power Density Spectrum
4) Implementation of Filters using IIR
5) Implementation of Filters using FIR
6) Generation of Sinusoidal signal through filtering
7) Generation of DTMF Signals
8) Implementation of Decimation and Interpolation processes, I/D sampling Rate Converters.

Getting familiarity with Simulink:

i. Features of DSP Processor Kit (DSK)
ii. Installation Procedure for DSK
iii. Introduction To Code Composer Studio
iv. Procedure to Work On CCS

The following Experiments are to be performed using DSP Processor Kit.

1. To Verify Linear Convolution (Assembly Language program Using 67XX Instructions).
2. To Verify Circular Convolution.
3. Implementation of FIR (Low Pass/High Pass) using Windowing Technique.
    i. Using Rectangular Window
    ii. Using Triangular Window
    iii. Using Kaiser Window
4. Implementation of IIR Filter (Low Pass and High pass).
5. To find The FFT of given 1-D Signal and Plot
6. To compute Power Density Spectrum(PDS) of a Sequence
7. Audio applications such as audio effects , Interpolation, Decimation effects

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

(ECE1112) VLSI DESIGN

Pre-requisites: Electronic Devices and circuits, Digital IC Concepts

Course Objectives

- To learn the various fabrication steps of IC and come across basic electrical properties of MOSFET.
- To study the concepts of stick diagrams and layouts with the knowledge of MOS layers through design rules.
- To study gate level design of subsystems, integrated circuits
- To learn concepts of PLD's ,design capture tools and CMOS testing.

Course Outcomes

After going through this course the student will be able to

- Learn IC Fabrication process steps required for PMOS, NMOS,CMOS, BiCMOS and I_{ds}- V_{ds} relationship.
- Understand VLSI Design flow for fabrication of a chip , layout design rules , stick diagrams and scaling of MOS transistor.
- Learn the time delays, driving large capacitive loads, wiring capacitance, and design of different subsystems.
- Understand concepts of PLD's, CMOS testing, Design Strategies, verification, and CMOS Testing.

UNIT I

INTRODUCTION: Introduction to MOS Technology – MOS, PMOS, NMOS, CMOS and BiCMOS technologies, fabrication fundamentals: Oxidation, Lithography, Diffusion, Ion implantation, Metallization and Encapsulation.

BASIC ELECTRICAL PROPERTIES : Basic Electrical Properties of MOS ,CMOS and BiCMOS Circuits: I_{ds}-V_{ds} relationships, MOS transistor threshold Voltage, gm, gds, figure of merit w_o, Pass transistor, NMOS inverter, Various pull ups, Determination of pull-up to pull-down ratio(Z_{pu} / Z_{pd}) , CMOS Inverter analysis and design, BiCMOS inverters, Latch-up in CMOS circuits.

UNIT II

VLSI CIRCUIT DESIGN PROCESSES : VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layouts, Lambda based design rules, Contact cuts , CMOS Lambda based design rules, Layout Diagrams for logic gates, Transistor

structures, wires and vias, Scaling of MOS circuits- Scaling models, scaling factors, scaling factors for device parameters, Limitations of Scaling.

UNIT III

GATE LEVEL DESIGN AND LAYOUT: Architectural issues, Switch logic networks: Gate logic, Alternate gate circuit: Pseudo-NMOS , Dynamic CMOS logic. Basic circuit concepts, Sheet Resistance R_S and its concept to MOS, Area Capacitance Units, Calculations, The delay unit T, Inverter Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers.

UNIT IV

SUBSYSTEM DESIGN: Subsystem Design, Shifters, Adders, ALUs, Multipliers: Array multiplier, Serial-Parallel multiplier, Parity generator, Comparators, Zero/One Detectors, Up/Down Counter, Memory elements.

SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN: PLDs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach.

UNIT V

VHDL SYNTHESIS: VHDL Synthesis, Circuit Design Flow, Circuit Synthesis, Simulation, Layout, Design capture tools, Design Verification Tools.

CMOS TESTING : CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Over view of Chip level Test Techniques and System-level Test Techniques, Layout Design for Improved Testability.

TEXTBOOKS

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, PHI, Edition, 2005.
2. Moderan VLSI Design –Wayne Wolf, Pearson Education , 3rd Edition, 1997.
3. CMOS VLSI Design – A circuits and systems perspective, Neil H.E Weste , David Harris , Ayan Banerjee, pearson ,2009.

REFERENCES

1. CMOS logic circuit Design – John P. Uyemura , Springer , 2007
2. VLSI DESIGN – K.Lal Kishore , VSV Prabhakar – I.K..International ,2009
3. VLSI Design – A.Albert Raj, Latha PHI, 2008.
4. Introduction to VLSI Design- Mead and Convey , BS Publcations, 2010.
5. VLSI Design – M. Michal Vai, CRC Press, 2009.

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IV Year B.Tech ECE – I Sem	L	T/P/D	C
	4	0	4

(ITD1106) COMPUTER NETWORKS

Pre-requisites: Digital communications

Course Objectives

- Understand fundamental concepts of computer networking.
- Familiarize the protocol and IEEE standards of various networks.
- Understand different routing protocols.
- Understand the concepts of Integrated and differentiated services.

Course Outcomes

After going through this course the student will be able to

- Understand the Layered Architecture of Computer Networks.
- Learn various datalink protocols and algorithms
- Learn various routing protocols and algorithms.
- Apply TCP and UDP in real time applications

UNIT I

DATA COMMUNICATIONS: Components – Direction of Data flow – networks – Components and Categories – types of Connections – Topologies –Protocols and Standards – ISO / OSI model

Physical layer: Digital transmission, multiplexing, transmission media, circuit switched networks, Datagram networks, virtual circuit networks, switch and Telephone networks.

UNIT II

Data link layer: Introduction, framing, Error – detection and correction – Parity – LRC – CRC – Hamming code, flow and error control, Noiseless channels, noisy channels, HDLC, point to point protocols. LAN - Ethernet IEEE 802.3 - IEEE 802.4 - IEEE 802.5 - IEEE 802.11

Medium Access sub layer: Random access, Controlled access, Channalization

UNIT III

Network layer: Logical addressing, internetworking, tunneling, address mapping, ICMP, IGMP, forwarding, Uni-cast routing protocols, multicast routing protocols.

UNIT IV

Transport Layer: 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, SMTP,, FTP, WWW, HTTP, SNMP,network security, Cryptography.

TEXT BOOKS

1. Data Communications and Networking – Behrouz A. Forouzan , Fourth Edition TMH,2006.
2. Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education/PHI.

REFERENCES

1. Data communications and computer Networks, P.C .Gupta, PHI.
2. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
3. Understanding communications and Networks, 3rd Edition, W.A. Shay, Cengage Learning.
4. Computer Networking: A Top-Down Approach Featuring the Internet. James F. Kurose & Keith W. Ross,3rd Edition, Pearson Education.
5. Larry L.Peterson and Peter S. Davie, “Computer Networks”, Harcourt Asia Pvt. Ltd., Second Edition.
6. William Stallings, “Data and Computer Communication”, Sixth Edition, Pearson Education, 2000.

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IV Year B.Tech ECE – I Sem	L	T/P/D	C
Elective - I	3	0	3

(ECE1113) DIGITAL IMAGE PROCESSING

Pre-requisites: Digital Signal processing

Course Objectives

- To introduce fundamentals of digital image processing and study image transforms
- To demonstrate digital image processing techniques in spatial and frequency domains
- To study and compare various image compression algorithms
- To study advanced image analysis methods: image segmentation, morphological image processing, & image restoration

Course Outcomes

After going through this course the student will be able to

- Understand the basic principles of digital image processing and perform image transforms
- Understand and perform basic image processing methods such as Image filtering operations, Image enhancement
- Analyze and compare various image compression techniques and their applications
- Design and implement various algorithms for image analysis

UNIT I

Fundamentals of Image Processing: Digital Image Fundamentals, Basic steps of Image Processing System, Sampling and Quantization of an image, relationship between pixels, Imaging Geometry.

Image Transforms: 2 D- Discrete Fourier Transform, Discrete Cosine Transform (DCT), Haar Transform, Hadmard Transform, Hotelling Transform and slant transform.

UNIT II

Image Enhancement: Spatial domain methods: Histogram processing, Fundamentals of Spatial filtering, Smoothing spatial filters, Sharpening spatial filters.

Frequency domain methods: Basics of filtering in frequency domain, image smoothing, image sharpening, Selective filtering.

UNIT III

Image Segmentation: Segmentation concepts, Point, Line and Edge Detection, Edge Linking using Hough Transform, Thresholding, Region Based segmentation.

Wavelet based Image Processing: Introduction to wavelet Transform, Continuous wavelet Transform, Discrete wavelet Transform, Filter banks, Wavelet based image compression

UNIT IV

Image Compression: Image compression fundamentals - Coding Redundancy, Spatial and Temporal redundancy, Compression models: Lossy and Lossless, Huffman coding, Arithmetic coding, LZW coding, Run length coding, Bit plane coding, Transform coding, Predictive coding, JPEG Standards.

UNIT V

Image Restoration: Image Restoration Degradation model, Algebraic approach to restoration, Inverse Filtering, Least Mean square filters.

Morphological Image Processing: Dilation and Erosion, Opening and closing, the hit or miss Transformation, Overview of Digital Image Watermarking Methods

TEXT BOOKS:

1. Digital Image Processing- Rafael C. Gonzalez and Richard E.Woods, 3rd Edition, Pearson, 2008.
2. Digital Image Processing- S.Jayaraman, S Esakkirajan, T Veerakumar, TMH, 2010.

REFERENCES:

1. Digital Image Processing-William K.Pratt, 3rd Edition, John Willey, 2004.
2. Fundamentals of Digital Image Processing-A.K.Jain, PHI, 1989.
3. Digital Image Processing using MATLAB - Rafael C. Gonzalez, Richard E.Woods and Steven L.Edding 2nd , TMH. 2010.
4. Digital Image Processing and Computer Vision – Somka, Hlavac, Boyl, Cengage Learning, 2008.
5. Introduction to image Processing and Analysis – John C. Russ, J. Christian Russ, CRC Press, 2010

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IV Year B.Tech ECE – I sem	**L**	**T/P/D**	**C**
Elective – I	**3**	**0**	**3**

(ECE1114) OPTICAL COMMUNICATIONS

Pre-requisites: Optical Physics, Communications Concepts

Course Objectives

- To learn about the basic elements of optical fiber transmission link, fiber modes, configurations, structures and losses associated
- To know the working principles of various optical sources and photo detectors
- To analyze and design a fiber optic link for a given budget requirement
- To understand the parameters effecting the systems performance

Course Outcomes

After going through this course the student will be able to

- Demonstrate an understanding of the propagation of light in optical fiber.
- Analyze the principles governing optical sources and detectors used in optical communications.
- Design an optical communication system for a particular application.
- Analyze optical systems for performance and utility.

UNIT I

Optical fiber communication - 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, Vnumber, Mode coupling, Step Index fibers, Graded Index fibers. Single mode fibers- Cut off wavelength, Mode Field Diameter, Effective Refractive Index. Signal distortion in optical fibers- Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses.

UNIT II

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, 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. 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 Photo detectors. Optical 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, Rise time budget with examples. WDM - Principles, Types of WDM, Measurement of Attenuation and Dispersion

TEXT BOOKS

1. Optical Fiber Communications – Gerd Keiser, Mc Graw-Hill International edition, 3rd Edition, 2000.
2. Optical Fiber Communications – John M. Senior, PHI, 2nd Edition, 2002.

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.
4. Fiber Optic Communications – Joseph C. Palais, 4th Edition, Pearson Education, 2004.

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

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

(EEE1119) ARTIFICIAL NEURAL NETWORKS AND FUZZY LOGIC

Course Objectives

- To cater the knowledge of Neural Networks and Fuzzy Logic Control and use these for controlling real time systems.
- To expose the students to the concepts of feed forward neural networks and about feedback neural networks.
- To teach about the concept of fuzziness involved in various systems and comprehensive knowledge of fuzzy logic control and to design the fuzzy control
- To learn the basic difference between the Fuzzy Logic and Neural Networks

Course Outcomes

After going through this course the student will be able to

- The concepts of feed forward neural networks and learning and understanding of feedback neural networks.
- Concept of fuzziness involved in various systems and fuzzy set theory.
- Comprehensive knowledge of fuzzy logic control and adaptive fuzzy logic.
- Adequate knowledge of application of fuzzy logic control to real time systems

UNIT I

INTRODUCTION TO NEURAL NETWORKS

Introduction, Humans and Computers, Biological Neuron and organization of the brain, Biological and Artificial Neuron Models, Hodgkin-Huxley Neuron Model, Integrate-and-Fire Neuron Model, Spiking Neuron Model, Characteristics of ANN, McCulloch-Pitts Model and Design of logic gates, Historical Developments, Potential Applications of ANN.

ESSENTIALS OF ARTIFICIAL NEURAL NETWORKS

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

Unit II

SINGLE LAYER FEED FORWARD NEURAL NETWORKS

Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Perceptron Convergence theorem and concepts, Limitations of the Perceptron Model, Applications.

MULTILAYER FEED FORWARD NEURAL NETWORKS

Credit Assignment Problem, Generalized Delta Rule, Derivation of Back propagation (BP) Training, Summary of Back propagation Algorithm, Learning Difficulties and Improvements.

Unit III

ASSOCIATIVE MEMORIES

Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory (Associative Matrix, Association Rules, Hamming Distance, The Linear Associator, Matrix Memories, Content Addressable Memory), Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function, Architecture of Hopfield Network: Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis, Capacity of the Hopfield Network, Applications.

Unit IV

CLASSICAL AND FUZZY SETS

Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Operations, properties, fuzzy relations, membership functions.

Fuzzy Logic System Components

Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

UNIT V

APPLICATIONS

Neural network applications: Process identification, control, fault diagnosis and load forecasting.

Fuzzy logic applications: Fuzzy logic control, Design and Analysis

TEXT BOOKS

1. Neural Networks, Fuzzy logic, Genetic algorithm - synthesis and applications by Rajasekharan and Rai, PHI Publications.
2. Artificial neural networks by B.Yegnarayana, PHI publications.

REFERENCE BOOKS

1. Neural Networks by James A Freeman and Davis Skapura, Pearson Education, 2002.
2. Neural Networks by Simon Hakins , Pearson Education
3. Neural Engineering by C.Eliasmith and CH.Anderson, PHI
4. Neural Networks and Fuzzy Logic System by Bart Kosko, PHI Publications.
5. Introduction to Artificial Neural Systems by J.M.Zurada, Jaico Publishing House.
6. Introduction to Neural Networks using MATLAB 6.0 by S.N.Sivanandam, S.Sumathi, S.N.Deepa, TMH, 2006.

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

IV Year B.Tech ECE – I sem	**L**	**T/P/D**	**C**
Open Elective-II	**3**	**0**	**3**

(MED1164) ELEMENTS OF NANO TECHNOLOGY

Course Objectives

- To understand the size dependent physical properties of materials with nano dimensions
- To learn the principles of various preparation methods of nano materials
- To know the different characterization techniques of nano materials and related instruments
- To study the basic electronic devices at nano scale.

Course Outcomes

After completing this course the student will be able to

- Realize and explain that the properties of nano materials are size dependent and vary from corresponding bulk materials
- Demonstrate the skills required to prepare some of the nano materials in the laboratory
- Characterize and study the properties with respect to their size and shapes.
- Appreciate the applications of nano electronic devices and understand their basic principles.

UNIT I

Introduction Nano scale, Definition of Nano technology, Consequences of the Nano scale for technology and society. Beyond Moore's Law. Nano-scale 1D to 3D structures; Technologies for the Nanoscale; Nano-scale fabrications; Nano manipulation, Nano lithography.

UNIT II

Nano scale Materials and Applications Nano composites; Nano-scale Electronics; Safety issues with nanoscale powders; Quantum wells, wires, dots and nanoparticles; Nano scale bio and medical applications; Applications in energy, informatics, medicine, etc.

UNIT III

Length scales, top-down and bottom-up approaches to nanotechnology. Common growth methods.Vapour-solid-liquid. Properties of selected Nano materials, including carbon Nano tubes, other carbon based materials and metallic Nano clusters

UNIT IV

Scanning tunnelling microscopy and spectroscopy, Atomic and molecular manipulation – lateral manipulation and 2D quantum corrals, vertical manipulation, 1D quantum structures, tip induced effects, Ullmann process.

UNIT V

Electron and ion sources, Field-ion microscope and atom-probe. Focused Ion Beam machines. High-resolution electron microscopy including TEM and aberration corrected TEM. Lithography, X-Ray, proton beam, microbeam techniques.

TEXTBOOKS

1. Jacob N. IsraelachviliInter molecular and Surface Forces, Second Edition: With Applications to Colloidal and Biological Systems Colloid Science
2. Dietmar Mobius and Reinhard Miller. Organized Monolayers and Assemblies: Structure, Processes and Function,Elsevier Science 2004
3. Michael Rieth Nano Engineering in Science & Technology : An introduction to the world of nano design World Scientific Publishing Co., Inc 2003
4. K. Holmberg, B. Jonsson, B. Kronberg, B. Lindman, Surfactants and Polymers in Aqueous Solution Wiley 2004.
5. Raoul Zana Dynamics of Surfactant Self-Assemblies: Micelles, Microemulsions, Vesicles and Lyotropic Phases CRC Publisher.
6. Sergey Edward Lyshevski, Nano- and Micro-Electromechanical Systems: Fundamentals of Nano- and Microengineering, 2005.
7. Lyklema J,Fundamentals of Interface and Colloid Science –Academic Press,
8. Z.L Wang Characterization of nanophase materials – Wiley-VCH,2000.
9. G. Schmidt Nanoparticles: From theory to applications –, Wiley 2004.

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IV Year B.Tech ECE – I sem	**L**	**T/P/D**	**C**
Open Elective-II	**3**	**0**	**3**

(CED1147) DISASTER MANAGEMENT

Course Objectives

- Understand the difference between a hazard and disaster
- Know about various disasters and their impacts
- Understand Different approaches of disaster risk reduction
- Understand Disaster risks in India

Course Outcomes

After going through this course the student will be able to

- Acquire the knowledge disaster Management
- Understand the vulnerability of ecosystem and infrastructure due to a disaster
- Acquire the knowledge of Disaster Management Phases
- Understand the hazard and vulnerability profile of India

UNIT I

Introduction to disaster

Concepts and definitions (Disaster, Hazard, Vulnerability, Resilience, Risks)

UNIT II

Disasters: Classifications, Causes, Impacts (including social, economic, political, environment, health, psychosocial, etc.)

Differential impacts-in terms of caste, class, gender, age, location, disability Global trends in disasters. Urban disaster, pandemics, complex emergencies, Climate change

UNIT III

Approaches to disaster Risk reduction

Disaster cycle-its analysis, phase, Culture of safety, prevention, mitigation and preparedness, community based DRR, Structural measures, roles and responsibilities of community. Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), states, center and other stake-holders.

UNIT IV

Inter-relationship between Disaster and Development

Factors affecting Vulnerabilities, differential impacts, impact of development projects such as dams, embankments, change in land-use etc. Climate change Adaption. Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT V

Disaster Risk Management in India

Hazard and vulnerability profile of India

Components of Disaster relief: Water, food, sanitation, shelter, health, waste management

Institutional arrangements (Mitigation, Response and Preparedness, DM Act Policy, Other related polices, plan, programmes and legislation)

Project Work :(Field Work, Case Studies)

The project/fieldwork is meant for students to understand vulnerabilities and to work on reducing disaster risks and to build a culture of safety. Projects must be conceived creatively based on the geographic location and hazard.

Suggested Reading list:

1. Alexander David, Introduction in 'Confronting Catastrophe', oxford University press, 2000
2. Andharia J. Vulnerability in disaster Discourse, JTCDM, Tata Institute of Social Sciences working paper no.8, 2008
3. Blaikie, P, Cannon T, Davis I, Wisner B 1997. At Risk Natural Hazards, Peoples' Vulnerability and Disaster, Rutledge.
4. Coppola P Damon, 2007. Introduction to International Disaster Management.
5. Carter, Nick 1991.Disaster Management: A Disaster Manager's Handbook. Asian Development Bank, Manila Philippines.
6. Cuny,F.1983. Development and Disasters, Oxford University Press
7. Govt.of India; Disaster Management Act 2005,Government of India, New Delhi.

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
Open Elective-II	**3**	**0**	**3**

(ITD1107) OPERATING SYSTEMS

Pre-requisites:

Course Objectives:

- Analyze the tradeoffs inherent in operating system design.
- Summarize the various approaches in solving the problem of mutual exclusion in an operating system.
- Evaluate the trade-offs in terms of memory size (main memory, cache memory, secondary memory) and processor speed.
- Demonstrate disk storage strategies, file strategies and analyze the system protection and security.

Course Outcomes:

Upon completion of this course, students should be able to:

- Identify the System calls, interrupts and process scheduling of any GOS.
- Write application keeping Concurrency and synchronization Semaphores/monitors, shared memory in mind
- Design new deadlock free and efficient memory management schemes for a GOS.
- Explain RAID, file systems facilities and protection and securityof any GOS.

UNIT I

Computer System and Operating System Overview: Overview of computer operating systems operating systems functions protection and security distributed systems special purpose systems operating systems structures and systems calls operating systems generation.

Process Management – Process concepts threads, scheduling-criteria algorithms, their evaluation, Thread scheduling.

UNIT II

Concurrency : Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic transactions.

Memory Management : Swapping, contiguous memory allocation, paging, structure of the page table , segmentation, virtual memory, demand paging, page-Replacement, algorithms.

UNIT III

Principles of deadlock – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock.
File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

UNIT IV

File System implementation- File system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance, case studies. UNIX, Linux, Windows.

Mass-storage structure overview of Mass-storage structure, Disk structure, disk attachment disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure.

UNIT V

Protection : Protection, Goals of Protection, Principles of Protection, Domain of protection Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability- Based systems, Language – Based Protection. Security- The Security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, firewalling to protect systems and networks, computer –security classifications, case studies UNIX, Linux, Windows.

TEXTBOOKS

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Operating systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition, TMH

REFERENCES

1. Operating Systems' – Internal and Design Principles Stallings, Fifth Edition–2005, Pearson education/PHI
2. Operating System A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson/PHI.

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IV Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
Elective-II	**3**	**0**	**3**

(ECE1115) RADAR SYSTEMS

Pre-requisites: Communication Fundamentals

Course Objectives

- Understanding of the components of a radar system and their relationship to overall system performance, the radar operating environment and techniques used to confront it, and top level measures of performance.
- Understanding basic detection theory as applies to radar.
- Understanding the concepts of the matched filter, ambiguity functions, and other aspects of waveform with noise.
- Understanding radar measurements, associated quality, and the fundamentals of radar tracking.

Course Outcomes

After going through this course the student will be able to

- Describe radars and demonstrate the factors affecting the radar performance using radar range equation
- Analyze different types of radar systems to assess their performance
- Explain the processing of radar signals and analyze the performance of simple tracking radar systems.
- Analyze different types of radar receivers, effects of the noise interference on radar systems and understand the configuration of electronic

UNIT I

Basics of Radar: Introduction, Radar block diagram and operation, Maximum Unambiguous Range, Simple form of Radar Equation, , Radar frequencies and Applications. Prediction of Range Performance, Minimum detectable Signal, Receiver Noise, Modified Radar Range Equation, Illustrative Problems.

Radar 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. Systems Losses (qualitative treatment) Illustrative Problems.

UNIT II

CW and Frequency Modulated Radar: Doppler Effect, CW Radar – Block Diagram , Isolation between Transmitter and receiver , Non zero IF Receiver , Receiver Bandwidth Requirements, Applications of CW Radar. Illustrative Problems.

FM-CW Radar: Range and Doppler Measurement, Block Diagram and Characteristics (Approaching/ Receding Targets), FM-CW altimeter, Multiple Frequency CW Radar.

UNIT III

MTI and Pulse Doppler 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 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 V

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.

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.

Electronic Warfare: Introduction to ESM, ECM and ECCM systems.

TEXT BOOKS

1. Introduction to Radar Systems – Merrill I. Skolnik, TMH Special Indian Edition, 2nd ed., 2007.
2. Radar Principles – Peebles, Jr., P.Z., Wiley, New York, 1998.

REFERENCES

1. Introduction to Radar Systems – Merrill I. Skolnik, 3rd ed., TMH, 2001.
2. Radar : Principles, Technology, Aplications – Byron Edde, Pearson Education, 2004.

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
Elective-II	**3**	**0**	**3**

(CSE1130) RELATIONAL DATA BASE MANAGEMENT SYSTEMS

Pre-requisites: Basic Computing Knowledge

Course Objectives

- To present an introduction to database management systems (DBMS) and relational data model.
- To provide an emphasis on how to organize, maintain and retrieve information efficiently and effectively from a DBMS.
- To introduce the concepts of transactions and transaction processing
- To present the issues and techniques relating to concurrency in multi-user database environments.

Course Outcomes

After going through this course the student will be able to

- Understand the fundamental concepts of database management. These concepts include aspects of database design, database languages, and database-system implementation.
- The students will be able to design and query databases, as well as understand the internals of databases.
- Define basic functions of DBMS & RDBMS.
- Describe database development process.
- Apply the Relational Database Model to understand the Logical and Physical aspects of the DBMS architecture.
- Analyze database models & entity relationship models.

UNIT I

Introduction to Databases and Database Management System - Database system Applications - Advantages of DBMS over File System - Data Models – Instances and schema - View of Data - Database Languages -DDL-DML - Database Users and Administrator - Database System Structure.

UNIT II

Database Design and ER diagrams – Attributes and Entity Sets – Relationships and Relationship Sets – Constraints - Keys - Design Issues - Entity-Relationship Diagram-Weak Entity Sets - Extended E-R Features - Database Design with ER model - Database Design for Banking Enterprise

UNIT III

Introduction to the Relational Model – Structure of RDBMS - Integrity Constraints over Relations – Enforcing Integrity Constraints – Querying Relational Data - Relational Algebra and Calculus.

Introduction to SQL- Data Definition commands, Data Manipulation Commands, Basic Structure, Set operations Aggregate Operations - Join operations - Sub queries and correlated queries, SQL functions , views ,Triggers.

UNIT IV

Functional Dependencies– Introduction , Basic Definitions, Trivial and Non trivial dependencies, closure of a set of dependencies, closure of attributes, irreducible set of dependencies- Schema Refinement in Database Design- Problems Caused by Redundancy – Decompositions – Problem Related to Decomposition –- Lossless Join Decomposition – Dependency Preserving Decomposition - FIRST, SECOND, THIRD Normal Forms – BCNF.

UNIT V

Transaction concept- Transaction state- Implementation of atomicity and Durability- Concurrent executions – Serializability, Recoverability

File Organization – Organization of records in file - Data Dictionary Storage – Indexing and Hashing – Basic Concepts , Ordered Indices, B^+Tree Index files.

TEXT BOOKS

1. Database System Concepts, Silberschatz, Korth , Fifth Edition, McGraw hill (1,2,3 & 5 Units)
2. Database Management Systems, Raghuramakrishnan, Johannes Gehrke, TATA Mc Graw Hill(1,2,3 & 5 Units)
3. Introduction to Database Systems, C.J.Date, Pearson Education (4^{th} Unit)

REFERENCES

1. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
2. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.

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IV Year B.Tech ECE – I sem	**L**	**T/P/D**	**C**
Elective-II	**3**	**0**	**3**

(ECE 1116) SPEECH PROCESSING

Pre-requisites: Signal Processing

Course Objectives

- To learn the fundamentals of Speech Production and Perception and modeling
- To Comprehensively learn the Signal Processing techniques applied for Speech,
- To Understand building blocks of Speech Processing for Speaker Recognition
- To learn various Speech Technologies related to Accent and Emotion Recognition.

Course Outcomes

After going through this course the student will be able to

- Study the concatenated tube models of Speech Production and represent Vocal tract as a filter and its transfer function determination .
- Find the fundamental frequency (pitch) and formant estimation using signal processing methods like average zero crossing rate, auto correlation function
- Understand the Linear prediction analysis and coding techniques.

Know the working of Speech technological applications

UNIT I

INTRODUCTION TO SPEECH SIGNAL PROCESSING :

Production and Classification of Speech Sounds : Introduction , Anatomy and physiology of Speech Production, Spectrographic analysis of speech, Categorization o Speech sounds, Prosody, Speech perception.

Acoustics of Speech production: Sound propagation, Uniform Lossless Tube example, Effects of Radiation at the lips, Vocal tract transfer function for vowels, Effect of Nasal coupling, Excitation of sound in Vocal tract, Models based upon acoustic theory.

Lossless Tube models : Wave propagation in Concatenated Lossless Tube , Boundary Conditions, Transfer functions of Lossless tube models.

Digital Models for Speech signals : Transfer functions of Vocal tract, Radiation, Excitation, The complete model

UNIT II

DSP TECHNIQUES FOR SPEECH ANALYSIS:

Time-Dependent processing of speech: Short-time energy and Average magnitude ,Role of Windows, Short-time average zero crossing Rate, Short-Time Auto correlation function, Pitch Period estimation using the Auto correlation function.

Short-Time Fourier Analysis :Practical consideration in the design of Digital Filter Banks, Filter Bank design using IIR filters, Fiter Bank design using FIR filter, Spectrographic Displays, Pitch detection.

UNIT III

SPEECH PROCESSING METHODS

Homomorphic Signal Processing of speech : Homomorphic systems for convolution, Complex Cepstrum of Speech,

Properties of the Complex Cepstrum, Computational considerations, Pitch detection, Formant detection, HomomorphicVocoder.

UNIT IV

SPEECH SIGNAL MODELLING:

Speech Coding : Scalar Quantization- Instantaneous and Adaptive Quantization ; Vector Quantization – Approach, Use in Speech Transmission.

Linear Prediction Analysis : Basic Principles of linear predictive analyses, Prediction error signal , Relation of LP analysis to lossless Tube models, Synthesis of speech from LP parameters ; Applications of LPC parameters -Pitch detection using LPC parameters, Formant analysis using LPC parameters, LPC Vocoder

UNIT V :

SPEECH TECHNOLOGIES:

Speech Recognition and understanding : Introduction , Common Feature Vectors; Deterministic Sequence Recognition – Linear Time Warp, Dynamic Time Warp ; Statistical Sequence Recognition –Hidden Markov Model ; Phonological models, Language models, Decoding with Acoustic and Language models, A complete system , Accepting realistic input

Speaker Recognition: Introduction,Spectral features – Mel Cepstrum, Sub Cepstrum ; Speaker Recognition Algorithms – Gaussian Mixture Models (GMM) , Speaker Identification and Speaker Verification using GMM .

TEXT BOOKS

1. L.R.Rabiner and R.W.Schafer : Digital Processing of Speech Signals, Pearson Education, 2002
2. Thomas F Quateri, Discrete time Speech Signal Processing , Principles and Practice, Pearson Education,2002
3. Ben Gold, Nelson Morgan,Speech and Audio Signal Processing John Wiley and Sons ,2002

REFERENCE BOOKS

1. LI DENG,DOUGLAS O' SHAUGHNESSY, Speech Processing, Marcel Dekker Inc
2. Digital speech ,A.M.KONDOZ, Second Edition, John Wiley & Sons.
3. Dellar and Proakis, Digital Speech processing..

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
Elective-III	**3**	**0**	**3**

(ECE1117) DSP PROCESSORS AND ARCHITECTURE

Pre-requisites: Digital Signal Processing

Course Objectives

- To study the Architectural details of TMS320C54xx DSPs and the concepts involved in execution control and pipelining
- To analyze the importance of numeric formats and sources of errors in DSP implementation
- To understand the concepts of Memory & I/O interfacing
- Develop various algorithms

Course Outcomes

After going through this course the student will be able to

- Compare various architectures
- Design systems and role sampling rate
- Interface different devices to the processor.
- Design and implement real time signal processing algorithms and applications based on DSP processors.

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.

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.Ifeachor,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.
4. DSP Processor Fundamentals, Architectures and Features – Lapsley , S. Chand, 2000.
5. "DSP Applications with TMS 320 Family", K. Shin ,Prentice Hall, 1987.

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IV Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
Elective-III	**3**	**0**	**3**

(ECE1118) TELECOMMUNICATION SWITCHING SYSTEMS

Pre-requisites: Analog and Digital Communications

Course Objectives

- To study about the basic concepts of telephony switching.
- To learn about the telecommunication networks.
- To learn about the telecommunication signaling.
- To learn about the packet switching and high speed networks.

Course Outcomes

After going through this course the student will be able to

- Design a telecommunication switching system.
- Analyze the performance of telecommunication network.
- Implement the signaling techniques in communication networks
- Analyze the different routing protocols and high speed networks

UNIT I

Switching Systems: Evolution of Telecommunications; Basics, functions, types and design parameters of switching system. 100/1000/10,000 Line exchange. Principles of Crossbar switching; A general trunking; Electronic and digital switching systems.

UNIT II

Telecommunications Traffic: Introduction; Unit of traffic; congestion; Traffic measurement; Mathematical model; Lost call systems-Theory; Traffic performance; Loss systems in Tandem; Use of traffic tables;Queing 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.

Switching Networks: Introduction; Single stage networks; Grading Principles; Design of progressive grading; other forms of gradings; Traffic capacity of Grading; Applications of grading; Link systems-grading; Two, Three and four stage networks; Grades of service of link systems.

Unit III

Time Division switching: Basics of time division space switching; basics of time division time switching; Time multiplexed space switch; Time multiplexed time switch; 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 IV

Signaling: Introduction;Customer Line signaling; Audio frequency Junction and trunk circuits; FDM carrier systems-Outband signaling; Inband (VF) signaling; PCM signaling; Inter Register signaling; Common channel signaling principles- General signaling networks; CCITT signaling system number 6; CCITT signaling system number 7; High level data link control; Signal units; The signaling information field.

Unit V

Packet Switching: Introduction; Statistical multiplexing; Local and wide Area networks- network topologies and their comparison; Optical fiber Networks; Large scale networks-General; Datagrams and virtual circuits; Routing; Flow control; Standards; Frame relay;

Broadband networks-general; Asynchronous Transfer mode; ATM switches; ISDN;

Cellular radio networks; private networks; charging; Routing-general, automatic, Alternative routing.

TEXT BOOKS

1. Telecommunication Switching and Traffic Networks, J.E Flood, Pearson Eduction, 2006.
2. Telecommunication Switching system 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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IV Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
Elective-III	**3**	**0**	**3**

(ECE1119) SATELLITE COMMUNICATIONS

Pre-requisites: Antennas, Microwave and Communication Concepts

Course Objectives

- Know, design understand the construction and principles of Satellites used for communications
- Know the tracking techniques of satellites
- Learn about various multiple accessing techniques
- Know about the application of satellites in GPS and other applications

Course Outcomes

After going through this course the student will be able to

- Understand the communication satellite mechanics and know about the satellite internal sub systems for communication applications
- Design the power budget for satellite links
- Know about the principles of GPS
- Understand various constellations of satellite and their applications

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. atellite 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
4. Satellite Communications- Dennis Roddy, McGraw Hill, 4th Edition, 2009

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

(ECE1208) MICROWAVE ENGINEERING LABORATORY

Pre-requisites: Microwave Concepts

Course Objectives

- To study the performance of microwave oscillators
- To measure the characteristic parameters of Microwave components
- To calculate scattering parameters of microwave junctions
- To analyze various parameters of Microwave components

Course Outcomes

After going through this course the student will be able to

- Characterize microwave oscillator sources.
- Measure and analyze performance characteristics of microwave components
- Analyze the scattering parameters of microwave junctions
- Design a microwave communication link

Minimum of 10 experiments to be conducted

- Reflex Klystron Characteristics.
- Gunn Diode Characteristics.
- Attenuation Measurement.
- Directional Coupler Characteristics.
- VSWR Measurement.
- Impedance and Frequency Measurement.
- Waveguide parameters measurement.
- Scattering parameters of Circulator.
- Scattering parameters of Magic Tee.
- Radiation Pattern Measurement.
- Scattering parameters of E-Plane Tee.
- Scattering parameters of H-Plane Tee.
- Characteristics of Isolator.
- Directivity measurement.

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

(ECE1209) ECAD AND VLSI LABORATORY

Pre-requisites: Electronic Devices and circuits, Digital IC Concepts

Course Objectives

- To learn hardware description language and modeling of combinational circuits.
- To learn hardware description language and modeling of sequential circuits.
- To design digital circuits using CAD tools.
- To learn the use of CAD tools for digital circuit design.

Course Outcomes

After going through this course the student will be able to

- Apply switching theory to the solution of logic design problems
- Understand the logical properties of flip-flops and design counters, adders, sequence detectors using HDL .
- Understand the flow of mentor graphic tools for digital design and draw layouts using CAD tools.
- Understand the concepts of frontend and backend tools for digital design.

E-CAD Programs

Programming can be done by using any compiler. Down load the programs on FPGA/CPLD boards and performance testing may be done using pattern generator (32 channel) and logic analyzer apart from verification by simulation with any of the front end tools.

1. HDL code to realize all the logic gates.
2. Design of 2-to -4 decoder.
3. Design of 8-to-3 encoder (Without and with parity)
4. Design of 8-to-1 Multiplexer
5. Design of 4 bit binary to gray converter.
6. Design of comparator
7. Design of full adder using 3 modeling styles.
8. Design of flips: SR, D, JK, T.
9. Design of 4-bit binary, BCD counters (synchronous /asynchronous reset) or any sequence counter.

VLSI Programs

1. Introduction to layout design rules
2. Layout, physical verification, placement and route for complex design.
3 Basic logic gates
    - CMOS inverter
    - CMOS NOR/ NAND gates
    - CMOS XOR gate and MUX
4 CMOS 1-bit full adder
5 Static / Dynamic logic circuits (register cell)
6 Latch

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IV Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
	0	**6**	**2**

(ECE1301) INDUSTRIAL ORIENTED MINI PROJECT

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IV Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(ECE1120) CELLULAR AND MOBILE COMMUNICATIONS

Pre-requisites: Analog and Digital Communication Fundamentals

Course Objectives

- To understand concepts of cellular and mobile radio systems
- To design cellular radio system and the required antennas.
- To learn various types of interferences and mobile propagation.
- To learn about digital cellular networks

Course Outcomes

After going through this course the student will be able to

- Design and analyze Basic Cellular System.
- Understand of frequency reuse and Co-channel Interference and different methods of cell splitting and sectoring.
- Measure the real time Co-Channel Interference.
- Apply the different methods of Handoff mechanisms

UNITI

CELLULAR MOBILE RADIO SYSTEMS: Introduction to Cellular Mobile System, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems.

ELEMENTS OF CELLULAR RADIO SYSTEM DESIGN : General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a omni directional Antenna system, Cell splitting, consideration of the components of Cellular system.

UNITII

INTERFERENCE : Introduction to Co-Channel Interference, real time Co-Channel interference, Co-Channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-co-channel interference-different types.

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 antenna height gain, form of a point to point model.

UNITIII

CELL SITE AND MOBILE ANTENNAS : Sum and difference patterns and their synthesis, omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas.

FREQUENCY MANAGEMENT AND CHANNEL ASSIGNMENT: 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.

UNIT IV

Handoff, dropped calls and cell splitting, types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff, Intersystem handoff, cell splitting, micro cells, vehicle locating methods, dropped call rates and their evaluation.

UNIT V

DIGITAL CELLULAR NETWORKS: GSM architecture, GSM channels, GSM Standards, multiple access schemes -TDMA, CDMA.

TEXTBOOKS

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2nd Edition, 2006.
2. Principles of Mobile Communications – Gordon L. Stuber, SpringerInternational 2nd Edition, 2007.

REFERENCES

1. Wireless Communications - Theodore. S. Rapport, Pearson education, 2nd Edition, 2002.
2. Wireless and Mobile Communications – Lee McGraw Hills, 3rd Edition, 2006.
3. Wireless Communication and Networking – Jon W. Mark and Weihua Zhqung, PHI, 2005.

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IV Year B. Tech ECE – II Sem	**L**	**T/P/D**	**C**
Elective - IV	**3**	**0**	**3**

(ECE1121) SPREAD SPECTRUM COMMUNICATIONS

Pre-requisites: Digital and Analog Communication Concepts

Course Objectives

- Understand the concepts of spread spectrum communication techniques, code tracking loops and synchronization of the receivers in wireless systems.
- Describe the principles of CDMA, detection schemes and interference cancellation techniques of CDMA.
- Analyze the performance of the spread spectrum communication systems.
- Understand the fundamental concepts of Software Defined Radio and develop SDR based end-to-end Communication.

Course Outcomes

After completing this course the student will be able to

- Apply fundamental knowledge of spread spectrum communication to provide initial synchronization of a receiver with spreading codes.
- Based on knowledge of CDMA, analyze the performance of detection schemes and interference cancellation techniques.
- Analyze the performance of spread spectrums in jamming environments.
- Apply the fundamental knowledge of Software Defined Radio, design SDR and establish SDR based end-to-end communication.

UNIT I

Introduction to spread spectrum system: 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 back ground 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.

Initial synchronization of the receiver spreading code: Introduction, Problem definition and the optimum synchronizer, serial search synchronization techniques, synchronization using matched filter, synchronization by estimated the received spreading code.

UNIT III

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 IV

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.

UNIT V

Software Defined Radio

Introduction to SDR: SDR concepts and history, Characteristics and Benefits of SDR, SDR Forum, Design principles of Soft ware Radio, Ideal SDR architecture, SDR Based End-to-End Communication.

TEXT BOOKS

1. Introduction to spread spectrum communication - Rodger Eziemer, Roger L. Peterson and David E Borth– Pearson, 1st Edition,1995
2. Introduction to CDMA wireless Communications- Mosa Ali Abu, Rgheff, Elsevier Publications, 2008.
3. A Modern Approach to Radio Engineering - Software Radio - Jeffrey H. Reed, Prentice Hall PTR, May 2002

REFERENCES

1. Modern Communication and Spread Spectrum - George R. Cooper, Clare D. Mc Gillem, McGraw Hill, 1986.
2. CDMA; Principles of Spread Spectrum Communication - Andrew J. Viterbi, Pearson Education, 1st Edition, 1995.
3. Wireless Digital Communications - Kamilo Feher, PHI, 2009.
4. WCDMA Design Handbook -Andrew Richardson, Cambridge University Press, 2005.
5. Software Defined Radio, Architectures, Systems and Functions - Dillinger, Madani, Alonistioti(Eds.), Wiley, 2003.

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IV Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
Elective – IV	**3**	**0**	**3**

(ECE1122) DIGITAL DESIGN THROUGH VERILOG

Pre-requisites: Digital Logic Design, Programming Knowledge

Course Objectives

- To model, simulate and synthesize the digital designs using Verilog HDL
- To describe and realize the functionality of the digital design by using ASM charts
- To know architectural features and implementation of digital designs in CPLDs
- To know architectural features and building blocks of Altera's FPGAs.

Course Outcomes

After completing this course the student will be able to

- Develop HDL code for digital system designs.
- Describe ASM charts for synchronous sequential systems
- Acquire knowledge to Implement and test designs on the target CPLDs & FPGAs.
- Develop different digital solutions ranging from signal processing, data manipulation, electronic instrumentation, control, telecommunications to consumer electronics

UNIT I

INTRODUCTION TO VERILOG: Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Functional Verification, System Tasks, Programming Language Interface (PLI), Module, Test Benches.

LANGUAGE CONSTRUCTS AND CONVENTIONS : Introduction, Keywords, Identifiers, White Space Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data Types, Scalars and Vectors, Parameters, Memory, Operators, System Tasks.

UNIT II

GATE LEVEL MODELING : Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Tri-State Gates, Array of Instances of Primitives, Design of Flip-flops with Gate Primitives, Delays, Strengths and Contention Resolution, Net Types, Design of Basic Circuits.

BEHAVIORAL MODELING : Introduction, Operations and Assignments, Functional Bifurcation, Initial Construct, Always Construct, Assignments with Delays, Wait construct, Multiple Always Blocks, Designs at Behavioral Level, Blocking and Non blocking Assignments, The case statement, Simulation Flow,if and if-else constructs, assign-deassign construct, repeat construct, for loop, the disable construct, while loop, forever loop, parallel blocks, force-release construct, Event.

UNIT III

MODELING AT DATA FLOW LEVEL: Introduction, Continuous Assignment Structures, Delays and Continuous Assignments, Assignment to Vectors, Operators.

SWITCH LEVEL MODELING: Introduction, Basic Transistor Switches, CMOS Switch, Bi-directional Gates, Time Delays with Switch Primitives, Instantiations with Strengths and Delays, Strength Contention with Trireg Nets

UNIT IV

SYSTEM TASKS, FUNCTIONS, AND COMPILER DIRECTIVES: Introduction, Parameters, Path Delays, Module Parameters, System Tasks and Functions, File-Based Tasks and Functions, Compiler Directives, Hierarchical Access.

FUNCTIONS, TASKS, AND USER-DEFINED PRIMITIVES: Introduction, Function, Tasks, User- Defined Primitives (UDP), FSM Design (Moore and Mealy Machines)

UNIT V

DIGITAL DESIGN WITH SM CHARTS: State Machine Charts, Derivation of SM Charts, Realization of SM Charts, Implementation of the Dice Game, Alternative realizations for SM Charts using Microprogramming, Linked State Machines.

DESIGNING WITH PROGRAMMABLE GATE ARRAYS AND

COMPLEXPROGRAMMABLE LOGIC DEVICES: Xilinx 3000 Series FPGAs, Altera FLEX 10K Series CPLDs.

TEXT BOOKS

1. Design through Verilog HDL – T.R. Padmanabhan and B. Bala Tripura Sundari, WSE, IEEE Press,2004.
2. A Verilog Primier – J. Bhaskar, BSP, 2003.

REFERENCES

1. Fundamentals of Logic Design with Verilog – Stephen. Brown and ZvonkoVranesic, TMH, 2005.
2. Digital Systems Design using VHDL – Charles H Roth, Jr. Thomson Publications, 2004.
3. Advanced Digital Design with Verilog HDL – Michael D. Ciletti, PHI, 2005.
4. HDL Programming Fundamentals VHDL and VERILOG, Botros, Thomson Publications.

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IV Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
Elective-IV	**3**	**0**	**3**

(CSE1112) CRYPTOGRAPHY AND NETWORK SECURITY

Pre-requisites: Computer Networks

Course Objectives

- Understand security concepts, Ethics in Network Security.Analyze the tradeoffs inherent in security, Understand the basic categories of threats to computers and networks and Comprehend security services and mechanisms in the network protocol stack
- Discuss issues for creating security policy for a large organization, Defend the need for protection and security, and the role of ethical considerations in computer use
- Describe efficient basic number-theoretic algorithms, including greatest common divisor, multiplicative inverse mod n, and raising to powers mod n.
- Describe at least one public-key cryptosystem, including a necessary complexity-theoretic assumption for its security.
- Create simple extensions of cryptographic protocols, using known protocols and cryptographic primitives.
- Comprehend and apply authentication services and mechanisms, Describe the enhancements made to IPv4 by IPSec, Understand Intrusions and intrusion detection
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
- Understand security threats, and the security services and mechanisms to counter them, Comprehend and apply relevant protocol like SSL, SSH etc, Comprehend and apply email security services and mechanisms.

Course Outcomes

After completing this course the student will be able to

- Design a security solution for a given application.
- Analyse a given system with respect to security of the system.
- Should be able to identify network security threats and determine efforts to counter them

- Should be able to write code for relevant cryptographic algorithms, Should be able to write a secure access client for access to a server
- Should be able to send and receive secure mails, Should be able to determine firewall requirements, and configure a firewall.

UNIT I

INTRODUCTION: Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Classical Encryption techniques, Fiestel Cipher Structure, Data Encryption Standard, Block Cipher Design Principles and Modes of Operation, Triple DES, IDEA, BLOWFISH, RC-4, Evaluation criteria for AES, AES Cipher, Placement of Encryption Function, Traffic Confidentiality

UNIT II

PUBLIC KEY CRYPTOGRAPHY

Confidentiality using Symmetric Encryption – Principles of Public key Cryptosystems, RSA algorithm, Key Management, Diffie-Hellman key Exchange, Elliptic Curve Cryptography. Buffer overflow, TCP session hijacking, ARP attacks, route table modification, UDP hijacking and man-in-the-middle attacks.

UNIT III

AUTHENTICATION AND HASH FUNCTIONS

Authentication requirements, Authentication functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs, MD5 message Digest algorithm , Secure Hash Algorithm, RIPEMD, HMAC Digital Signatures, Authentication Protocols, Digital Signature Standard, Authentication Applications: Kerberos – X.509 Authentication Service

UNIT IV

NETWORK SECURITY: Email Security and Web Security

Electronic Mail Security – PGP/ SMIME, IP security- Architecture, Authentication Header, Encapsulating Security Payload, Key Management, Web Security- Secure Socket Layer, Transport Layer Security and Secure Electronic Transaction

UNIT V

SYSTEM LEVEL SECURITY

Intrusion detection – password management – Viruses and related Threats – Virus Counter measures – Firewall Design Principles – Trusted Systems.

TEXT BOOKS

1. William Stallings, “Cryptography And Network Security – Principles and Practices”, Prentice Hall of India, Fourth Edition, 2005.
2. Bruce Schneier, “Applied Cryptography”, John Wiley & Sons Inc, 2001

REFERENCES

1. Charles B. Pfleeger, Shari Lawrence Pfleeger, “Security in Computing”, Third Edition, Pearson Education, 2003
2. Atul Kahate, “Cryptography and Network Security”, Tata McGraw-Hill, 2003.
3. “Hack Proofing your network” by Ryan Russell, Dan Kaminsky, Rain Forest, Puppy, Joe Grand, DavidAhmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and Ryan Permeh, wiley Dreamtech

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IV Year B. Tech ECE – II sem	**L**	**T/P/D**	**C**
Elective-IV	**3**	**0**	**3**

(ECE1123) TELEVISION AND VIDEO ENGINEERING

Pre-requisites: Communication Fundamentals

Course Objectives

- To learn the fundamentals of Television Picture formation, transmission, reception.
- To Understand the Television broadcast and receiver fundamentals
- Know the principles of color video transmission and VCR technologies.
- To understand digital television technologies and high definition Television.

Course Outcomes

After going through this course the student will be able to

- Understand the issues related to propagation of TV signals, antennas.
- Know the working of TV Receiver and design principles.
- Understand the various video systems like VCR, Video disc systems CCTV
- Know the principles involved in the working of Latest Technologies like HDTV

UNIT I

BASIC TELEVISION SYSTEM : TV Transmitter, Receiver, Synchronization

Television Pictures : Geometric form and aspect ratio, Persistence of vision and Flicker, Image Continuity, Vertical resolution, The Kell factor , Horizontal resolution and video bandwidth, The scanning process, Interlaced Scanning , Scanning sequence

Composite Video Signal : Video signal dimension, Composite video signal, Horizontal and Vertical sync Signals ,Video modulation and Vestigial sideband signal, Sound modulation and the intercarrier system, reception of Vestigial sideband signal

Colour Signal generation : Perception of brightness and colors, additive colour mixing ,Chromaticity Diagram, video signals for colour, Formation of Chrominance signal, Colour TV signal transmission.

UNIT II

TELEVISION BROADCASTING

Picture signal Transmission: Positive and negative modulation, VSB transmission, sound signal Transmission, Standard channel Bandwidth, TV signal propagation

TV Transmitter: TV broadcast channels, Design principles of TV transmitters, Block diagrams of TV Transmitters

TV Antenna systems: Antenna Requirements, TV transmission Antennas, Television Reception problems

TV Standards: Consolidated CCIIR System-B standard, NTSC color System, SECAM System, PAL system.

TV Cameras: Camera tube types, Silicon diode Array Vidicon, CCD Image scanners, Colour Camera.

TV Picture Tube: Monochrome picture tube, PIN picture tube, TRINITRON picture tube.

Studio Equipment: Production control room (PCR) facilities, Master control room (MCR) Equipment

UNIT III

TELEVISION RECEIVER

RECEIVER FUNCTIONS AND SUBSYSTEMS: Monochrome Receiver: RF Tuner, IF subsystem, AGC, Video amplifier, , FM Sound Detectors, Sound section, Sync separation and processing, Noise in sync pulses, Separation of frame and line Sync pluses, AFC, deflection circuits, Deflection Drive ICs scanning circuits, PAL –D Colour receiver: Electronic Tuners, Digital tuning techniques, IF subsystem, Y-signal channel , chroma decoder, video and intercarrier sound signal detection, raster circuits,

RECEIVER CIRCUITS AND TV APPLICATIONS:

Colour TV display Tubes: Delta-gun , Precision-in-line and Trinitron Color Picture tubes, Remote control of TV Receivers, Receiver Antennas

Flat panel Display TV receivers: LCD TV, LED TV, Plasma TV, and OLED TV

UNIT IV

VIDEO SYSTEMS

TV Applications: CCTV, Cable TV ,Video games, Tele-Text broadcast receiver, Stereo sound in TV,

VCR AND VEDIO DISC SYSTEMS: video camera signal processing, video monitors, video cassette recorders, video disc systems, interactive video systems

UNIT V

ADVANCED TELEVISION SYSTEMS

Cable Television and Direct Broadcast Satellite Systems : CATV Systems and channels, Scrambling and conditional access Systems ,Direct Broadcasting Satellites INSAT series, International Direct Broadcast Satellites.

Digital Television Technology: Digital Television signals, Transmission of Digital TV Signals, Bit-rate Reduction, Digital TV Receivers, Picture-in-Picture processor

High Definition TV systems:HDTV standards and compatibility, The MUSE system,The HD-MAC family.

State of the art TV Systems: 3D TV, Direct To Home Television, IP TV.

TEXT BOOKS

1. Television and Video Engineering - AM Dhake 2nd Edition, TMH, 2003.
2. Modern Television Practice, Principles, Technologyand Servicing - RR.Gulati, New Age International Publishers, 2004.

REFERENCES

1. R.R.Gulati, " Monocrome and Colour Television" New Age International Publishers,2003.
2. Colour Television, Theory and Practice - SP Bali.

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IV Year B.Tech ECE – II Sem	L	T/P/D	C
Elective - V	3	0	3

(ECE1124) EMBEDDED REAL TIME OPERATING SYSTEMS

Pre-requisites: Microprocessor and Microcontrollers Concepts

Course Objectives

- Learn the general embedded system concepts
- Understand design of embedded hardware and software development tools
- Learn the basics of OS and RTOS
- Describe key issues such as CPU scheduling, memory management, task synchronization, and file system in the context of real-time embedded systems.

Course Outcomes

After completing this course the student will be able to

- Understand and design real time and non real time embedded systems
- Define the unique design challenges of real-time systems and program them.
- Understand unique characteristics of RTOS and use RTOS to build an embedded real-time system
- Gain knowledge and skills necessary to design and develop embedded applications based on real-time operating systems.

UNIT I

FUNDAMENTALS OF EMBEDDED SYSTEMS

Definition – Classification of Embedded Systems - Processors in the system - Other Hardware units. Software components - Examples for embedded systems, Design issues and trends

UNIT II

EMBEDDED HARDWARE DEVELOPMENT ENVIRONMENT

Processor Architecture- Structured units of a processor - Processor selection factors. Common memory devices - Memory selection - Memory map - Internal devices & I/O devices, Serial devices - Parallel port devices, Timer and Counting devices - Direct memory access, Communication Interface Standards,.

UNIT III

EMBEDDED SOFTWARE DEVELOPMENT ENVIRONMENT ‘

Embedded System Development Process, Embedded Operating systems, Types of Embedded Operating systems, Host and Target machines, Linkers/Locators for

embedded software, getting embedded software into the target system, Testing on host machine.

UNIT IV

REAL TIME OPERATING SYSTEMS CONCEPTS -I

Typical OS structure - RTOS structure - The context of its use - Schedule management for multiple tasks - Scheduling in real time - RTOS task scheduling models – Round Robin, Round Robin with Interrupts, Priority driven- Preemptive and Non-preemptive scheduling

UNIT V

REAL TIME OPERATING SYSTEMS CONCEPTS -II

Tasks and Task states, Tasks and Data, Semaphores and shared data, Message queues, Mailboxes and Pipes, Timer functions, events, Memory management, Interrupt routines in an RTOS environment.

Case study of RTOS using MUCOS. Case study for RTOS based programming - Coding for Automatic Chocolate vending machine using MUCOS.

TEXT BOOKS

1. An Embedded Software Primer – David E. Simon, Pearson Ed., 2005.
2. Embedded systems - architecture, programming and design - Raj Kamal; Tata McGraw Hill

REFERENCES

1. Real time Systems", J. W. S. Liu, Pearson
2. The 8051 Microcontroller & Embedded Systems using Assembly and C by Ayala & Gadre, Cengage Publications

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IV Year B. Tech ECE – II sem	**L**	**T/P/D**	**C**
Elective-V	**3**	**0**	**3**

(ECE1125) AD-HOC WIRELESS NETWORKS

Course Objectives

- To learn about the fundamentals of Adhoc wireless networks.
- To learn about the different Routing protocols.
- To learn about the different Multicasting and Security protocols.
- To learn about the Qos and different power management schems.

Course Outcomes

After completing this course the student will be able to

- Design protocols using IEEE standards
- Design and implement different Routing protocols.
- Design and implement different Multicasting and security protocols.
- Implement different power management schems.

UNIT I

FUNDAMENTALS

Introduction – Fundamentals of Wireless Communication Technology – The Electromagnetic Spectrum – Radio Propagation Mechanisms – Characteristics of the Wireless Channel – IEEE 802.11a–b Standard – Origin of Ad hoc Packet Radio Networks – Technical Challenges – Architecture of PRNETs – Components of Packet Radios – Ad hoc Wireless Networks – What is an Ad Hoc Network? Heterogeneity in Mobile Devices – Wireless Sensor Networks – Traffic Profiles – Types of Ad hoc Mobile Communications – Types of Mobile Host Movements – Challenges Facing Ad hoc Mobile Networks – Ad hoc wireless Internet.

UNIT II

AD HOC ROUTING PROTOCOLS

Introduction – Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks – Classifications of Routing Protocols – Table–Driven Routing Protocols – Destination Sequenced Distance Vector (DSDV) – Wireless Routing Protocol (WRP) – Cluster Switch Gateway Routing (CSGR) – Source–Initiated On–Demand Approaches – Ad hoc On–Demand Distance Vector Routing (AODV) – Dynamic Source Routing (DSR) – Temporally Ordered Routing Algorithm (TORA) – Signal Stability Routing (SSR) – Location–Aided Routing (LAR) – Power–Aware Routing (PAR) – Zone Routing Protocol (ZRP).

UNIT III

MULTICASTROUTING IN ADHOC NETWORKS

Introduction – Issues in Designing a Multicast Routing Protocol – Operation of Multicast Routing Protocols – An Architecture Reference Model for Multicast Routing Protocols – Classifications of Multicast Routing Protocols – Tree–Based Multicast Routing Protocols– Mesh–Based Multicast Routing Protocols – Summary of Tree and Mesh based Protocols – Energy–Efficient Multicasting – Multicasting with Quality of Service Guarantees – Application – Dependent Multicast Routing – Comparisons of Multicast Routing Protocols.

UNIT IV

TRANSPORT LAYER– SECURITY PROTOCOLS

Introduction – Issues in Designing a Transport Layer Protocol for Ad hoc Wireless Networks – Design Goals of a Transport Layer Protocol for Ad hoc Wireless Networks –Classification of Transport Layer Solutions – TCP over Ad hoc Wireless Networks – Other Transport Layer Protocols for Ad hoc Wireless Networks – Security in Ad Hoc Wireless Networks – Network Security Requirements – Issues and Challenges in Security Provisioning – Network Security Attacks – Key Management – Secure Routing in Ad hoc Wireless Networks.

UNIT V

QoS AND ENERGY MANAGEMENT

Introduction – Issues and Challenges in Providing QoS in Ad hoc wireless Networks – Classifications of QoS Solutions – MAC Layer Solutions – Network Layer Solutions – QoS Frameworks for Ad hoc Wireless Networks Energy Management in Ad hoc Wireless Networks –Introduction – Need for Energy Management in Ad hoc Wireless Networks – Classification of Energy Management Schemes – Battery Management Schemes – Transmission Power Management Schemes – System Power Management Schemes.

TEXT BOOKS

1. C. Siva Ram Murthy and B. S. Manoj, “Ad Hoc Wireless Networks Architectures and Protocols”, Prentice Hall, PTR, 2004.

REFERENCES

1. C. K. Toh, “Ad Hoc Mobile Wireless Networks Protocols and Systems”, Prentice Hall, PTR, 2001.
2. Charles E. Perkins, “Ad Hoc Networking”, Addison Wesley, 2000
3. Introduction to Wireless Telecommunications Systems and Networks, Mullet, Cengage Publications

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IV Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
Elective-V	**3**	**0**	**3**

(EIE1107) BIO-MEDICAL INSTRUMENTATION

Pre-requisites: Electronic Measurements and Instrumentation

Course Objectives

- Identify and obtain biological parameters and relationship between them.
- Identify mathematical models and principles for the design of biomedical instrumentation systems.
- Understand the principles involved in acquiring different bio-signals.
- Represent these principles in form of mathematical equations.

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Course Outcomes

After going through this course the student will be able to

- Apply fundamental knowledge of sciences to analyze the relationship among different bio signals
- Apply fundamental knowledge of mathematics coupled with electronics and use it for designing bio amplifiers for different applications.
- Understand or become aware of artifacts caused by an incorrect diagnosis of the symptoms through sample data.
- Apply these equations to analyze real time problems by making good assumptions and learn systematic engineering method design robust amplifiers.

UNIT I

Components of Medical Instrumentation System. Bio signals and their characteristics, Bio amplifier. Characteristics of medical instruments. Problems encountered with measurements from human beings.

Organization of cell. Nernst equation for membrane. Resting and Action Potential.

UNIT II

Bio Electrodes – Bio potential Electrodes and their classifications-External electrodes, Internal Electrodes-Biochemical Electrodes.

UNIT III

The Heart and Cardiovascular system- Heart Sounds- Mechanical function, Electrical Conduction system of the heart. Cardiac cycle. Relation between electrical and

mechanical activities of the heart. Interpretation of ECG waveform with respect to electro mechanical activity of the heart.

UNIT IV

Cardiac Instrumentation: Blood pressure and Blood flow measurement. Specification of ECG machine. Einthoven triangle, Standard 12-lead configurations, EEG and EMG-Neuro-Muscular Instrumentation: Specification of EEG and EMG machines. Electrode placement for EEG and EMG recording. Interpretation of EEG and EMG.

UNIT V

Therapeutic equipment.: Pacemaker, Defibrillator, Shortwave diathermy. Hemodialysis machine.

Respiratory Instrumentation: Mechanism of respiration, Spirometry, Pneumotachograph Ventilators.

TEXT BOOKS

1. Biomedical Instrumentation and Measurements – by Leslie Cromwell, F.J. Weibell, E.A. Pfeiffer, PHI.
2. Medical Instrumentation, Application and Design – by John G. Webster, John Wiley.

REFERENCES

1. Principles of Applied Biomedical Instrumentation – by L.A. Geoddes and L.E. Baker, John Wiley and Sons.
2. Hand-book of Biomedical Instrumentation – by R.S. Khandpur, McGraw-Hill, 2003.
3. Introduction to Biomedical equipment technology-by Joseph Carr and Brown,

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IV Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
Elective-V	**3**	**0**	**3**

(ECE1126) CPLD AND FPGA ARCHITECTURES

Pre-requisites: Digital Logic Design

Course Objectives

- To Learn architectures and technologies of various PLD's , CPLDs and FPGAs
- To introduce the student to state machines for sequential circuit design and petrinets for parallel controllers.
- To describe partitioning techniques and Placement & Routing algorithms for FPGAs.
- To gain knowledge about EDA Tools for FPGAs & ASICs and case studies

Course Outcomes

After going through this course the student will be able to

- Understand the various architectures of PLD's ,CPLDs and FPGAs
- Design real time applications using state machines and petrinets.
- Analyze placement and routing algorithms.
- Verify the digital design, placement and routing of the designs using CAD tools.

UNIT I

Programmable logic: Combinational logic - PLD'S- ROM, PLA, PAL, PGA, Sequential programmable logic devices.

CPLDs: Features, programming and applications using complex programmable logic devices Altera series – Max 5000/7000 series and Altera FLEX logic- 10000 series CPLD, Cypress FLASH 370 Device technology, Lattice PLSI's architectures – Speed performance and in system programmability.

UNIT II

FPGAs: Field Programmable gate arrays- Logic blocks, routing architecture, design flow , technology mapping for FPGAs, Programming technologies, Xilinx XC4000,Virtex-II FPGA,Spartan-3 FPGA and ALTERA's FLEX 8000/10000 FPGAs, ACTEL's ACT-1,2,3 and their speed performance.

UNIT III

State machines: Linked state machine, one hot state machine, petrinets for state machines-Basic concepts, properties, extended petrinets for parallel controllers, traffic light controller.

UNIT IV

Placement: objectives Min-cut based placement , iterative improvement placement, **Routing-** objectives , segmented channel routing maze routing, routability estimation , net delays, computing signal delay in RC tree networks.

UNIT V

EDA Tools: Digital front end digital design tools for FPGAs and ASICs: Using mentor graphics EDA tools: FPGA Advantage, Simulation, synthesis, floor planning, Place and Route (PAR), Configuration of FPGA, Case studies of multiplexers, counters.

TEXT BOOKS

1. Field Programmable Gate Array Technology - S Trimberger, Edr, Kluwer Academic Publications,1994.
2. Field Programmable Gate Arrays, John V.Oldfield, Richard C Dore, Wiley Publications.
3. Digital System Design Using VHDL – Charles H Roth, Jr. Thomson, 1998.

REFERENCES

1. Digital Design Using Field Programmable Gate Array, P.K.Chan and S. Mourad, Prentice Hall, 1994,
2. Application – Specific Integrated Circuits – Michael John Sebastian Smith, Addison Wesley Professional ,1997.
3. Field programmable gate array, S. D. Brown, R.J.Francis, J.Rose ,Z.G.Vranesic, BSP, 2007.
4. Digital Systems Design with FPGA's and CPLDs – Ian Grout, Elsevier, 2009.

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IV Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(ECE1302) TECHNICAL SEMINAR

VNR Vignana Jyothi Institute of Engineering and Technology

IV Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(ECE1303)COMPREHENSIVE VIVA

VNR Vignana Jyothi Institute of Engineering and Technology

IV Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
	0	**18**	**12**

(ECE1304) PROJECT WORK