ACADEMIC REGULATIONS

COURSE STRUCTURE AND DETAILED SYLLABUS

FOR

ELECTRONICS AND COMMUNICATION ENGINEERING

For B.TECH. FOUR YEAR DEGREE COURSE

(Applicable for the batches admitted from 2012-2013)
REGULATION : R12

J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY

(Autonomous)

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J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

Academic Regulations 2012 for B. Tech (Regular)

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

1. Award of B.Tech. Degree

A student will be declared eligible for the award of the B. Tech. Degree if he 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. **Register for 200 credits and secure 200 credits**

2. 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.

3. 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
11	Bio-Medical Engineering
12	Information Technology
25	Mining Engineering

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

4. Credits

	I Year		Semester	
	Periods / Week	Credits	Periods / Week	Credits
Theory	03	06	03	03
	02	04	--	--
Practical	03	04	03	02
Drawing	02T/03D	04	03 06	02 04
Mini Project	--	--	--	02
Comprehensive Viva Voce	--	--	--	02
Seminar	--	--	6	02
Project	--	--	15	10

5. Distribution and Weightage of Marks

i. The performance of a student in each semester / I year shall be evaluated subject –wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition, Industry oriented mini-project, seminar and project work shall be evaluated for **50, 50 and 200** marks respectively.

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

iii. For the subject having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and estimation, the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day work and 10 marks for subjective paper) and 75 marks for end examination. There shall be two internal tests in a Semester.

For theory subjects, the distribution shall be 25 marks for internal evaluation **(Midterm exams (20marks) + Assignment (5marks))and 75 marks for end examination**. There shall be altogether four assignments (Each assignment consisting of 6 questions from every two units of syllabus)set by the teacher from the whole syllabus of the subject

The pattern of question paper shall consist of two parts namely Part-A and Part-B out of which the candidate has to answer Part-A compulsorily and from Part-B, the candidate has to answer three questions out of five questions given. The Part-A i.e. question no.1 consists of sub questions, which are based on fundamentals and concept testing nature. These questions may of the following type:

a. Short answer questions for which answer is two to three sentences
b. Multiple choice questions
c. Fill in the blanks
d. True/False type

Any sub question may carry a maximum of 1 or 2 marks. Altogether candidate has to answer 4 questions out of 6 questions but question no.1 of Part-A is compulsory. The time allocated for the mid term examination is 2 hours. There shall be 2 Mid Term Examinations(1^{st} Mid shall be from 1-4 Units and 2^{nd} Mid shall be from 5-8 Units)

The Internal Evaluation is for 25 marks (20 for Mid term Examination and 5 Marks for Assignment), the average of these two shall be considered as the final marks for Internal Evaluation secured by the candidate.

However, for **first year**, there shall be 3 mid term examinations (Each for 20 Marks) and 3 Assignments (Each for 5 Marks) , [1st mid shall be from 1-2 units, 2nd mid from 3-5 units and 3rd mid shall be from 6-8 units]. There shall be altogether six assignments (Each assignment consisting of 6 questions from every unit of syllabus)set by the teacher from the whole syllabus of the subject.

The Internal Evaluation is for 25 marks (20 for Mid term Examination and 5 Marks for Assignment), the average of these three shall be considered as the final marks for Internal Evaluation secured by the candidate.

The question paper shall contain 6 questions, 1 in Part-A and 5 in Part-B. The candidate shall have to answer Part-A compulsorily and shall have to answer any three questions from remaining five questions of Part-B. The Part-A i.e. question no.1 consists of sub questions, which are based on fundamentals and concept testing nature. These questions may of the following type:

a. Short answer questions for which answer is two to three sentences
b. Multiple choice questions
c. Fill in the blanks
d. True/False type

Any sub question may carry a maximum of 1 or 2 marks. Altogether candidate has to answer 4 questions out of 6 questions.

iv. For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 end examination marks. Out of the 25 marks for internal, day-to-day work in the laboratory shall be evaluated for 15 marks and internal examination for practical shall be evaluated for 10 marks conducted by the concerned laboratory teacher. The end examination shall be conducted with external examiner and laboratory teacher. The external examiner shall be appointed by the Chief Controller of Examinations.

v. For the subject having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and estimation, **the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day work and 10 marks for subjective paper)** and 75 marks for end examination. There shall be two internal tests in a Semester and average of the two shall be considered for the award of marks for internal tests. However in the I year class, there shall be three tests and the average of the three mid term examinations will be taken into consideration.

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

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

viii. There shall be a Comprehensive Viva-Voce in IV year II semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of (i) Head of the Department (ii) two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he / she studied during the B.Tech course of study. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee. There are no internal marks for the Comprehensive viva-voce.

ix. Out of a total of 200 marks for the project work, 50 marks shall be for Internal Evaluation and 150 marks for the End Semester Examination. The End Semester Examination (viva-voce)

shall be conducted by the same committee appointed for industry oriented mini project. In addition the project supervisor shall also be included in the committee. The topics for industry oriented mini project, seminar and project work shall be different from each other. The evaluation of project work shall be conducted at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project.

6. Attendance Requirements:

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

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

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

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

v. Students whose shortage of attendance is not condoned in any semester / I year are not eligible to take their end examination of that class and their registration shall stand cancelled.

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

7. Minimum Academic Requirements:

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

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% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end 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 one regular and one supplementary examinations of I year, and one regular examination of II year I semester irrespective of whether the candidate takes the examination or not.

iii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of total **62 c**redits from the following examinations, whether the candidate takes the examinations or not.

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

iv. A student shall register and put up minimum attendance in all 200 credits and earn the 200 credits. Marks obtained in all 200 credits shall be considered for the calculation of percentage of marks.

v. 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 shall stand cancelled.

8. Course pattern:

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

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

iii. When a student is detained due to lack of credits / shortage of attendance he may be re-admitted when the semester / year is offered after fulfilment of academic regulations, whereas the academic regulations hold good with the regulations he was first admitted.

9. Award of Class:

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

Class Awarded	**% of marks to be secured**	
First Class with Distinction	70% and above	From the aggregate marks secured for the best 200 Credits.
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

10. Minimum Instruction Days:

The minimum instruction days for each semester / I year shall be 90/180 clear instruction days.

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

12. General:

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

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

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

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

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

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

1. The Students have to acquire 150 credits from II to IV year of B.Tech. Program (Regular) for the award of the degree.
Register for **150** credits and secure **150** credits.

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

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

4. Promotion Rule:

A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of 37 **credits from the examinations.**

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

5. Award of Class:

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

First Class with Distinction	70% and above	From the aggregate marks secured for 150 Credits. (i.e. II year to IV year)
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

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

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

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

	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.	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.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs 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.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all 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.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions : (if the squad reports that the college is also involved in encouraging malpractices)
   (i) A show cause notice shall be issued to the college.
   (ii) Impose a suitable fine on the college.
   (iii) Shifting the examination centre from the college to another college for a specific period of not less than one year.

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B. TECH. ELECTRONICS AND COMMUNICATION ENGINEERING

I YEAR **COURSE STRUCTURE**

Code	Subject	L	T/P/D	C
6751001	English	2	-	4
6751002	Mathematics – I	3	1	6
6751008	Mathematical Methods	3	1	6
6751004	Engineering Physics	2	1	4
6751005	Engineering Chemistry	2	-	4
6751006	Computer Programming & Data Structures	3*	-	6
6751007	Engineering Drawing	2	3	4
6751612	Computer Programming Lab.	-	3	4
6751613	Engineering Physics / Engineering Chemistry Lab.	-	3	4
6751614	English Language Communication Skills Lab.	-	3	4
6751619	IT Workshop / Engineering Workshop	-	3	4
	Total	**17**	**18**	**50**

II YEAR I SEMESTER **COURSE STRUCTURE**

Code	Subject	L	T/P/D	C
6753007	Mathematics – III	3	1	3
6753019	Probability Theory & Stochastic Processes	3	1	3
6753013	Environmental Studies	3	1	3
6753020	Electrical Circuits	4	1	4
6753009	Electronic Devices & Circuits	4	-	4
6753021	Signals & Systems	4	1	4
6753606	Electronic Devices & Circuits Lab.	-	3	2
6753607	Basic Simulation Lab.	-	3	2
	Total	**21**	**11**	**25**

II YEAR II SEMESTER **COURSE STRUCTURE**

Code	Subject	L	T/P/D	C
6754019	Principles of Electrical Engineering	3	1	3
6754020	Electronic Circuit Analysis	4	-	4
6754021	Pulse & Digital Circuits	4	1	4
6754010	Switching Theory & Logic Design	4	1	4

6754011	Electromagnetic Theory & Transmission Lines	4	1	4
6754006	Electrical Engineering Lab.	-	3	2
6754607	Electronic Circuit Analysis Lab.	-	3	2
6754608	Pulse & Digital Circuits Lab.	-	3	2
	Total	**19**	**13**	**25**

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III YEAR I SEMESTER **COURSE STRUCTURE**

Code	Subject	L	T/P/D	C
6755012	Control Systems.	4	-	4
6755021	Computer Organization	4	1	4
6755022	Antennas & Wave Propagation	3	1	3
6755023	Electronic Measurements & Instrumentation	4	1	4
6755024	Analog Communications	3	1	3
6755009	IC Applications	3	1	3
6755606	Analog Communications Lab.	-	3	2
6755607	IC Applications Lab.	-	3	2
	Total	**21**	**11**	**25**

III YEAR II SEMESTER **COURSE STRUCTURE**

Code	Subject	L	T/P/D	C
6756023	Managerial Economics & Financial Analysis	4	-	4
6756024 6756025 6756014	**OPEN ELECTIVE** Operating Systems Object Oriented Programming Nano technology	4	1	4
6756026	Digital Communications	3	1	3
6756012	Microprocessors & Microcontrollers	4	1	4
6756027	Digital Signal Processing	4	1	4
6756606	Microprocessors & Microcontrollers Lab.	-	3	2
6756607	Digital Signal Processing Lab.	-	3	2
6756608	Advanced English Communication Skills Lab	-	3	2
	Total	**19**	**13**	**25**

IV YEAR I SEMESTER **COURSE STRUCTURE**

Code	Subject	L	T/P/D	C
6757034	Management Science	3	1	3
6757035	VLSI Design	4	-	4
6757036	Microwave Engineering	3	1	3
6757037	Computer Networks	4	1	4
	ELECTIVE – I	3	1	3

6757038 6757039 6757040 6757041	EMI/EMC DSP Processors & Architectures Telecommunication Switching Systems Digital Image Processing			
 6757042 6757043 6757044 6757045	**ELECTIVE – II** Optical Communications Embedded Systems Television Engineering Multimedia and Signal coding	4	1	4
6757607	e-CAD & VLSI Lab.	-	3	2
6757608	Microwave Engg. & Digital Commns. Lab.	-	3	2
	Total	**21**	**11**	**25**

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IV YEAR II SEMESTER **COURSE STRUCTURE**

Code	Subject	L	T/P/D	C
 6758024 6758025 6758026 6758016	**ELECTIVE-III** Cellular & Mobile Communications Satellite Communications Biomedical Instrumentation Artificial Neural Networks	3	1	3
 6758027 6758028 6758029 6758030	**ELECTIVE – IV** Internetworking Radar Systems Spread Spectrum Communications Network Security	3	1	3
 6758031 6758032 6758033 6758034	**ELECTIVE –V** RF Circuit Design Wireless Communications & Networks Digital Design through Verilog HDL Pattern Recognition	3	1	3
6758613	Industry Oriented Mini Project	-	-	2
6758614	Seminar	-	6	2
6758615	Major Project	-	15	10
6758616	Comprehensive Viva	-	-	2
	Total	**9**	**24**	**25**

Note : All End Examinations (Theory and Practical) are of three hours duration.
T-Tutorial **L – Theory** **P – Practical/Drawing** **C – Credits**

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	L	T/P/D	C
I Year B.Tech ECE.			
6751001	**2**	**-/-/-**	**4**

ENGLISH

1. INTRODUCTION:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure by the students. Hence, it is suggested that they read it on their own with topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section , as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. *However, the stress in this syllabus is on skill development and practice of language skills.*

2. OBJECTIVES:

a. To improve the language proficiency of the students in English with emphasis on LSRW skills.
b. To equip the students to study academic subjects with greater facility through the theoretical and practical components of the English syllabus.
c. To develop the study skills and communication skills in formal and informal situations.

3. SYLLABUS:

Listening Skills:

Objectives

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

Students should be given practice in listening to the sounds of the language to be able to recognise them, to distinguish between them to mark stress and recognise and use the right intonation in sentences.

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

Speaking Skills:

Objectives

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

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities (Using exercises from all the nine units of the prescribed text: *Learning English : A Communicative Approach*.)
- Just A Minute(JAM) Sessions.

Reading Skills:

Objectives

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

- Skimming the text
- Understanding the gist of an argument

- Identifying the topic sentence
- Inferring lexical and contextual meaning
- Understanding discourse features
- Recognizing coherence/sequencing of sentences

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

Writing Skills :

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.

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

4. TEXTBOOKS PRESCRIBED:

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

For Detailed study

1 First Text book entitled "Enjoying Everyday English", Published by Sangam Books, Hyderabad

For Non-detailed study

1. **Second text book "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur**

A. STUDY MATERIAL:

UNIT-I

a. Sir C.V. Raman (Detail) A pathbreaker in the saga of Indian Science. **(Detail)**
b. Leading a team and Work brings Solace (from Wings of Fire)
--University Press

UNIT-II

a. The Connoisseur (Detail)
b. Mother Theresa (Non-detail)

UNIT-III

a. Kalpana Chawla " Inspiration" (Detail)
b. Sam Pitroda (Non-detail)

UNIT-IV

a. Bubbling Well Road (Detail)
b. I have a dream-Martin Luther king(Non-detail)

UNIT-V

a. The Cuddalore Experience(Detail)
b. Amartya kumar Sen(Non-detail)

UNIT-VI

a. **Youth, Awake, Arise- STOP NOT TILL**

Swami Vivekananda Institute of Human Excellence,

b. John F. Kennedy (Non-detail)

UNIT-VII

Exercises on;
Reading & Writing Skills
Reading Comprehension
Letter Writing
Essay Writing

UNIT-VIII

Exercises on Remedial Grammar;
Common errors in English
Subject-Verb agreement
Tense aspect
Vocabulary development-Synonyms, Antonyms, One word substitutes, Prefixes-Suffixes, Idioms, Phrases, Words often confused

REFERENCES :

1. **Innovate with English: A Course in English for Engineering Students,** edited by T Samson, Foundation Books
2. English Grammar Practice**, Raj N Bakshi, Orient Longman.**
3. **Effective English, edited** by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
4. Handbook of English Grammar& Usage**, Mark Lester and Larry Beason, Tata Mc Graw –Hill.**
5. Spoken English**, R.K. Bansal & JB Harrison, Orient Longman.**
6. Technical Communication, **Meenakshi Raman, Oxford University Press**
7. Objective English **Edgar Thorpe & Showick Thorpe**, **Pearson Education**
8. Grammar Games**, Renuvolcuri Mario, Cambridge University Press.**
9. Murphy's English Grammar with CD**, Murphy, Cambridge University Press.**
10. Everyday Dialogues in English**, Robert J. Dixson, Prentice Hall India Pvt Ltd.,**
11. ABC of Common Errors **Nigel D Turton, Mac Millan Publishers.**
12. Basic Vocabulary **Edgar Thorpe & Showick Thorpe**, **Pearson Education**
13. Effective Technical Communication**, M Ashraf Rizvi, Tata Mc Graw –Hill.**
14. An Interactive Grammar of Modern English, **Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO**
15. A Communicative Grammar of English, **Geoffrey Leech, Jan Svartvik, Pearson Education**
16. Enrich your English, **Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,**
17. A Grammar Book for You And I, **C. Edward Good, MacMillan Publishers.**

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MATHEMATICS – I

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

UNIT-II : Differential equations of first order and their applications
Overview of differential equations – exact, linear and Bernoulli. Applications to Newton's Law of cooling, Law natural growth and decay, orthogonal trajectories and geometrical applications.

UNIT-III : Higher Order Linear differential equations and their applications
Linear differential equations of second and higher order with constant coefficients, RHS term of the $f(X)=e^{ax}$, Cos ax, and x^n, e^{ax} $V(x)$, x^n $V(x)$ method of variation of parameters. Applications bending of beams, Electrical circuits, simple harmonic motion.

UNIT-IV : Laplace transform and its application to Ordinary differential equations
Laplace transform of standard functions – Inverse transform – first shifting theorem, Transforms of derivatives and integrals – Unit step function – second shifting theorem – Dirac's delta function-Convolution theorem-Periodic function – differentiation and integration of transforms-Application of Laplace transforms to ordinary differential equations.

UNIT-V : Function of Single Variable
Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – Generalized mean value theorem (all theorems without proof) Functions of several variables – Functional dependence – Jacobian – Maxima and Minima of functions of two variables with constraints and without constraints.

UNIT-VI : Application of Single variable
Radius, Centre and Circle of Curvature-Evolutes and Envelopes Curve tracing – Cartesian, polar and parametric curves.

UNIT-VII : Integration & its applications
Riemann Sums, integral Representation for lengths, Areas, Volumes and Surface areas in Cartesian and polar coordinates, multiple integrals – double and triple integrals – change of order of integration – change of variable.

UNIT-VIII : Vector Calculus
Vector Calculus: Gradient-Divergence-Curl and their related properties, Potential function – Laplacian and second order operators. Line integral – work done – surface integrals-Flux of a vector valued functions.
Vector integrals theorem: Green's –Stock's and Gauss's Divergence Theorems (Statement & their verification).

TEXT BOOKS:
1. Engineering Mathematics by B.V.Ramana
2. Engineering Mathematics-I by T.K.V. Iyanar & B.Krishna Gandhi & Others, S.Chand

REFERENCES:
1. Engineering Mathematics-I by D.S.Chandrasekhar, Prison Books Pvt. Ltd.
2. Engineering Mathematics-I by G.Shankar Rao, I.K.International Publications.
3. Advanced Engineering Mathematics by Jain and S.R.K. Iyangar, Narosa Publications.
4. A text Book of KREYSZIG'S Engineering Mathematics, (Original KREYSZIG'S) WILEY Publications.
5. Engineering Mathematics-I by P.B.Bhaskara Rao, S.K.V.S.Rama chary, M.Bhujanga Rao,
6. Engineering Mathematics-I by C.Shankaraiah, VGS Booklinks.

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MATHEMATICAL METHODS

UNIT-I : Solution for linear systems

Matrices and Linear systems of equations: Elementary row transformations- Rank-Echelon form, Normal forms– Solution of Linear Systems – Direct Methods – LU Decomposition – LU Decomposition from Gauss Elimination – Solution of Tridiagonal Systems- Solution of Linear Systems.

UNIT-II : Eigen values & Eigen Vectors

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

UNIT-III : Linear Transformations

Real matrices – Symmetric, skew – symmetric, orthogonal, Linear Transformation – Orthogonal Transformation. Complex matrices: Hermitian, Skew-Hermitian and Unitary – Eigen values and Eigen vectors of complex matrices and their properties. Quadratic forms- Reduction of quadratic form to canonical form – Rank – Positive, Negative definite – semi definite – index – signature- Sylvester law, Singular value decomposition.

UNIT-IV : Solution of Non – linear Systems

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

Interpolation:

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

UNIT-V : Curve fitting & Numerical Integration

Curve fitting: Fitting a straight line – Second degree curve-exponentional curve-power curve by method of least squares. Numerical Differentiation – Simpson's 3/8 Rule, Gaussian Integration.

UNIT-VI : Numerical solution of IVP's in ODE

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

UNIT-VII :Fourier Series-Fourier Transform

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

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

UNIT-VIII : Z-Transform & Partial differential equations

Z-Transform-Properties-Damping rule-shifting rule-Initial & Final value theorems-convolution theorem –solution of difference equation by Z-transform -Introduction and Formation of partial equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and nonlinear (Standard type) equations.

TEXT BOOKS:

1. Engineering Mathematics by B.V.Ramana
2. Mathematical Methods by T.K.V. Iyanar & B.Krishna Gandhi & Others, S.Chand.

REFERENCES:

1. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.
2. Mathematical Methods by G.Shankar Rao, I.K.International Publications, N.Delhi.
3. Mathematical Methods by V.Ravindranath, Etl, Himalaya Publications.
4. A text Book of KREYSZIG'S Mathematical Methods, Dr.A.Ramakrishna Prasad, WILEY Publications.
5. Mathematical Methods by P.B.Bhaskara Rao, S.K.V.S.Rama chary, M.Bhujanga Rao, B.S. Publications.
6. Mathematical Methods byK.V.Suryanarayana Rao by Scitech Publication.

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ENGINEERING PHYSICS

Unit-I Physical Optics:

1. Interference: Types of Interferences, Interference in thin films (reflected light) - Newton's rings.
2. Diffraction: Types of diffraction, Frounhoffer's Diffraction at a single slit, double slit and diffraction grating (N-slits).
3. Polarization: Introduction to polarization, Malus law, double refraction, Nicol's prism, Brewster's law

Applications of Interference, Diffraction & Polarization in industry.

UNIT-II Crystallography –XRD methods

4. Crystallography : Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Diamond and hcp Structures, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems.
5. X-ray Diffraction: Basic Principles, Bragg's Law, Laue Method, Powder Method, Applications of X- ray Diffraction.

UNIT-III Defects in Crystals & Principles of Quantum Mechanics

6. Defects in Crystals: Point Defects: Vacancies, Substitution, Interstitial, Frenkel and Schottky Defects, Concentration of vacancies at given temperature, concentration of Schottky & Frenkel defects, Qualitative treatment of line (Edge and Screw Dislocations) Defects, Burger's Vector, Surface Defects and Volume Defects. (Qualitative treatment)
7. Principles of Quantum Mechanics: Waves and Particles, de Broglie Hypothesis , Matter Waves, Davisson and Germer's Experiment, G. P. Thomson Experiment, Heisenberg's Uncertainty Principle, application of quantum mechanics in information security, Physical Significance of the Wave Function, Schrödinger's Time Independent Wave Equation - - Particle in One Dimensional Potential Box.

UNIT-IV Band Theory of Solids

8. Band Theory of Solids: Drawbacks of Classical free Electron theory, Quantum Free electron theory, Fermi energy and Density of States, Electron in a periodic Potential, Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), Origin of Energy Band Formation in Solids, Classification of Materials into Conductors, Semi Conductors & Insulators, Concept of Effective Mass of an Electron and Hole.
9. Semiconductor Physics: Fermi Level in Intrinsic and Extrinsic Semiconductors, Intrinsic Semiconductors and Carrier Concentration, Extrinsic Semiconductors and Carrier Concentration, Equation of Continuity, Direct & Indirect Band Gap Semiconductors, Hall Effect.

UNIT-V Acoustics of Building & Acoustic Quieting and Ultrasonics

10. Basic Requirement of Acoustically Good Hall, Reverberation and Time of Reverberation, Sabine's Formula for reverberation Time (Quantative treatment), Measurement of Absorption Coefficient of a Material, Factors Affecting The Architectural Acoustics and their Remedies.

Ultrasonics:

Concept of ultrasonics wave generation, Different methods of generation of Ultrasonic's (Piezostriction and Magnetostriction) , concept of NDT & Applications.

UNIT-VI Dielectric and Magnetic Properties

11. Dielectric Properties: Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic (Quantitative) and Orientation Polarizations (Qualitative) and Calculation of Polarizabilities - Internal Fields in Solids, Clausius-Mossotti Equation, Piezo-electricity, Pyro-electricity and Ferro-electricity.
12. Magnetic Properties: Permeability, Field Intensity, Magnetic Field Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials, Ferrites and their Applications, Concept of Superconductivity, Meissner Effect, Magnetic Levitation, Applications of Superconductors.

UNIT-VII` Lasers and Fiber Optics

13. 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 Diode Laser, Applications of Lasers.

14. Fiber Optics: Constructions and Principle of Optical Fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers and Refractive Index Profiles, Attenuation in Optical Fibers, Application of Optical Fibers.

UNIT-VIII Nanotechnology

15. Introduction to Nanotechnology, Surface to Volume Ratio, Quantum Confinement, properties of Nanomaterials, Synthesis methods: Bottom-up Fabrication: Sol-gel, Precipitation, Combustion Methods; Top-down Fabrication: Chemical Vapour Deposition, Physical Vapour Deposition, Pulsed Laser Vapour Deposition Methods,
Characterization: Difference between Optical Microscopy and Electron Microscopy, XRD&TEM,SEM, scanning Probe Microscopy (AFM & STM), Applications of Nanomaterials.

TEXT BOOKS:

1. Applied Physics - P.K.Palanisamy (SciTech Publications (India) Pvt. Ltd., Fifth Print 2008).
2. Applied Physics - S.O. Pillai & Sivakami (New Age International (P) Ltd., Second Edition 2008).
3. Applied Physics - T. Bhima Shankaram & G. Prasad (B.S. Publications, Third Edition 2008).
4. Engineering Physics – Hitendra K Malik A K Singh (Tata Mc Graw Hill Edu Pvt Ltd
5. Nanotechnology – M.Ranter & D.Ranter (Pearson Edu)
6. Solid State Physics – A J Dekker (Macmillan)
7. Engineering Physics – Adeel Ahmad & B S Bellubbi (Florence Publication , Hyd)

REFERENCES:

1.Solid state physics -- M.Arumugam
2 Applied physics – Mani naidu

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ENGINEERING CHEMISTRY

UNIT I:

Electrochemistry and Batteries: Concept of ElectroChemistry, Conductance-Electrolyte in solution, Conductance-Specific, Equivalent and molar conductance, Ionic mobilities, Kolrausch's Law. Application of conductance. EMF: Galvanic Cells, types of Electrodes, Reference Electrode (SCE, Quinhydrone electrode), Ion Selective Electrodes (Glass Electrode) Nernest equation, Concentration Cells, Galvanic series,Potentiometric titrations, Florimetry, Numerical problems.

Batteries: Primary and secondary cells, (lead-Acid cell, Ni-Cd cell, Lithium cells). Applications of batteries, fuel cells – Hydrogen – Oxygen fuel cells, Advantages of fuel cells.

UNIT II:

Corrosion and its corrosion control: Introduction, causes and different types of corrosion and effects of corrosion, theories of corrosion – Chemical, Electrochemical corrosion, corrosion reactions, factors affecting corrosion – Nature of metal – galvanic series, over voltage, purity of metal, nature of oxide film, nature of corrosion product. Nature of environment-effect of temperature, effect of pH, Humidity, effect of oxidant.

Corrosion control methods – Cathodic protection, sacrificial anode, impressed current cathode. Surface coatings – methods of application on metals- hot dipping, galvanizing, tinning, cladding, electroplating - Organic surface coatings – paints constituents and functions.

UNIT III:

Polymers: Types of Polymerization, Mechanism (Chain growth & Step growth).Plastics:

Thermoplastic resins & Thermoset resins. Compounding & fabrication of plastics, preparation, properties, engineering applications of: polyethylene, PVC, PS, Teflon, Bakelite, Nylon. Conducting polymers: Poly acetylene, polyaniline, conduction, doping, applications. Liquid Crystal polymers: Characteristics and uses Rubber – Natural rubber, vulcanization. Elastomers – Buna-s, Butyl rubber, Thiokol rubbers, Fibers – polyester, fiber reinforced plastics (FRP), applications

UNIT IV:

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

UNIT V:

Surface Chemistry: Solid surfaces- types of adsorption- Langmuir adsorption isotherm, BET adsorption equation- Calculation of surface area of solid, application adsorption. Nanomaterials: Introduction, preparation and applications of Nanomaterials.

UNIT VI:

Energy sources: fuels, classification – conventional fuels (solid, liquid, gaseous) Solid fuels – coal – analysis – proximate and ultimate analysis and their significance Liquid fuels – primary – petroleum – refining of petroleum-cracking knocking synthetic petrol – Bergius and Fischer Tropsech's process; Gaseous fuels – natural gas, analysis of flue gas by Orsat's method Combustion – problems, Calorific value of fuel – HCV, LCV, determination of calorific value by Junker's gas calorie meter.

UNIT VII:

Phase rule: Definitions: phase, component, degree of freedom, phase rule equitation. Phase diagrams - one component system: water system. Two component system lead- silver system, heat treatment based on iron-carbon phase diagram, hardening, annealing.

UNIT VIII:

Materials Chemistry: Cement: composition of Portland cement, manufacture of port land Cement, setting & hardening of cement (reactions). Lubricants: Criteria of a good lubricant, mechanism, properties of lubricants: Cloud point, pour point,flash & fire point,Viscosity. Refractories: Classification, Characteristics of a good refractory and Ceramics.

Introduction to analytical chemistry-IR, UV-Visible spectroscopy-theory and instrumentation -with simple examples.

TEXT BOOKS:

1.Text Book of Engineering Chemistry – Shasi Chawla, Dhantpat Rai publishing Company, NewDelhi (2008).
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).
3. Text of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co,New Delhi(2006)

REFERENCE BOOKS

1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited , New Delhi(2006)
2. Enginering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills co., New Delhi (2004).
3. Chemistry of Engineering Materials by CV Agarwal,C.P Murthy, A.Naidu, BS Publications.
4. Chemistry of Engineering Meterials by R.P Mani and K.N.Mishra, CENGAGE learning.
5. Applied Chemistry – A text for Engineering & Technology – Springar (2005).
6. Text Books of Engineering Chemistry by C.P. Murthy, C.V. Agarwal, A. Naidu B.S. Publications, Hyderabad (2006).
7. Engineering Chemistry – R. Gopalan, D. Venkatappayya, D.V. Sulochana Nagarajan – Vikas Publishers (2008).

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COMPUTER PROGRAMMING AND DATA STRUCTURES

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programmes, Software Development Method, Algorithms, Pseudo code, flow charts, applying the software development method.

UNIT - II

Introduction to C Language – Background, Simple C Programme, Identifiers, Basic data types, Variables, Constants, Input / Output, Operators. Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Bit wise operators, Statements, Simple C Programming examples.

Selection Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Programming examples.

UNIT - III

Designing Structured Programmes, Functions, basics, user defined functions, inter function communication,

Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Preprocessor commands, example C programmes

Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C programme examples.

UNIT - IV

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions, command –line arguments.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C programme examples.

UNIT - V

Derived types – Structures – Declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit fields, enumerated types, C programming examples.

UNIT - VI

Input and Output – Concept of a file, streams, standard input / output functions, formatted input / output functions, text files and binary files, file input / output operations, file status functions (error handling), C programme examples.

UNIT – VII

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

UNIT - VIII

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack application-infix to postfix conversion, postfix expression evaluation, recursion implementation, Queues-operations, array and linked representations.

TEXT BOOKS :

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Fifth Edition, Pearson education.

REFERENCES:

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education
3. C Programming with problem solving, J.A. Jones & K. Harrow, dreamtech Press
4. Programming in C – Stephen G. Kochan, III Edition, Pearson Eductaion.
5. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition
6. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI
7. C Programming & Data Structures, E. Balagurusamy, TMH.
8. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
9. C& Data structures – E V Prasad and N B Venkateswarlu, S. Chand&Co.

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ENGINEERING DRAWING

UNIT – I

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

a) Conic Sections including the Rectangular Hyperbola – General method only.
b) Cycloid, Epicycloid and Hypocycloid
c) Involute.
d) Scales: Different types of Scales, Plain scales comparative scales, scales of chords.

UNIT – II

DRAWING OF PROJECTIONS OR VIEWS ORTHOGRAPHIC PROJECTION IN FIRST ANGLE

PROJECTION: Principles of Orthographic Projections – Conventions – First and Third Angle, Projections of Points and Lines inclined to both planes, True lengths, traces.

UNIT – III

PROJECTIONS OF PLANES & SOLIDS: Projections of regular Planes, auxiliary planes and Auxiliary projection inclined to both planes. Projections of Regular Solids inclined to both planes – Auxiliary Views.

UNIT – IV

SECTIONS AND SECTIONAL VIEWS:- Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

UNIT – V

DEVELOPMENT AND INTERPENETRATION OF SOLIDS: Development of Surfaces of Right, Regular Solids – Prisms, Cylinder, Pyramid Cone and their parts. Interpenetration of Right Regular Solids

UNIT - VI

INTERSECTION OF SOLIDS:- Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

UNIT –VII

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

UNIT – VIII

TRANSFORMATION OF PROJECTIONS : Conversion of Isometric Views to Orthographic Views – Conventions, Introduction to perspective projections(Practise not required)

TEXT BOOK :

1. Engineering Drawing, N.D. Bhat / Charotar
2. Engineering Drawing and Graphics, Venugopal / New age.
3. Engineering Drawing – Basant Agrawal, TMH

REFERENCES :

1. Engineering drawing – P.J. Shah.S.Chand.
2. Engineering Drawing, Narayana and Kannaiah / Scitech publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill.
4. Computer Aided Engineering Drawing- Trymbaka Murthy- I.K. International.
5. Engineering Drawing – Grower.
6. Engineering Graphics for Degree – K.C. John.

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COMPUTER PROGRAMMING LAB

Objectives:

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

Recommended Systems/Software Requirements:

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

Week l.

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

b) A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

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

Week 2.

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

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

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

Week 3

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

i) To find the factorial of a given integer.

ii) To find the GCD (greatest common divisor) of two given integers.

iii) To solve Towers of Hanoi problem.

Week 4

a) The total distance travelled by vehicle in 't' seconds is given by distance = $ut+1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

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

Week 5

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

b) Write a C program that uses functions to perform the following:

i) Addition of Two Matrices

ii) Multiplication of Two Matrices

Week 6

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

i) To insert a sub-string in to a given main string from a given position.

ii) To delete n Characters from a given position in a given string.

b) Write a C program to determine if the given string is a palindrome or not

Week 7

a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.

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

Week 8

a) Write a C program to generate Pascal's triangle.

b) Write a C program to construct a pyramid of numbers.

Week 9

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

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

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

Print x, n, the sum

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

Week 10

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

b) Write a C program to convert a Roman numeral to its decimal equivalent.

Week 11

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

i) Reading a complex number
ii) Writing a complex number
iii) Addition of two complex numbers
iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

Week 12

a) Write a C program which copies one file to another.

b) Write a C program to reverse the first n characters in a file.

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

Week 13

a) Write a C programme to display the contents of a file.

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

Week 14

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

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

Week 15

Write C programs that implement stack (its operations) using

i) Arrays ii) Pointers

Week 16

Write C programs that implement Queue (its operations) using

i) Arrays ii) Pointers

Week 17

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

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

Week 18

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

i) Bubble sort
ii) Selection sort

Week 19
Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers :
i) Linear search ii) Binary search

Week 20
Write C program that implements the following sorting method to sort a given list of integers in ascending order:
i) Quick sort

Week 21
Write C program that implement the following sorting method to sort a given list of integers in ascending order:
i) Merge sort

Week 22
Write C programs to implement the Lagrange interpolation and Newton- Gregory forward interpolation.

Week 23
Write C programs to implement the linear regression and polynomial regression algorithms.

Week 24
Write C programs to implement Trapezoidal and Simpson methods.

Text Books
1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
3. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
4 Practical C Programming,Steve Oualline,O'Reilly,SPD. TMH publications.
5. Computer Basics and C Programming, V. Rajaraman, PHI Publications.
6. Data structures and Program Design in C,R.Kruse,C.L.Tondo,B.P.Leung,M.Shashi,Pearson Education.

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ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB

ENGINEERING PHYSICS LAB
(Any twelve experiments compulsory)

1. Dispersive power of the material of a prism – Spectrometer
2. Determination of wavelength of a source – Diffraction Grating.
3. Newton's Rings - Radius of curvature of plano convex lens.
4. Melde's experiment – Transverse and longitudinal modes.
5. Time constant of an R-C circuit.
6. L-C-R circuit.
7. Magnetic field along the axis of current carrying coil – Stewart and Gees method.
8. Study the characteristics of LED and LASER sources.
9. Study the characteristics of p-i-n and avalanche photodiode detectors.
10. Bending losses of fibres.
11. Evaluation of numerical aperture of given fibre.
12. Energy gap of a material of p-n junction.
13. Thermo electric effect – Seebeck effect and Peltier effect.
14. Torsional pendulum.
15. Single slit diffraction using laser.

ENGINEERING CHEMISTRY LAB
List of Experiments (Any 12 of the following):

Titrimetry:

a. Estimation of hardness of water by EDTA method. (or)
Estimation of calcium in limestone by Permanganometry.

Mineral Analysis:

2 Determination of percentage of copper in brass

3 Estimation of manganese dioxide in pyrolusite.

Instrumental Methods:

4. **Colorimetry:**
Determination of ferrous iron in cement by colorimetric method.
(Or) Estimation of Copper by Colorimetric method.
5. **Conductometry:**
Conductometric titration of strong acid Vs strong base.
(or) Conductometric titration of mixture of acids Vs strong base.
6. **Potentiometry:**
Titration of strong acid Vs strong base by potentiometry.
(or) Titration of weak acid Vs strong base by potentiometry.

Physical Properties:

7. Determination of viscosity of sample oil by redwood/oswald's viscometer
8. Determination Surface Tension of lubricants.

Identification and Preparations:

9. Identification of functional groups present in organic compounds.
10. Preparation of organic compounds
Asprin (or) Benzimidazole

Kinetics:

11. To determine the rate constant of hydrolysis of methyl acetate catalysed by an acid and also the energy of activation. (or) To study the kinetics of reaction between $K_2S_2O_8$ and KI.
12. Demonstration Experiments (Any One of the following) :
    a. Determination of dissociation constant of weak acid-by PH metry
    b. Preparation of Thiokol rubber
    c. Adsorption on Charcoal
    d. Heat of reaction

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

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

Objectives:

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

SYLLABUS :

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

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Situational Dialogues / Role Play.
4. Oral Presentations- Prepared and Extempore.
5. 'Just A Minute' Sessions (JAM).
6. Describing Objects / Situations / People.
7. Information Transfer
8. Debate
9. Telephoning Skills.
10. Giving Directions.

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:

i) P – IV Processor
   a) Speed – 2.8 GHZ
   b) RAM – 512 MB Minimum
   c) Hard Disk – 80 GB

ii) Headphones of High quality

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- The Rosetta Stone English Library.
- Clarity Pronunciation Power – Part I.
- Mastering English in Vocabulary, Grammar, Spellings, Composition
- Dorling Kindersley series of Grammar, Punctuation, Composition etc.
- Language in Use, Foundation Books Pvt Ltd with CD.
- Oxford Advanced Learner's Compass, 7th Edition.
- Learning to Speak English - 4 CDs.
- Vocabulary in Use, Michael McCarthy, Felicity O'Den, Cambridge.
- Murphy's English Grammar, Cambridge with CD.
- English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

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

1. **A Handbook for English Language Laboratories** – Prof. E. Suresh Kumar, P. Sreehari, Foundation Books.
2. **Effective Communication & Public Speaking** by S. K. Mandal**,** Jaico Publishing House.
3. **English Conversation Practice** by Grant Taylor, Tata McGraw Hill.
4. **Speaking English effectively** by Krishna Mohan, N. P. Singh, Mac Millan Publishers.
5. **Communicate or Collapse: A Handbook of Efffective Public Speaking, Group Discussions and Interviews**, by Pushpa Lata & Kumar**,** Prentice-Hall of India.
6. **Learn Correct English, Grammar, Usage and Composition** by Shiv. K. Kumar & Hemalatha Nagarajan, Pearson Longman
7. **Spoken English** by R. K. Bansal & J. B. Harrison, Orient Longman.
8. **English Language Communication: A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr. G. Natanam & Prof. S. A. Sankaranarayanan, Anuradha Publications, Chennai.
9. **Effective Technical Communication**, M. Ashraf Rizvi, Tata McGraw-Hill.
10. **A Practical Course in English Pronunciation**, (with two Audio cassettes) by J. Sethi, Kamlesh Sadanand & D.V. Jindal, Prentice-Hall of India Pvt. Ltd., New Delhi.
11. **A text book of English Phonetics for Indian Students** by T. Balasubramanian, Mac Millan
12. **Spoken English: A foundation Course, Parts 1 & 2, Kamalesh Sadanand and Susheela punitha**, Orient Longman

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Paper:

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

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IT WORKSHOP/ ENGINEERING WORKSHOP

Objectives :

The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel and Power Point

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

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

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

PC Hardware

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

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

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

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

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

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

Internet & World Wide Web

Week 7 - Task 1 : **Orientation & Connectivity Boot Camp :** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Week 8 - Task 2 : Web Browsers, Surfing the Web : Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Week 9 - Task 3 : **Search Engines & Netiquette :** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Week 10 - Task 4 : Cyber Hygiene : Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install an anti virus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Productivity tools

LaTeX and Word

Week 11 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

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

Week 12 - Task 2 : Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Week 13 - Task 3 : Creating a Newsletter : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel

Week 14 - Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

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

Week 15 - Task 2 : Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting

LaTeX and MS/equivalent (FOSS) tool Power Point

Week 16 - Task1 : Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Week 17- Task 2 : Second week helps students in making their presentations interactive. Topic covered during this week includes : Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

Week 18 - Task 3 : Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes :- Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

REFERENCES :

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill
4. Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education
5. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech

6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
7. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft)

ENGINEERING WORKSHOP

1. TRADES FOR EXERCISES :

At least two exercises from each trade:

1. House Wiring
2. Carpentry
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Fitting

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Metal Cutting (Water Plasma)
2 Power Tools in Construction, wood working, Electrical Engineering and Mechanical Engineering

TEXT BOOK:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana, Scitech Publishers.
2 Workshop Manual by Venkat Reddy

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MATHEMATICS – III

UNIT – I: Special Functions I
Gamma and Beta Functions, Series solutions to differential equations, – Their properties – evaluation of improper integrals. Bessel functions – properties – Recurrence relations – Orthogonality.

UNIT-II: Special Functions II
Legendre polynomials – Properties – Rodrigue's formula – Recurrence relations – Orthogonality. Chebycher's polynomials – properties – recurrence relations - Orthogonality

UNIT-III: Functions of a complex variable
Continuity – Differentiability – Analyticity – Properties – Cauchy-Riemann conditions, Maxima – Minima principle, Harmonic and conjugate harmonic functions – Milne – Thompson method. Elementary functions, general power Z^c principal value Logarithmic function.

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

UNIT-V: Complex power series
Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point –Isolated singular point – pole of order m – essential singularity. (Distinction between the real analyticity and complex analyticity)

UNIT-VI: Contour Integration
Residue – Evaluation of residue by formula and by Laurent series - Residue theorem.

UNIT-VII: Evaluation of integrals of the type

(a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$ (b) $\int_{c}^{c+2\pi} f(\cos\theta, \sin\theta)d\theta$

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

MATLAB/R introduction

UNIT-VIII: Conformal mapping

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

TEXT BOOKS:

1. Engineering Mathematics by B.V.Ramana, Tata Mc.Grawhill Publications
2. Engineering Mathematics – III by T.K.V. Iyengar, B.Krishna Gandhi and Others – S.Chand.
3. Introduction to MATLAB by Rudragupta

REFERENCES:

1. Higher Engineering Mathematics by B.S. Grewal Khanna Publications.
2. Advance Engineering Mathematics by Jain & S.R.K. Iyengar, Narasa Publications.
3. Complex Variables by R.V. Churchill.
4. Advanced Engineering Mathematics by Allen Jaffrey Academic Press.
5. Engineering Mathematics – III by P.B. Bhaskara Rao, S.K.V.S.Rama Chary, M.Bhujanga Rao & Others.
6. Engineering Mathematics – III by C. Shankaraiah, V.G.S. Book Links.

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PROBABILITY THEORY AND STOCHASTIC PROCESSES

Unit I: Probability
Probability introduced through Sets and Relative Frequency, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Probability as a Relative Frequency, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, Independent Events.

Unit II: Random Variable
Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variables, Distribution and Density functions and their Properties - Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh and Conditional Distribution, Methods of defining Conditional Event, Conditional Density, Properties.

Unit III: Operation on One Random Variable – Expectations
Introduction, Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function, Transformations of a Random Variable: Monotonic Transformations for a Continuous Random Variable, Nonmonotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable.

Unit IV: Multiple Random Variables
Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Interval conditioning, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem (Proof not expected), Unequal Distribution, Equal Distributions.

Unit V: Operations on Multiple Random Variables
Expected Value of a Function of Random Variables: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables.

Unit VI: Stochastic Processes – Temporal Characteristics
The Stochastic Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Concept of Stationarity and Statistical Independence, First-Order Stationary Processes, Second-Order and Wide-Sense Stationarity, Nth Order and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and its Properties, Cross-Correlation Function and its Properties, Covariance and its Properties, Linear System Response of Mean and Mean-squared Value, Autocorrelation Function, Cross-Correlation Functions, Gaussian Random Processes, Poisson Random Process.

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

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

TEXT BOOKS:

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, 4 ed., 2001, TMH.
2. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis and S. Unnikrishna Pillai, 4 ed., TMH.
3. Principles of Communication systems – H.Taub, Donald.L.Schilling, Goutam Saha, 3 ed., 2007, TMH.

REFERENCES:

1. Theory of Probability and Stochastic Processes- Pradip Kumar Gosh, University Press
2. Probability Theory and Stochastic Processes- Mallikarjuna Reddy, Cengage Learning.
3. Probability and Random Processes with Application to Signal Processing – Henry Stark and John W. Woods, 3 ed., PE
4. Probability Methods of Signal and System Analysis - George R. Cooper, Clave D. MC Gillem, 3 ed., 1999, Oxford.
5. Statistical Theory of Communication - S.P. Eugene Xavier, 1997, New Age Publications.

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ENVIRONMENTAL STUDIES

UNIT-I**: ECOSYSTEMS**: Concept of ecosystem, Classification of ecosystem, Functions of ecosystem, Food chains, Food webs and ecological pyramids, Flow of energy, Biogeochemical cycles, Biomagnification, carrying capacity.

UNIT-II:**NATURAL RESOURCES**: Classification of Resources: Living and Non-Living resources, Renewable and Non-Renewable resources. Water resources: use and over utilization, Land resources, land degradation, Forest resources, Mineral resources uses. Energy resources: growing energy needs, use of alternate energy sources-case studies. Environmental effects due to exploitation of various resources.

UNIT-III: **BIODIVERSITY AND BIOTIC RESOURCES**: Species, ecosystem diversity, Hotspots, Value of biodiversity, Threats to biodiversity, Conservation of biodiversity: In-Situ and Ex-Situ conservation, Biological disasters, pandemic and epidemics, Biological warfare.

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

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

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

UNIT-VII: **ENVIRONMENTAL POLICY, LEGISLATION, RULES AND REGULATIONS:** National Environmental Policy, Environmental Protection Act, Legal aspects, Air (Prevention and control of pollution) Act-1981, Water (Prevention and control of pollution) Act-1974, Water pollution Cess Act-1977, Forest Conservation Act, solid waste (biomedical waste and hazardous waste)management and handling rules.

UNIT-VIII: **TOWARDS SUSTAINABLE FUTURE**: Concept of Sustainable Development, Threats to Sustainability, Strategies for achieving Sustainable development, Environmental Ethics, Environmental Economics, Concept of Green Computing, Green chemistry and low Carbon life styles..

Text Book:

1. TEXT BOOK OF ENVIRONMENTAL Science and Technology by M.Anji Reddy 2007
2. Principles of Environmental Science and Engineering by P.Venugopal Rao
3. Introduction to Environmental Studies by K.Mukkanti

References

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

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ELECTRICAL CIRCUITS

Unit – I: Introduction to Electrical Circuits
Circuit Concept, R-L-C Parameters, Voltage and Current Sources, Independent and Dependent Sources, Source Transformation, Voltage – Current relationship for Passive Elements (for different input signals –Square, Ramp, Saw tooth and Triangular).

Unit - II:
Kirchoff's Laws, Network Reduction Techniques – Series, Parallel, Series Parallel, Star –to-Delta or Delta-to-Star Transformations, Nodal Analysis, Mesh Analysis, Supernode and Super mesh for DC Excitations.

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 & 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: Magnetic Circuits
Magnetic Circuits, Faraday's law 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 – VI: Network Topology
Definitions, Graph, Tree, Basic cutset and Basic Tie set Matrices for Planar Networks, Loop and Nodal methods for analysis of Networks with Dependent & Independent Voltage and Current Sources, Duality & Dual Networks.

Unit – VII: Network Theorems (With D.C)
Tellegen's, Superposition, Reciprocity, Thevinin's, Norton's, Maximum Power Transfer, Milliman's and Compensation theorems for D.C excitations.

Unit – VIII: Network Theorems (With A.C)
Tellegen's, Superposition, Reciprocity, Thevinin's, Norton's, Maximum Power Transfer , Milliman's and Compensation theorems for A.C excitations.

Text Books:

1. Engineering Circuit Analysis - W.H. Hayt and J. E. Kemmerly and S.M.Durbin, 6 ed., 2008, TMH.
2. Circuits & Networks – A.Sudhakar, Shyammohan S. Pillai, 3 ed., 2009, TMH.
3. Electric Circuits by A.Chakrabarhty, Dhanipat Rai & Sons.

Reference Books:

1. Network Analysis – M.E.Vanvalkenburg, 3 ed., PHI.
2. Linear Circuit Analysis- Raymond A. DeCarlo and Pen-Min-Lin, 2 ed., 2004,Oxford University Press.
3. Network Theory - N.C.Jagan & C.Lakshminarayana, 2006, BSP.
4. Electric Circuit Theory – K.Rajeswaran, 2004, PE
5. Basic Circuit Analysis – D.R. Cunnigham & J.A.Stuller, Jaico Publications.

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ELECTRONIC DEVICES AND CIRCUITS

Unit- I: p-n Junction Diode

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

Unit- II: Rectifiers and Filters

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

Unit- III: Bipolar Junction Transistor

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

Unit- IV: Transistor Biasing and Stabilization

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

Unit- V: Small Signal Low Frequency BJT Models

BJT Hybrid Model, Determination of h-parameters from Transistor Characteristics, Analysis of a Transistor Amplifier Circuit using h-Parameters, Comparison of CB, CE, and CC Amplifier Configurations.

Unit-VI: Field Effect Transistor

The Junction Field Effect Transistor (Construction, principle of operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes.

Unit VII: FET Amplifiers

FET Common Source Amplifier, Common Drain Amplifier, Generalized FET Amplifier, Biasing FET, FET as Voltage Variable Resistor, Comparison of BJT and FET.

Unit VIII: INDUSTRIAL ELECTRONIC DEVICES & APPLICATIONS:

Negative resistance Devices, Unijunction Transistor(UJT), UJT Relaxation Oscillator, Programmable UJT(PUT), Silicon Controlled Rectifier(SCR), Transient Effect in SCR, Light Activated SCR(LASCR), SILICON Controlled Switch(SCS), Schottky Barrier Diode, DIAC,TRIAC Diodes & their characteristics.

Text Books

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2ed., 1998, TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 ed., 2006, PEI/PHI.
3. Introduction to Electronic Devices and Circuits - Rober T. Paynter, PE.

References

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 ed., 2008, TMH.
2. Electronic Devices and Circuits - K. Lal Kishore, 2 ed., 2005, BSP.
3. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal, 1 ed., 2009, Wiley India Pvt. Ltd.
4. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 ed., 2008, TMH.

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SIGNALS AND SYSTEMS

Unit I : Signal Analysis
Analogy between Vectors and Signals, Orthogonal Signal Space, Signal approximation using Orthogonal functions, Mean Square Error, Closed or complete set of Orthogonal functions, Orthogonality in Complex functions, Exponential and Sinusoidal signals, Concepts of Impulse function, Unit Step function, Signum function.

Unit II : Fourier 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.

Unit III : Fourier Transforms
Deriving Fourier Transform from Fourier Series, Fourier Transform of arbitrary signal, Fourier Transform of standard signals, Fourier Transform of Periodic Signals, Properties of Fourier Transform, Fourier Transforms involving Impulse function and Signum function, Introduction to Hilbert Transform.

Unit IV : Signal Transmission Through Linear Systems
Linear System, Impulse response, Response of a Linear System, Linear Time Invariant (LTI) System, Linear Time Variant (LTV) System, Transfer function of a LTI system, Filter characteristics of Linear Systems, Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between Bandwidth and Rise time.

Unit V : Convolution and Correlation of Signals
Concept of convolution in Time domain and Frequency domain, Graphical representation of Convolution, Convolution property of Fourier Transforms, Cross Correlation and Auto Correlation of functions, Properties of Correlation function, Energy density spectrum, Parseval's Theorem, Power density spectrum, Relation between Auto Correlation function and Energy/Power spectral density function, Relation between Convolution and Correlation, Detection of periodic signals in the presence of Noise by Correlation, Extraction of signal from noise by filtering.

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

Unit VII : Laplace Transforms
Review of Laplace Transforms (L.T), Partial fraction expansion, Inverse Laplace Transform, Concept of Region of Convergence (ROC) for Laplace Transforms, Constraints on ROC for various classes of signals, Properties of L.T, Relation between L.T and F.T of a signal, Laplace Transform of certain signals using waveform synthesis.

Unit VIII : Z–Transforms
Fundamental difference between Continuous and Discrete time signals, Discrete time signal representation using Complex exponential and Sinusoidal components, Periodicity of Discrete time signal using complex exponential signal, Concept of Z- Transform of a Discrete Sequence, Distinction between Laplace, Fourier and Z Transforms, Region of Convergence in Z-Transform, Constraints on ROC for various classes of signals, Inverse Z-transform, Properties of Z-transforms.

Text Books:

1. Signals, Systems & Communications - B.P. Lathi, 2009, BSP.
2. Signals and Systems – A.Rama Krishna Rao – 2008, TMH.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2 ed., PHI.

References:

1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2 ed.
2. Introduction to Signal and System Analysis – K.Gopalan 2009, CENGAGE Learning.
3. Fundamentals of Signals and Systems - Michel J. Robert, 2008, MGH International Edition.
4. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, 3 ed., 2004, PE.

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ELECTRONIC DEVICES AND CIRCUITS LAB

PART A: (Only for Viva-voce Examination)

ELECTRONIC WORKSHOP PRACTICE (in 3 lab sessions) :

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of
   - Multimeters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies
   - CRO.

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

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Input & Output Characteristics of Transistor in CB Configuration.
4. Input & Output Characteristics of Transistor in CE Configuration.
5. Half Wave Rectifier with & without filters
6. Full Wave Rectifier with & without filters
7. FET characteristics
8. Measurement of h parameters of transistor in CB, CE, CC configurations
9. Frequency Response of CE Amplifier.
10. Frequency Response of Common Source FET amplifier
11. SCR characteristics.
12. UJT Characteristics
13. Triac Characteristics
14. Apllication in Power control Triac.

PART C:

Equipment required for Laboratories:

1.	Regulated Power supplies (RPS)	-	0-30 V
2.	CRO's	-	0-20 MHz.
3.	Function Generators	-	0-1 MHz.
4.	Multimeters		
5.	Decade Resistance Boxes/Rheostats		
6.	Decade Capacitance Boxes		
7.	Ammeters (Analog or Digital)	-	0-20 µA, 0-50µA, 0-100µA, 0-200µA, 0-10 mA.
8.	Voltmeters (Analog or Digital)	-	0-50V, 0-100V, 0-250V
9.	Electronic Components	-	Resistors, Capacitors, BJTs, LCDs, SCRs, UJTs, FETs, LEDs, MOSFETs,diodes Ge& Si type, Transistors – npn,pnp type)

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BASIC SIMULATION LAB

List of Experiments:

1. Basic Operations on Matrices.
2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
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 Signals and Sequences.
7. Verification of Linearity and Time Invariance Properties of a given Continuous/Discrete System.
8. Computation of unit sample, unit step and sinusoidal responses of the given LTI system and verifying its physical 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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PRINCIPLES OF ELECTRICAL ENGINEERING

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

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

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

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

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

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

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

Text Books :
1.Fundamentals of Electric Circuits – Charles K. Alexander, Mathew N. O. Sadiku, 3 ed., 2008,TMH.
2. Network Analysis – A Sudhakar ,Shyammohan S.Palli, 3 ed., 2009, TMH.
3. Introduction to Electrical Engineering – M.S.Naidu and S. Kamakshaiah, 2008, TMH.

Reference Books :
1. Networks, Lines and Fields – John.D.Ryder, 2 ed.,, 2008 (Reprint), PHI.
2. Engineering Circuit Analysis - W.H.Hayt and J. E Kemmerly and S.M.Durbin, 6 ed., 2008, TMH.
3. Network analysis and Synthesis – C L Wadhwa, 3 ed., 2007, New Age International Publishers.
4. Network Analysis – N.C.Jagan and C.Lakshmi Narayana, BSP, 2006.
5. Electric Circuits – Nilsson, Riedel, 8 ed., PE.

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ELECTRONIC CIRCUIT ANALYSIS

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

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

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

Unit –IV : MOS Amplifiers [3]
Basic concepts, MOS Small signal model, Common source amplifier with Resistive load, Diode connected Load and Current Source Load, Source follower, Common Gate stage Cascode and Folded Cascode Amplifier and their Frequency response.

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

Unit – VI: Oscillators
Classification of Oscillators, Conditions for Oscillations, RC Phase Shift Oscillator, Generalized analysis of LC oscillators - Hartley, and Colpitts Oscillators, Wien-Bridge & Crystal Oscillators, Stability of Oscillators.

Unit – VII: Large Signal Amplifiers
Classification, Class A Large Signal Amplifiers, Transformer Coupled Class A Audio Power Amplifier, Efficiency of Class A Amplifier, Class B Amplifier, Efficiency of Class B Amplifier, Class-B Push-Pull Amplifier, Complementary Symmetry Class B Push-Pull Amplifier, Class C Amplifier, Thermal Stability and Heat Sinks.

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

TEXT BOOKS:

1. Integrated Electronics - Jacob Millman and Christos C Halkias, 1991 ed., 2008, TMH.
2. Electronic Devices and Circuits - S. Salivahanan, N.Suresh Kumar, A Vallavaraj, 2 ed., 2009, TMH.
3. Design of Analog CMOS Integrated Circuits – Behzad Razavi, 2008, TMH.

REFERENCES:

1. Electronic Devices and Circuit Theory - Robert L.Boylestad, Louis Nashelsky, 9 ed., 2008 PE.
2. Introductory Electronic Devices and Circuits– Robert T. Paynter, 7 ed., 2009, PEI.
3. Electronic Circuit Analysis – K. Lal Kishore, 2004, BSP.
4. Electronic Devices and Circuits, David A. Bell – 5 ed., Oxford University Press.
5. Microelectric Circuits – Sedra and Smith – 5 ed., 2009, Oxford University Press.

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PULSE AND DIGITAL CIRCUITS

Unit-I

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

Unit- II

Non-Linear Wave Shaping: Diode clippers, Transistor clippers, Clipping at two independent levels, Comparators, Applications of Voltage comparators. Clamping Operation, Clamping circuit taking Source and Diode resistances into account, Clamping Circuit Theorem, Practical Clamping Circuits, Effect of Diode Characteristics on Clamping Voltage, Synchronized Clamping.

Unit-III

Switching Characteristics of Devices : Diode as a Switch, Piecewise Linear Diode Characteristics, Diode Switching times, Transistor as a Switch, Break down voltages, Transistor in Saturation, Temperature variation of Saturation Parameters, Transistor-switching times, Silicon-controlled-switch circuits.

Unit-IV

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

Unit-V

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, Transistor Current Time Base Generators, Methods of Linearity improvement.

Unit-VI

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

Unit-VII

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

Unit-VIII

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

Text Books:

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

References:

1. Pulse and Digital Circuits – A. Anand Kumar, 2005, PHI.
2. Fundamentals of Pulse and Digital Circuits- Ronald J. Tocci, 3 ed., 2008.
3. Pulse and Digital Circuits – Motheki S. Prakash Rao, 2006, TMH.
4.Wave Generation and Shaping - L. Strauss.

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SWITCHING THEORY AND LOGIC DESIGN

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

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

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

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

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

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

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

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

TEXTBOOKS:

1. Switching & Finite Automata theory – Zvi Kohavi, 2 ed., TMH.
2. Digital Design – Morris Mano, 3 ed., 2006, PHI.
3. Switching Theory and Logic Design – A. Anand Kumar, 2008, PHI.

REFERENCES:

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

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ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

UNIT I

Electrostatics – I : Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Illustrative Problems.

UNIT II

Electrostatics – II:

Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial, Spherical Capacitors, Illustrative Problems.

UNIT III

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

UNIT IV

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

UNIT V

EM Wave Characteristics - I: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media, Conductors & Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics, Polarization, Illustrative Problems.

UNIT VI

EM Wave 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 VII

Transmission Lines - I : Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Lossless ness/Low Loss Characterization, Distortion – Condition for Distortionlessness and Minimum Attenuation, Loading - Types of Loading, Illustrative Problems.

UNIT VIII

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

TEXT BOOKS:

1. Elements of Electromagnetics – Matthew N.O. Sadiku, 4 ed., 2008, Oxford Univ.Press.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, 2 ed., 2000, PHI.
3. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan, 2001, (Tech. India Publications), New Delhi.

REFERENCES:

1. Engineering Electromagnetics – Nathan Ida, 2 ed., 2005, Springer (India) Pvt. Ltd., New Delhi.
2. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, 7 ed., 2006, TMH.
3. Networks, Lines and Fields – John D. Ryder, 2 ed., 1999, PHI.

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ELECTRICAL ENGINEERING LAB

PART – A

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

Note: Any **12** of the above experiments are to be conducted

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ELECTRONIC CIRCUIT ANALYSIS LAB

List of Experiments (12 experiments to be done) :

I) Design and Simulation in Simulation Laboratory using any Simulation Software.
(Any 6 Experiments):

1. Common Emitter Amplifier
2. Common Source Amplifier
3. Two Stage RC Coupled Amplifier
4. Current shunt and Voltage Series Feedback Amplifier
5. Cascode Amplifier
6. Wien Bridge Oscillator using Transistors
7. RC Phase Shift Oscillator using Transistors
7. Class A Power Amplifier (Transformer less)
9. Class B Complementary Symmetry Amplifier
10. Common Base (BJT) / Common Gate (JFET) Amplifier.

II) Testing in the Hardware Laboratory (6 Experiments)

A) Any Three circuits simulated in Simulation laboratory
B) Any Three of the following
   1. Class A Power Amplifier (with transformer load)
   2. Class C Power Amplifier
   3. Single Tuned Voltage Amplifier
   4. Hartley & Colpitt's Oscillators
   5. Darlington Pair
   6. MOS Amplifier

Equipments required for Laboratories:

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

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

3. Win XP/ Linux etc.

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PULSE AND DIGITAL CIRCUITS LAB

Minimum Twelve experiments to be conducted:

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

Equipment required for Laboratories:

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

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CONTROL SYSTEMS

Objective :

In this course it is aimed to introduce to the students the principles and applications of control systems in every day life. The basic concepts of block diagram reduction, time domain analysis solutions to time invariant systems and also deals with the different aspects of stability analysis of systems in frequency domain and time domain.

UNIT – I INTRODUCTION

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

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

UNIT II TRANSFER FUNCTION REPRESENTATION

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

UNIT-III TIME RESPONSE ANALYSIS

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

UNIT – IV 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 – V FREQUENCY RESPONSE ANALYSIS

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

UNIT – VI STABILITY ANALYSIS IN FREQUENCY DOMAIN

Polar Plots-Nyquist Plots-Stability Analysis.

UNIT – VII CLASSICAL CONTROL DESIGN TECHNIQUES

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

UNIT – VIII State Space Analysis of Continuous Systems

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

TEXT BOOKS:

1. Automatic Control Systems 7th edition– by B. C. Kuo 2009– PHI/Jhon wiley 8ed
2. Control Systems Principles and Desgin – by I M. Gopal, TMH3nd edition 2008.

REFERENCE BOOKS:

1. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.
2. Control Systems by Anand Kumar,PHI 2008.
3. Control Systems Engg. by NISE 5th Edition – John wiley
4. "Modelling & Control Of Dynamic Systems" by Narciso F. Macia George J. Thaler, cengage Publishers.

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COMPUTER ORGANIZATION

UNIT I :
BASIC STRUCTURE OF COMPUTERS : Computer Types, Functional unit, Basic OPERATIONAL concepts, Bus structures, Software, Performance, multiprocessors and multi computers. Data Representation. Fixed Point Representation. Floating – Point Representation. Error Detection codes.

UNIT II :
REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS : Register Transfer language.Register Transfer Bus and memory transfers, Arithmetic Mircrooperatiaons, logic micro operations, shift micro operations, Arithmetic logic shift unit. Instruction codes. Computer Registers Computer instructions
– Instruction cycle.
Memory – Reference Instructions. Input – Output and Interrupt. STACK organization. Instruction formats. Addressing modes. DATA Transfer and manipulation. Program control. Reduced Instruction set computer.

UNIT III :
MICRO PROGRAMMED CONTROL : Control memory, Address sequencing, microprogram example, design of control unit Hard wired control. Microprogrammed control

UNIT IV :
COMPUTER ARITHMETIC : Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit Decimal Arithmetic operations.

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

UNIT-VI
INPUT-OUTPUT ORGANIZATION : Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt Direct memory Access, Input –Output Processor (IOP) Serial communication; Introduction to peripheral component, Interconnect (PCI) bus. Introduction to
standard serial communication protocols like RS232, USB, IEEE1394.

UNIT VII :
PIPELINE AND VECTOR PROCESSING : Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

UNIT VIII :
MULTI PROCESSORS : Characteristics or Multiprocessors, Interconnection Structures, Interprocessor Arbitration. InterProcessor Communication and Synchronization Cache Coherance. Shared Memory Multiprocessors.

TEXT BOOKS :
1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI

REFERENCES :
1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition.
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier
5.Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

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ANTENNAS AND WAVE PROPAGATION

Unit I

Antenna Basics: Introduction, Basic Antenna Parameters – Patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain-Resolution, Antenna Apertures, Effective Height, Illustrative Problems.

Fields from Oscillating Dipole, Field Zones, Shape-Impedance Considerations, Antenna Temperature, Front - to-back Ratio, Antenna Theorems, Radiation– Basic Maxwell's Equations, Retarded Potentials – Helmholtz Theorem

Unit II

Thin Linear Wire Antennas – Radiation from Small Electric Dipole, Quarter Wave Monopole and Half Wave Dipole – Current Distributions, Field Components, Radiated Power, Radiation Resistance, Beam Width, Directivity, Effective Area and Effective Height, Natural Current Distributions, Far Fields and Patterns of Thin Linear Centre-fed Antennas of Different Lengths, Illustrative Problems. Loop Antennas - Introduction, Small Loop, Comparison of Far Fields of Small Loop and Short Dipole, Radiation Resistances and Directivities of Small and Large Loops (Qualitative Treatment).

Unit III

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

Unit IV

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

Unit V

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

Unit VI

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

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

Unit VII

Wave Propagation – I: Introduction, Definitions, Categorizations and General Classifications, Different Modes of Wave Propagation, Ray/Mode Concepts. Ground Wave Propagation (Qualitative Treatment) – Introduction, Plane Earth Reflections, Space and Surface Waves, Wave Tilt, Curved Earth Reflections. Space Wave Propagation – Introduction, Field Strength Variation with Distance and Height, Effect of Earth's Curvature, Absorption. Super Refraction, M-Curves and Duct Propagation, Scattering Phenomena, Tropospheric Propagation, Fading and Path Loss Calculations.

Unit VIII

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

TEXT BOOKS:

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

REFERENCES:

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

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ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

UNIT – I

Block Schematics of Measuring Systems, Performance Characteristics, Static Characteristics, Accuracy, Precision, Resolution, Types of Errors, Gausian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag ;Measuring Insturments: DC Voltmeters, D' Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Multimeters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments.

UNIT – II

Electronic Voltmeters, Multimeters, AC, DC Meters, Digital Voltmeters: Ramp Type, Staircase Ramp, Dual slope Integrating type, Successive Approximation Type, Autoranging, $3\frac{1}{2}$, $3\frac{3}{4}$ Digit display, Pico ammeter, High Resistance Measurements, Low Current Ammeter, Applications; Signal Generators: AF, RF Signal Generators, Sweep frequency Generators, Pulse and Square wave Generators, Function Generators, Arbitrary waveform Generator, Video signal Generators, Specifications.

UNIT – III

Signal Analyzers, AF, HF Wave Analyzers, Harmonic Dustortion, Heterodynewave Analyzers, Spectrum Analyzers, Power Analyzers, Capacitance-Voltage Meters, Oscillators.

UNIT – IV

DC and AC Bridges: Wheat stone Bridge, Kelvin Bridge, AC Bridges, Maxwell, Hay, Schering, Wien, Anderson Bridges, Resonance Bridge, Similar Angle Bridge, Wagners' ground connection, Twin T, Bridged T Networks, Detectors.

UNIT – V

Oscilloscopes: CRT, Block Schematic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes, High Frequency CRO Considerations, Delay lines, Applications, Specifications.

UNIT – VI

Special purpose oscilloscopes: Dual Trace, Dual Beam CROs, Sampling oscilloscopes, Storage oscilloscopes, Digital Storage CROs, Frequency Measurement, Period Measurement, Errors in Time/Frequency measurements, universal counters, Extension of range; Recorders: Strip-Chart, X-Y, Oscillographic recorders.

UNIT – VII

Transducers: Classification, Strain gauges, Bonded, unbounded; Force and Displacement Tranducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Themocouples, Synchros. Special Resistance Thermometers, Digital Temperature sensing system. Piezoelectric Transducers, Variable Capacitance Transducers, Magneto strictive Transducers.

UNIT – VIII

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

TEXT BOOKS:

1. Electronic Measurements and Insturmentation – K. Lal Kishore, Pearson Education 2010.
2. Electronic Instrumentation: H.S.Kalsi – TMH, 2nd Edition 2004.

REFERENCE BOOKS:

1. Electronic Instrumentation and Measurements – David A. Bell, Oxford Univ. Press, 1997.
2. Modern Electronic Instrumentation and Measurment Techniques: A.D. Helbincs, W.D. Cooper: PHI 5th Edition 2003.
3. Electronic Measurements and Instrumentation: B.M. Oliver, J.M. Cage TMH Reprint 2009.
4. Industrial Instrumentation: T.R. Padmanabham Springer 2009.

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ANALOG COMMUNICATIONS

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

UNIT II
DSB MODULATION: Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Ring Modulator, Coherent detection of DSB-SC Modulated waves, COSTAS Loop. Radio Transmitters-Classification of Transmitters, AM transmitter block diagram and explanation of each block.

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

UNIT IV
ANGLE MODULATION CONCEPTS: Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Comparison of FM & AM.

UNIT V
ANGLE MODULATION METHODS: Generation of FM Waves: Direct Method: Parametric Variation Method: Varactor Diode, Reactance Modulator, indirect Method: Armstrong Method, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Foster Seeley Discriminator, Ratio detector, FM transmitter block diagram and explanation of each block.

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

UNIT VII
RECEIVERS : Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.

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

TEXTBOOKS:

1. Principles of Communication Systems – H Taub & D. Schilling, Gautam Sahe, TMH, 2007 3rd Edition
2. Principles of Communication Systems - Simon Haykin, John Wiley, 2nd Edition,.

REFERENCES:

1. Electronics & Communication System – George Kennedy and Bernard Davis, 4th Edition TMH 2009
2. Analog Communications- KN Hari Bhat & Ganesh Rao, Pearson Publications, 2nd Edition. 2008.
3. Communication Systems Second Edition – R.P. Singh, SP Sapre, TMH, 2007
4. Communication Systems – B.P. Lathi, BS Publication, 2006.

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IC APPLICATIONS

PART 1: LINEAR INTEGRATED CIRCUITS

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

UNIT II: OP-AMP APPLICATIONS
Basic Applications of Op-Amp, Instrumentation Amplifier, AC Amplifier, V to I and I to V Converters, Sample & Hold Circuits, Differentiators and Integrators, Comparators, Schmitt Trigger, Multivibrators, Introduction to Voltage Regulators, Features of 723 Regulator.

UNIT III: ACTIVE FILTERS & OSCILLATORS
Introduction, First Order and Second Order Low Pass, High Pass and Band Pass Filters, Active Band Reject and All Pass Filters.
Principle of Operation and Types of Oscillators – RC, Wien Bridge and quadrature type. Waveform Generators – Triangular, Saw Tooth, Square Wave.

UNIT IV: TIMERS & PHASE LOCKED LOOPS
Introduction to 555 Timer, Functional Diagram, Monostable and Astable Operations and Applications, Schmitt Trigger, PLL - Introduction, Block Schematic, Principles and Description of Individual Blocks of 565, VCO.

PART 2: DATA CONVERTER INTEGRATED CIRCUITS

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

PART 3: DIGITAL INTEGRATED CIRCUITS

UNIT VI: INTRODUCTION
Classification of Integrated Circuits, Standard TTL NAND Gate- Analysis & Characteristics, TTL Open Collector Outputs, Tristate TTL, MOS & CMOS open drain and tristate outputs, Comparison of Various Logic Families, IC interfacing- TTL driving CMOS & CMOS driving TTL.

UNIT VII: COMBINATIONAL CIRCUIT ICs
Use of TTL-74XX Series & CMOS 40XX Series ICs, TTL ICs - Code Converters, Decoders, Demultiplexers, Encoders, Priority Encoders, multiplexers & their applications, Priority Generators, Arithmetic Circuit ICs-Parallel Binary Adder/Subtractor Using 2's Complement System, Magnitude Comparator Circuits.

UNIT VIII: SEQUENTIAL CIRCUIT ICs
Commonly Available 74XX & CMOS 40XX Series ICs – RS, JK, JK Master-Slave, D and T Type Flip-Flops & their Conversions, Synchronous and asynchronous counters, Decade counters, Shift Registers & applications.

TEXT BOOKS:

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

REFERENCES:

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

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ANALOG COMMUNICATIONS LAB

Note: Minimum 12 experiments should be conducted:

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

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

Equipment required for Laboratories:

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

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IC APPLICATIONS LAB

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

List of Experiments:

Part-1: TO VERIFY THE FOLLOWING FUNCTIONS.

Adder, Subtractor, Comparator using IC 741 Op-Amp.
Integrator and Differentiator using IC741 Op-Amp.
Active Low Pass & High Pass Butterworth (second Order).
RC Phase Shift and Wien Bridge Oscillators using IC 741 Op-Amp.
IC 555 timer in Monostable operation.
Schmitt trigger circuits using IC 741 & IC 555.
IC 565 – PLL applications
Voltage regulator IC 723, three terminal voltage regulators- 7805, 7809, 7912.
Sample and Hold LF 398 IC.

Part-2: TO VERIFY THE FUNCTIONALITY of the following 74 series TTL ICs.

D Flip –Flop (74LS74) and JK Master-Slave Flip-Flop (74 LS73}.
Decade counter (74LS90) and UP-Down Counter(74 LS192).
Universal Shift registers- 74LS194/ 195.
3 -8 decoder- 74LS138.
4 bit comparator 74LS85.
8X1 Multiplexer –- 74151 and 2X4 demultiplexer – 74155.
RAM (16X4) – 74189 (read and write operations).
Stack and queue implementation using RAM, 74189.

EQUIPMENT REQUIRED:

1. 20 MHz/ 40 MHz/60 MHzOscilloscope.
2. 1 MHz Function Generator (Sine, Square, Triangular and TTL) .
3. Regulated Power Supply.

4.Multimeter / Volt Meter.

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MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

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

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

Unit III Theory of Production and Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.
Cost Analysis: Cost concepts, Opportunity cost, Fixed vs. Variable costs, Explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems)- Managerial Significance and limitations of BEA.

Unit IV Introduction to Markets & Pricing Policies:
Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.
Objectives and Policies of Pricing- Methods of Pricing: 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.

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

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

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

TEXT BOOKS:
1. Aryasri: Managerial Economics and Financial Analysis, TMH, 2009.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
REFERENCES:
1. Raghunatha Reddy & Narasimhachary: Managerial Economics& Financial Analysis, Scitech, 2009.
2. V.Rajasekarn & R.Lalitha, Financial Accounting, Pearson Education, New Delhi, 2010.
3. Suma Damodaran, Managerial Economics, Oxford University Press, 2009.
4. Domnick Salvatore: Managerial Economics in a Global Economy, 4th Edition, Cengage, 2009.
5. Subhash Sharma & M P Vittal, Financial Accounting for Management, Text & Cases, Machmillan, 2008.
6. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2008.
7. Truet and Truet: Managerial Economics:Analysis, Problems and Cases, Wiley, 2009.
8. Dwivedi:Managerial Economics, Vikas, 2009.
9. M.Kasi Reddy, S.Saraswathi: Managerial Economics and Financial Accounting, PHI, 2007.
10. Erich A. Helfert: Techniques of Financial Analysis, Jaico, 2007.

Prerequisites: Nil
Objective: To explain the basic principles of managerial economics, accounting and current business environment underlying business decision making.
Codes/Tables: Present Value Tables need to be permitted into the examinations Hall.
Question Paper Pattern: 5 Questions to be answered out of 8 questions .Out of eight questions 4 questions will be theory questions and 4 questions should be problems.
Each question should not have more than 3 bits.

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OPERATING SYSTEMS

UNIT - I

Operating Systems Overview- Operating systems functions, Overview of computer operating systems, protection and security, distributed systems, special purpose systems, operating systems structures-operating system services and systems calls, system programs, operating system structure,operating systems generation

UNIT - II

Process Management – Process concepts, threads, scheduling-criteria, algorithms, their evaluation,
Thread scheduling, case studies UNIX, Linux, Windows

UNIT - III

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

UNIT - IV

Memory Management - Swapping, contiguous memory allocation, paging, structure of the page table , segmentation, virtual memory, demand paging,page-replacement,algorithms,Allocation of frames,Thrashing case studies UNIX, Linux, Windows

UNIT - V

Principles of deadlock – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock.

UNIT - VI

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.
File System implementation- File system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance, case studies. UNIX, Linux, Windows

UNIT - VII

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.
I/O systems- Hardware, application I/o interface, kernel I/O subsystem, Transforming I/O requests to Hardware operations, STREAMS, performance.

UNIT - VIII

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

TEXT BOOKS :

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne,8th edition, John Wiley.
2. Operating systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition, TMH

REFERENCES :

1. Operating Systems – Internals and Design Principles, Stallings, sixth Edition–2009, Pearson education.
2. Modern Operating Systems, Andrew S Tanenbaum 2nd edition PHI.
3. Principles of Operating Systems , B.L.Stuart, Cengage learning, India Edition.
4. Operating Systems, A.S.Godbole,2nd Edition, TMH
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6. Operating Systems,G.Nutt,N.Chaki and S.Neogy,3rd Edition,Pearson Education.
7. Operating Systems, R.Elmasri,A,G.Carrick and D.Levine,Mc Graw Hill.
8.Operating Systems,S.Haldar,A.A.Aravind,Pearson education.

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	L	T/P/D	C
III Year B.Tech. ECE-II Sem			
6756025	**4**	**-/1/-**	**4**

OBJECT ORIENTED PROGRAMMING
(OPEN ELECTIVE)

UNIT I :

Object oriented thinking :- Need for oop paradigm, A way of viewing world – Agents, responsibility, messages, methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions, summary of oop concepts, coping with complexity, abstraction mechanisms.

UNIT II :

Java Basics History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, nested and inner classes, exploring string class.

UNIT III :

Inheritance – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class.

UNIT IV :

Packages and Interfaces : 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.
Exploring java.io.

UNIT V :

Exception handling - Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.
String handling,Exploring java.util

UNIT VI :

Multithreading- Differences between multi threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, interthread communication, thread groups, daemon threads.
Enumerations, autoboxing, annotations ,generics.

UNITVII :

Event Handling : Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.
The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

UNIT VIII :

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.
Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

TEXT BOOKS :

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

REFERENCES :

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley & sons.
2. An Introduction to OOP, third edition, T. Budd, pearson education.
3. Introduction to Java programming , Y. Daniel Liang, pearson education.
4. An introduction to Java programming and object oriented application development, R.A. Johnson- Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, eighth Edition, Pearson Education.
6. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, eighth Edition, Pearson Education
7. Object Oriented Programming with Java, R.Buyya,S.T.Selvi,X.Chu,TMH.
8. Java and Object Orientation, an introduction, John Hunt, second edition, Springer.
9. Maurach's Beginning Java2 JDK 5 , SPD.
10. Programming and Problem Solving with Java, JM Slack, B S Publications.

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NANO TECHNOLOGY
(OPEN ELECTIVE)

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

Unit-II:
Quantum Mechanical phenomenon in nanostructures:
Quantum confinement of electrons in semiconductor Nano structures, one dimensional confinement (Quantum wires), two dimensional confinements (Quantum Wells), three dimensional confinements (Quantum dots).

Unit-III
Carbon Nano Structures:
Carbon nanotubes (CNTs), Fullerenes, C60, C80 and C240 Nanostructures, Properties (mechanical, optical and electrical) and applications.

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

Unit-V
Nano scale characterization techniques:
Scanning probe techniques (AFM, MFM, STM, SEM, TEM), XRD

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

Unit-VII
Nano and molecular electronics:
Resonant-Tunneling structures, single electron tunneling, Single Electron transistors, coulomb blockade, giant magneto resistance, tunneling magneto resistance.

Unit-VIII
nanolithography and nanomanipulation:
e-beam lithography and SEM based nanolithography and nanomanipulation, Ion beam lithography, oxidation and metallization. Mask and its application. Deep UV lithography, X-ray based lithography.

TEXT BOOKS:

1. Charles.p.pode, Introduction to nanotechnology, springer publications
2. Springer Handbook of Nanotechnology - Bharat Bhusan
3. Phani kumar, principles of nanotechnology, scitech publications

REFERENCES BOOKS:

1. David Ferry “Transport in Nano structures” Cambridge University press 2000
2. Nanobiotechnology; ed. C.M.Niemeyer, C.A. Mirkin.
3. Nanofabrication towards biomedical application: Techniques, tools, Application and impact – Ed. Challa S.,S. R. Kumar, J. H. Carola.
4. Encyclopedia of Nanotechnology- Hari Singh Nalwa
5. Carbon Nanotubes: Properties and Applications- Michael J. O'Connell.
6. S. Dutta “Electron Transport in Mesoscopic systems” Cambridge University press
7. H. Grabert and M. Devoret “Single charge Tunneling” Plenum press 1992

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III Year B.Tech. ECE - II Sem			
6756026	**3**	**1/-/-**	**3**

DIGITAL COMMUNICATIONS

Unit-1

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

Unit-II

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

Unit-III

Digital Modulation Techniques: Introduction, ASK,ASK Modulator, Coherent ASK Detector, Non-Coherent ASK Detector, FSK, Bandwidth and Frequency Spectrum of FSK, Non coherent FSK Detector, Coherent FSK Detector, FSK Detection Using PLL, BPSK, Coherent PSK Detection, QPSK, Differential PSK.

Unit-IV

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

Unit-V

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

Unit-VI

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

Unit-VII

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

Unit-VIII

Spread Spectrum Modulation: Use of Spread Spectrum, Direct Sequence Spread Spectrum (DSSS), Code Division Multiple Access, Ranging using DSSS, Frequency Hopping Spread Spectrum, PN - sequences: Generation and Characteristics, Synchronization in Spread Spectrum Systems

TEXT BOOKS:

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

REFERENCES:

1. Digital Communications – John G. Proakis , Masoud salehi – 5th Edition, McGraw-Hill, 2008.
2. Digital Communication – Simon Haykin, Jon Wiley, 2005.
3. Digital Communications – Ian A. Glover, Peter M. Grant, 2nd Edition, Pearson Edu., 2008.
4. Communication Systems – B.P. Lathi, BS Publication, 2006.

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MICROPROCESSORS AND MICROCONTROLLERS

Unit 1
8086 Architecture: Introduction to 8085 Microprocessor, 8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical memory organization, Architecture of 8086, signal descriptions of 8086- common function signals, Minimum and Maximum mode signals, Timing diagrams, Interrupts of 8086.

Unit 2
Instruction Set and Assembly Language Programming of 8086: Instruction formats, addressing modes, instruction set, assembler directives, macros, simple programs involving logical, branch and call instructions, sorting, evaluating arithmetic expressions, string manipulations.

Unit 3
I/O Interface: 8255 PPI, various modes of operation and interfacing to 8086, interfacing keyboard, display, stepper motor interfacing, D/A and A/D converter.

Unit 4
Interfacing with advanced devices: Memory interfacing to 8086, Interrupt structure of 8086, Vector interrupt table, Interrupt service routine, Introduction to DOS and BIOS interrupts, Interfacing Interrupt Controller 8259 DMA Controller 8257 to 8086.

Unit 5
Communication Interface: Serial communication standards, Serial data transfer schemes, 8251 USART architecture and interfacing, RS- 232, IEEE- 488, Prototyping and trouble shooting.

Unit 6
Introduction to Microcontrollers: Overview of 8051 microcontroller, Architecture, I/O Ports, Memory organization, addressing modes and instruction set of 8051, simple programs

Unit 7
8051 Real Time Control: Interrupts, timer/ Counter and serial communication, programming Timer Interrupts, programming external hardware interrupts, programming the serial communication interrupts, programming 8051 timers and counters

Unit 8
The RISC Architecture: Introduction, Family architecture, Register File, The ALU, Memory access and Instruction execution, I/O memory. EEPROM, I/O ports, Timers, UART, Interrupt Structure

TEXT BOOKS:
1. D. V. Hall, Micro processors and Interfacing, TMGH, 2nd edition 2006.
2. Kenneth. J. Ayala, The 8051 microcontroller, 3rd edition, Cengage learning, 2010

REFERENCES:
1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, TMH, 2nd edition 2006.
2. The 8051Microcontrollers, Architecture and programming and Applications -K.Uma Rao, Andhe Pallavi, , Pearson, 2009.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design - By Liu and GA Gibson, PHI, 2nd Ed.,
4. Microcontrollers and application, Ajay. V. Deshmukh, TMGH, 2005
5. The 8085 Microprocessor: Architecture, programming and Interfacing – K.Uday Kumar, B.S.Umashankar, 2008, Pearson

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III Year B.Tech. ECE - II Sem **L T/P/D C**
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DIGITAL SIGNAL PROCESSING

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

Unit II
Discrete Fourier Series: DFS representation of Periodic Sequences, Properties of Discrete Fourier Series,, Discrete Fourier Transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT : Over-lap Add method, Over-lap Save method, Relation between DTFT, DFS, DFT and Z-Transform.

Unit III
Fast Fourier Transforms: Fast Fourier transforms (FFT) - Radix-2 decimation-in-time and decimation-in-frequency FFT Algorithms, Inverse FFT, and FFT with general Radix-N

Unit IV
Realization of Digital Filters: Applications of Z – transforms, solution of difference equations of digital filters, System function, Stability criterion, Frequency response of stable systems, Realization of digital filters – Direct, Canonic, Cascade and Parallel forms

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

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

Unit VII
Multirate Digital Signal Processing: Introduction, Down sampling, Decimation, Upsampling, interpolation, Sampling Rate Conversion, conversion of band pass signals, Concept of resampling, Applications of multi rate signal processing

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

Text books:
1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.
2. Discrete Time Signal Processing – A. V. Oppenheim and R.W. Schaffer, PHI, 2009
3. Fundamentals of Digital Signal Processing – Loney Ludeman, John Wiley, 2009

Reference books:
1. Digital Signal Processing – Fundamentals and Applications – Li Tan, Elsevier, 2008
2. Fundamentals of Digital Signal Processing using Matlab – Robert J. Schilling, Sandra L. Harris, Thomson, 2007
3. Digital Signal Processing – S.Salivahanan, A.Vallavaraj and C.Gnanapriya, TMH, 2009
4. Discrete Systems and Digital Signal Processing with MATLAB – Taan S. EIAli, CRC press, 2009.
5. Digital Signal Processing - A Practical approach, Emmanuel C. ***Ifeachor*** and Barrie W. Jervis, 2nd Edition, Pearson Education, 2009

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III Year B.Tech ECE - II Sem **L T/P/D C**
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MICROPROCESSORS AND MICROCONTROLLERS LAB

List of Experiments:

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

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.
7. Parallel communication between two microprocessors using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Program and verify Timer/ Counter in 8051.
11. Program and verify Interrupt handling in 8051
12. UART Operation in 8051.
13. Communication between 8051 kit and PC.
14. Interfacing LCD to 8051.
15. Interfacing Matrix/ Keyboard to 8051.
16. Data Transfer from Peripheral to Memory through DMA controller 8237 / 8257.
17. Touch screen interface to ARM Processor.
18. Temperature control soldering session- ARM Processor based

Note: -

- Minimum of 12 experiments to be conducted.
- Atleast 2 experiments from microcontrollers are compulsory.

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DIGITAL SIGNAL PROCESSING LAB

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

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

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

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ADVANCED ENGLISH COMMUNICATION SKILLS LAB

1. Introduction

The introduction of the English Language Lab is considered essential at 3rd year level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

- Gather ideas and information, to organise ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice versa.
- To take part in social and professional communication.

2. Objectives:

This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.

3. Syllabus:

The following course content is prescribed for the Advanced Communication Skills Lab:

- **Functional English** - starting a conversation – responding appropriately and relevantly – using the right body language – role play in different situations.
- **Vocabulary Building** – synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases.
- **Reading Comprehension** – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, Critical reading.
- **Writing Skills** – structure and presentation of different types of writing – *Resume writing / e-correspondence/Technical report writing/Portfolio writing* – planning for writing – *research abilities/data collection/organizing data/tools/analysis* – improving one's writing.
- **Group Discussion** – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
- **Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars and written presentations through posters/projects/reports/PPTs/e-mails/assignments etc.
- **Interview Skills** – concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.

4. 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:

iii) P – IV Processor
   a. Speed – 2.8 GHZ
   b. RAM – 512 MB Minimum
   c. Hard Disk – 80 GB

iv) 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)
- **The following software from 'train2success.com'**
  - **Preparing for being Interviewed,**
  - **Positive Thinking,**
  - **Interviewing Skills,**
  - **Telephone Skills,**
  - **Time Management**
  - **Team Building,**
  - **Decision making**
- **English in Mind**, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

6. Books Recommended:

1. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. **Advanced Communication Skills Laboratory Manual** by Sudha Rani, D, Pearson Education 2011.
3. **English Language Communication : A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
4. **English Vocabulary in Use** series, Cambridge University Press 2008.
5. **Management Shapers Series** by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
6. **Communication Skills** by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
7. **Handbook for Technical Writing** by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
8. **Job Hunting** by Colm Downes, Cambridge University Press 2008.
9. **Master Public Speaking** by Anne Nicholls, JAICO Publishing House, 2006.
10. **English for Technical Communication for Engineering Students**, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.
11. Books on **TOEFL/GRE/GMAT/CAT/ IELTS** by Barron's/DELTA/Cambridge University Press.
12. **International English for Call Centres** by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

Advanced Communication Skills Lab Practicals*:*

1. The practical examinations for the English Language Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.

2. For the English Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

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IV Year B.Tech. ECE - I Sem	**L**	**T/P/D**	**C**
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MANAGEMENT SCIENCE

Unit I

***Introduction to Management*:** Entrepreneurship and organization - Nature and Importance of Management, Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Douglas McGregor's Theory X and Theory Y, Systems Approach to Management. Ethics and corporate social responsibilities.

Unit II

***Designing Organisational Structures*:** Departmentation, Decentralisation centralization and Recentralization. Types of Organisation structures - Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Cellular Organisation, team structure, lean and flat organization structure and their merits, demerits and suitability.

Unit III

***Operations Management*:** Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement-Statistical Quality Control: $\overline{X}$ chart, R chart, *c* chart, *p* chart,

Unit IV

***Project Management (PERT/CPM*):** Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), identifying critical path, Project Cost Analysis, Project Crashing.

Unit V

***A) Materials Management*:** Objectives, Need for Inventory control, EOQ, ABC Analysis, VED Analysis, FSN Analysis, Purchase Procedure, Stores Management - Logistics and basics of supply Chain Management.

***B) Marketing*:** Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle., Channels of distribution. Retailing and Basics of Rural Marketing.

Unit VI

Human Resources Management (HRM): Evolution of HRM, Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Promotion, Motivation and leadership - Basic concepts and theories, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

Unit VII

***Strategic Management*:** Porter's five factors theory, Vision, Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, PEST Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Strategies and benefits of information and communication technologies (ICT).

Unit VIII

***Contemporary Management Practices*:** Basic concepts of Just-In-Time (JIT) System, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levels, Value Chain Analysis,Enterprise Resource Planning (ERP), Performance Management, Business Process outsourcing (BPO), Business Process Re-engineering 5S Model, Benchmarking, Balanced Score Card.

REFERENCE BOOKS:

1. Aryasri: *Management Science*, TMH, New Delhi, 2009
2. Stoner, Management, Pearson, 2009
3. Kotler Philip & Keller Kevin Lane: Marketing Management PHI, 2009.
4. Koontz, Weihrich, & Aryasri: Principles *of Management*, TMH, 2009.
5. Thomas N.Duening & John M.Ivancevich *Management—Principles and Guidelines*, Cengage, 2009.
6. Kanishka Bedi, *Production and Operations Management*, Oxford University Press, 2009.
7. Memoria & S.V.Ganker, *Personnel Management*, Himalaya, 2009
8. Schermerhorn: *Management*, Wiley, 2009.
9. Parnell: Strategic Management, Biztantra, 2009.
10. L.S.Srinath: PERT/CPM,Affiliated East-West Press, 2009.
11. William J. Stevenson & Ceyhun Ozgur: Introduction to Management Science, TMH, 2007.
12. P.Subba Rao : Human Resource Management.
13. Ramaswamy Namakumari: Marketing Management.

Pre-requisites: Managerial Economics

***Objective*:** To familiarize with the process of management and to provide basic insights into select contemporary management practices.

Codes/Tables: Normal Distribution Function Table need to be permitted into the examination Hall.

Question Paper Pattern: 5 Questions to be answered out of 8 questions. The question paper should contain atleast 2 practical problems, one each from units –III & IV

Each question should not have more than 3 bits.

Unit VIII will have only short questions, not essay questions.

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IV Year B.Tech. ECE - I Sem	L	T/P/D	C
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VLSI DESIGN

Unit I
Introduction: Introduction to IC Technology – MOS, PMOS, NMOS, CMOS & BiCMOS
Technologies; Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Encapsulation, Probe testing, Integrated Resistors and Capacitors, CMOS Nanotechnology

Unit II
Basic Electrical Properties: Basic Electrical Properties of MOS and BiCMOS Circuits: I_{ds}-V_{ds} relationships, MOS transistor threshold Voltage, g_m, g_{ds}, Figure of merit ωo; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

Unit III
VLSI Circuit Design Processes: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2 μm CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits.

Unit IV
Gate Level Design: Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Time delays, Driving large capacitive loads, Wiring capacitance, Fan – in, Fan – out, Choice of layers.

Unit V:
Data Path Subsystems: Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters.

Unit VI:
Array Subsystems: SRAM, DRAM, ROM, Serial Access Memories, Content Addressable Memory.

Unit VII:
Semiconductor Integrated Circuit Design: PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach, Parameters influencing low power design.

Unit VIII
CMOS Testing: CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques, System-level Test Techniques, Layout Design for improved Testability.

TEXT BOOKS:
1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, PHI, 2005 Edition
2. VLSI Desing- K .Lal Kishore, V. S. V. Prabhakar, I.K International, 2009.
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. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.
3. VLSI Design – A.Albert Raj, Latha, PHI, 2008
4. Introduction to VLSI – Mead & Convey, BS Publications, 2010
5. VLSI Design – M. Micheal Vai, CRC Press, 2009.

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IV Year B.Tech. ECE - I Sem **L T/P/D C**
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MICROWAVE ENGINEERING

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

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

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

Unit IV
Waveguide Components And Applications - II: Ferrites– Composition and Characteristics, Faraday Rotation; Ferrite Components – Gyrator, Isolator, Circulator. Scattering Matrix– Significance, Formulation and Properties, S Matrix Calculations for – 2 port Junctions, E plane and H plane Tees, Magic Tee, Circulator and Isolator. Illustrative Problems.

Unit V
Microwave Tubes – I: Limitations and Losses of conventional tubes at microwave frequencies. Microwave tubes – O type and M type classifications. O-type tubes : 2 Cavity Klystrons – Structure, Reentrant Cavities, Velocity Modulation Process and Applegate Diagram, Bunching Process and Small Signal Theory – Expressions for o/p Power and Efficiency. Reflex Klystrons – Structure, Velocity Modulation and Applegate Diagram, Mathematical Theory of Bunching, Power Output, Efficiency, Oscillating Modes and o/p Characteristics, Effect of Repeller Voltage on Power O/p. Illustrative Problems.

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

M-Type Tubes
Introduction, Cross-field effects, Magnetrons – Different Types, Cylindrical Traveling Wave Magnetron – Hull Cut-off and Hartree Conditions, Modes of Resonance and PI-Mode Operation, Separation of PI-Mode, o/p characteristics. Illustrative Problems.

Unit VII
Microwave Solid State Devices: Introduction, Classification, Applications. TEDs – Introduction, Gunn Diodes – Principle, RWH Theory, Characteristics, Basic Modes of Operation - Gunn Oscillation Modes, LSA Mode, Introduction to Avalanche Transit Time Devices.

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

Text Books:

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

References:

1. Foundations for Microwave Engineering – R.E. Collin, IEEE Press, John Wiley, 2nd Edition, 2002.
2. Microwave Circuits and Passive Devices – M.L. Sisodia and G.S.Raghuvanshi, Wiley Eastern Ltd., New Age International Publishers Ltd., 1995.
3. Microwave Engineering Passive Circuits – Peter A. Rizzi, PHI, 1999.
4. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th ed., 1955.
5. Microwave Engineering – A. Das and S.K. Das, TMH, 2nd ed., 2009.

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COMPUTER NETWORKS

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

UNIT II
Physical Layer: digital transmission, multiplexing, transmission media, circuit switched networks, Datagram networks, virtual circuit networks, switch and Telephone network.

UNIT III
Data link layer: Introduction, Block coding, cyclic codes, checksum, framing, flow and error control, Noiseless channels, noisy channels, HDLC, point to point protocols, IPV6.

UNIT IV
Medium Access sub layer: Random access, controlled access, channelization, IEEE standards, Ethernet, Fast Ethernet, Giga-Bit Ethernet, wireless LANs, Bluetooth.

UNIT V
Connecting LANs, backbone networks and virtual LANs, Wireless WANs, SONET, frame relay and ATM.

UNIT VI
Network Layer: Logical addressing, internetworking, tunneling, address mapping, ICMP, IGMP, forwarding, uni-cast routing protocols, multicast routing protocols.

UNIT VII
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 VIII
Application Layer – Domain name space, DNS in internet, electronic mail, FTP, WWW, HTTP, SNMP, multi-media, network security

TEXT BOOKS:
1. Data Communications and Networking – Behrouz A. Forouzan, **Fourth Edition TMH, 2006**.
2. Computer Networks -- Andrew S Tanenbaum, 4th Edition, Pearson Education.

REFERENCE BOOKS:
1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A.Shay, Cengage Learning.
3. Computer and Communication Networks, Nader F. Mir, Pearson Education
4. Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose,K.W.Ross,3rd Edition, Pearson Education.
5. Data and Computer Communications, G.S.Hura and M.Singhal, CRC Press, Taylor and Francis Group.
6. Data communications and computer Networks, P.C.Gupta, PHI.

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ELECTRO MAGNETIC INTERFERNCE AND ELECTROMAGNETIC COMPATIBILITY
(ELECTIVE-I)

Unit – I: Sources of EMI
Definition of EMI and EMC, Classification, Natural and man-made EMI sources, Switching transients, Electrostatic Discharge, Nuclear Electromagnetic Pulse and High Power Electromagnetics.

Unit – II: EMI Coupling Modes
Penetration – Introduction. Shielding theory - shielding effectiveness, the circuit approach, the wave approach, Aperture theory, Calculation of effectiveness of a conducting box with an aperture. Introduction to propagation and cross talk – Introduction, Basic principles, Determination of EM Field from Transmission Lines.

Unit – III: **EMI controlling techniques-1**
Grounding - Principles and Practice of Earthing, Precautions in Earthing, Measurements of ground resistance, System grounding for EMC, Cable shielding Grounding.
Shielding – Theory and Effectiveness, Materials, Integrity at discontinuities, Conductive coatings, Cable shielding, Effectiveness measurements. Electrical Bonding.

Unit – IV: EMI controlling techniques-2
Characteristics and Types of Filters – Impedance Mismatch, Lumped element Low-Pass, High- Pass, Band-Pass and Band-Reject filters. Power Line filter Design - Common mode, Differential mode, Combined CM and DM filters, Design Example.
EMC Gaskets – Knitted Wire-Mesh Gaskets, Wire-Screen Gaskets, Oriented Wire mesh, Conductive Elastomer, Transparent Conductive windows, Conductive Adhesive, Conductive Grease, Conductive Coatings, Isolation transformers, Opto-Isolators.

Unit – V: EMI Measurements-1
Introduction to open area test site measurements – Measurement precautions – open area test site – Terrain Roughness – NSA – Measurement of test site imperfections – Antenna factor measurement – Measurement errors.

Unit – VI: EMI Measurements-2
Radiated Interference measurements – Anechoic chamber – TEM cell – Reverberating chamber – GHz TEM cell – Comparison of test facilities – Measurement uncertainties

Unit – VII: EMI Measurements-3
Conducted Interference measurements – Characterisation – Conducted EM noise on power supply lines – Conducted EMI from equipment – Immunity – Detectors and measurement – Pulsed EMI immunity – Electrostatic Discharge

Unit – VIII: EMI/EMC Standards
Introduction – Standards for EMI/EMC – MIL –STD 461/462 – IEEE/ANSI Standards – CISPR/IEC Standards – FCC regulations.

TEXT BOOKS:

1. Engineering Electromagnetic Compatibility – V.Prasad Kodali – 2/e – IEEE Press – Wiley India Pvt. Ltd – 2001.
2. Principles and Techniques of Electromagnetic Compatibility – Christos Christopoulos – 2/e – CRC Press (Taylor & Francis Group) – 2007

REFERENCES:

1. Introduction to Electromagnetic Compatibility – Clayton R.Paul – John Wiley & Sons, 1992.
2. Electromagnetic Compatibility of Integrated Circuits – Techniques for low emission and susceptibility – Edited by Sonia Ben Dhia, Mohamed Ramdani and Etienne Sicard – Springer, 2006.
3. EMI reduction in Electronic Systems – Mills – J.P – Prentice Hall Inc.
4. Noise Reduction in Electronic Systems – Henry W.Ott, 2nd Edition, Wiley Interscience, 1988.

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DSP PROCESSORS AND ARCHITECTURES
(ELECTIVE – I)

UNIT I

INTORODUCTION TO DIGITAL SIGNAL PROCESING: Introduction, A Digital signal-processing system, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation.

UNIT II

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

UNIT III

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

UNIT IV

EXECUTION CONTROL AND PIPELINING: Hardware looping, Interrupts, Stacks, Relative Branch support, Pipelining and Performance, Pipeline Depth, Interlocking, Branching effects, Interrupt effects.

UNIT V

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

UNIT VI

IMPLEMENTATIONS OF BASIC DSP ALGORITHMS : The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, 2-D Signal Processing.

UNIT VII

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

UNIT VIII

INTERFACING MEMORY AND I/O PERIPHERALS TO PROGRAMMABLE DSP DEVICES:

Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA). A Multichannel buffered serial port (McBSP), McBSP Programming, a CODEC interface circuit, CODEC programming, A CODEC-DSP interface example.

TEXT BOOKS:

1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
2. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. S. Chand & Co, 2000.

REFERENCES:

1. Digital Signal Processors, Architecture, Programming and Applications – B. Venkata Ramani and M. Bhaskar, TMH, 2004.
2. Digital Signal Processing – Jonatham Stein, John Wiley, 2005.

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TELECOMMUNICATION SWITCHING SYSTEMS
(ELECTIVE-I)

Unit I
Switching Systems: Evolution of Telecommunications; Basics of a Switching System; Functions of a Switching System; Strowger Switching Components; Step by Step Switching; Design Parameters; 100 Line Switching System; 1000 Line Blocking Exchange; 10,000 Line Exchange; Crossbar Switching-Principle of Crossbar Switching; Crossbar Switch Configurations; Cross-point Technology; Crossbar Exchange Organization; A General Trunking; Electronic Switching; Reed Electronic Systems; Digital Switching Systems.

Unit II
Telecommunications Traffic: Introduction; The Unit of Traffic; Congestion; Traffic Measurement; A Mathematical Model; Lost-Call Systems-Theory; Traffic Performance; Loss Systems in Tandem; Use of Traffic Tables; Queuing Systems-The Second Erlang Distribution; Probability of Delay; Finite Queue Capacity; Some Other Useful Results; Systems with a Single Server; Queues in Tandem; Delay Tables; Applications of Delay Formulae.

Unit III
Switching Networks: Introduction; Single Stage Networks; Gradings-Principle; Design of Progressive Gradings; Other Forms of Grading; Traffic Capacity of Gradings; Application of Gradings; Link Systems-General, Two Stage Networks; Three Stage Networks; Four Stage Networks; Discussion; Grades of Service of Link Systems.

Unit IV
Time Division Switching: Basic Time Division Space Switching; Basic Time Division Time Switching; Time Multiplexed Space Switching; Time Multiplexed Time Switching; Combination Switching; Three Stage Combination Switching.

Unit V
Control of Switching Systems: Introduction; Call Processing Functions-Sequence of Operations; Signal Exchanges; State Transition Diagrams; Common Control; Reliability; Availability and Security; Stored Program Control.

Unit VI
Signalling: Introduction; Customer Line Signaling; Audio Frequency Junctions 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; The High Level Data Link Control Protocol; Signal Units; The Signaling Information Field.

Unit VII
Packet Switching: Introduction; Statistical Multiplexing; Local Area and Wide Area Networks-Bus Networks; Ring Networks; Comparison of Bus and Ring Networks; Optical Fiber Networks; Large Scale Networks-General; Datagrams and Virtual Circuits; Routing; Flow Control; Standards; Frame Relay; Broadband Networks-General; The Asynchronous Transfer Mode; ATM Switches.

Unit VIII
Networks: Introduction; Analog Networks; Integrated digital Networks; Integrated Services Digital Networks; Cellular Radio Networks; Intelligent Networks; Private Networks; Charging; Routing – General, Automatic Alternative Routing.

Text Books:

1. J. E Flood, "Telecommunications Switching and Traffic Networks," Pearson Education, 2006.
2. Tyagarajan Viswanathan, "Telecommunications Switching Systems and Networks," Prentice Hall of India Pvt. Ltd., 2006.

Reference Book:

1. John C Bellamy, "Digital Telephony," John Wiley International Student Edition,3rd Edition, 2000.
2. Behrouz A. Forouzan, " Data Communications and Networking," TMH, 2nd Edition, 2002.
3. Tomasi," Introduonction to Data Communication and Networking," Pearson Education, 1st Edition, 2007.

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DIGITAL IMAGE PROCESSING
(ELECTIVE – I)

Unit I
Digital Image Fundamentals & Image Transforms: Digital Image fundamentals, Sampling and quantization, Relation ship between pixels, **Image Transforms:** 2-D FFT, Properties, Walsh transform, Hadamard Transform, Discrete Cosine Transform, Haar transform, Slant transform, Hotelling transform.

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

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

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

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

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

Unit VII
Wavelet based Image processing: Introduction to Wavelet Transform, Continuous Wavelet Transform, Discrete Wavelet Transform, Filter banks, Wavelet based image compression.

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

TEXT BOOKS:

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

REFERENCES:

1.Digital Image Processing using MAT LAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Eddings, 2nd Edition, TMH, 2010.
2. Fundamentals of Digital Image Processing – A.K.Jain , PHI, 1989
3. Digital Image processing and Computer vision – Somka, Hlavac, Boyle- Cengage learning (Indian edition) 2008.
4. Introductory Computer vision Imaging Techniques and Solutions- Adrian low, 2008, 2nd Edition
5. Introduction to Image Processing & Analysis – John C. Russ, J. Christian Russ, CRC Press, 2010.

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OPTICAL COMMUNICATIONS
(ELECTIVE-II)

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

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

Unit III
Information capacity determination, Group delay, Types of Dispersion - Material dispersion, Wave-guide dispersion, Polarization mode dispersion, Intermodal dispersion. Pulse broadening, Optical fiber Connectors- Connector types, Single mode fiber connectors, Connector return loss.

Unit IV
Fiber Splicing- Splicing techniques, splicing single mode fibers. Fiber alignment and joint loss- Multimode fiber joints, single mode fiber joints,. Optical sources- LEDs, Structures, Materials, Quantum efficiency, Power, Modulation, Power bandwidth product, Injection Laser Diodes- Modes, Threshold conditions, External quantum efficiency, Laser diode rate equations, Resonant frequencies. Reliability of LED&ILD

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

Unit VI
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 VII
Optical system design — Considerations, Component choice, Multiplexing, Point-to- point links, System considerations, Link power budget with examples, Overall fiber dispersion in Multi mode and Single mode fibers, Rise time budget with examples

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

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

REFERENCES:
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. Introduction to Fiber Optics by Donald J.Sterling Jr. – Cengage learning, 2004.
5. Optical Communication Systems – John Gowar, 2nd edition, PHI, 2001.

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EMBEDDED SYSTEMS
(ELECTIVE – II)

UNIT – I
Embedded Computing: Introduction, Complex Systems and Microprocessor, Embedded System Design Process, Formalisms for System Design, Design Examples. (Chapter I from Text Book 1, Wolf)

UNIT – II
8051 Architecture: Introduction, 8051 Microcontroller Hardware, Timers and Counters, I/O Ports and Circuits, Serial Data Communication, External Memory, Interrupts (Chapter 3 from Text Book 2, Ayala and Gadre)

UNIT – III
8051 Programming: Assembly Language Programming Process, 8051 Instruction Set: Data Transfer, Arithmetic, Logical and Branch Instructions, Decimal Arithmetic, Interrupt Programming (Chapters 4 – 8 from Text Book 2, Ayala and Gadre)

UNIT – IV
PSoC Architecture and Programming: PSoC as a Single-Chip Solution for Embedded System Design, Analog, Digital and Controller (8051) Blocks in PSoC, Hardware Programming through PSoC Creator, I/O Pin Configurability (Text Book 3, Robert Ashby)

UNIT – V
Applications: Blinking an LED, Cap Sense, Digital Logic, Precision Analog and Serial Communications (Text Book 4, Robert Ashby)

Unit - VI
Introduction to Real – Time Operating Systems: 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.
(Chapter 6 and 7 from Text Book 3, Simon).

Unit - VII
Basic Design Using a Real-Time Operating System: Principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (Open Source); Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded
Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System. (Chapter 8,9,10 & 11 from Text Book 3, Simon).

Unit - VIII
Introduction to advanced architectures: ARM and SHARC, Processor and memory organization and Instruction level parallelism; Networked embedded systems: Bus protocols, I2C bus and CAN bus; Internet-Enabled Systems, Design Example-Elevator Controller.
(Chapter 8 from Text Book 1, Wolf).

TEXT BOOKS:

1. 'Computers as Components – Principles of Embedded Computing System Design', Wayne Wolf, Elsevier (2nd Edition)
2. 'The 8051 Microcontroller', Kenneth Ayala and Dhanunjay Gadre, Thomson
3. 'The PSoC Controller' (Paper Back Edition), Robert Ashby, Newens
4. 'My First Five PSoC Designs', Robert Ashby, e-Book

REFERENCES:

1. Embedding system building blocks, Labrosse, via CMP publishers.
2. Embedded Systems, Raj Kamal, TMH.
3. Micro Controllers, Ajay V Deshmukhi, TMH.
4. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
5. Microcontrollers, Raj kamal, Pearson Education.
6. An Embedded Software Primer, David E. Simon, Pearson Education.

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TELEVISION ENGINEERING
(ELECTIVE-II)

Unit I

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

Unit II

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

Unit III

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

Unit-IV

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

Unit V

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

Unit VI

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

Unit –VII

Color Receiver: introduction to colour receiver, Electron tuners, IF subsystem, Y-signal channel, Chroma decoder, Separation of U & V Color, Phasors, synchronous demodulators, Sub carrier generation, raster circuits.

Unit VIII

Introduction to Digital TV, Digital Satellite TV, Direct to Home Satellite TV, Digital TV Transmitter, Digital TV Receiver, Digital Terrestrial TV, LCD TV, LED TV, CCD Image Sensors, HDTV.

Test Books:

1. Television and Video Engineering- A.M.Dhake, 2nd Edition.
2. Modern Television Practice – Principles, Technology and Service- R.R. Gallatin, New Age International Publication, 2002.
3. Monochrome and Colour TV- R.R. Gulati, New Age International Publication, 2002.

References:

1. Colour Television Theory and Practice-S.P.Bali, TMH, 1994.
2. Basic Television and Video Systems-B.Grob and C.E.Herndon, McGraw Hill, 1999.

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MULTIMEDIA AND SIGNAL CODING
(ELECTIVE-II)

Unit I:
Introduction to Multimedia: Multimedia, World Wide Web, Overview of multimedia tools, Multimedia authoring, Graphics/ image data types, and file formats.

Unit II:
Color in Image and Video: Color Science – Image Formation, Camera Systems, Gamma Correction, Color Matching Functions, CIE Chromaticity Diagram, Color Monitor Specifications, Out-of-Gamut colors, White point correction, XYZ to RGB transform, Transform with Gamma Correction, L*a*b* Color model.
Color models in images – RGB color model for CRT displays, Subtractive Color : CMY Color model, Transformation from RGB to CMY, Under color removal : CMYK System, printer Gamuts.
Color models in video – Video Color Transforms, YUV color model, YIQ color model, YCbCr Color Model.

Unit III:
Video Concepts: Types of video signals, Analog video, Digital Video.
Audio Concepts: Digitization of sound, Quantization and Transmission of audio.

Unit IV:
Compression Algorithms:
Lossless compression algorithms: Run length coding, Variable length coding, Arithmetic coding, Lossless JPEG, Image Compression.
Lossy Image Compression Algorithms: Transform Coding:- KLT and DCT Coding, Wavelet based coding.
Image Compression Standards: JPEG and JPEG2000.

Unit V:
Video Compression Techniques: Introduction to Video Compression, Video Compression based on Motion Compensation, Search for motion vectors, H.261- Intra-frame and Inter-frame coding, Quantization, Encoder and Decoder, Overview of MPEG1 and MPEG2.

Unit VI:
Audio Compression Techniques: ADPCM in Speech Coding, G.726 ADPCM, Vocoders – Phase Insensitivity, Channel Vocoder, Formant Vocoder, Linear Predictive Coding, CELP, Hybrid Excitation Vocoders, MPEG Audio – MPEG Layers, MPEG Audio Strategy, MPEG Audio Compression algorithms, MPEG-2 AAC, MPEG-4 Audio.

Unit VII:
Computer and Multimedia Networks: Basics of Computer and Multimedia networks, Multiplexing technologies, LAN and WAN, Access networks

Unit VIII:
Multimedia Network Communications and Applications: Quality of Multimedia data transmission, multimedia over IP, Multimedia over ATM networks, Transport of MPEG4, Media on Demand.

Text books:
1. Fundamentals of Multimedia – Ze- Nian Li, Mark S. Drew, PHI, 2010.
2. Multimedia Signals & Systems – Mrinal Kr. Mandal Springer International Edition 1st edition, 2009

Reference Books:
1. Multimedia Communication Systems – Techniques, Stds & Netwroks K.R. Rao, Zorans. Bojkoric, Dragorad A.Milovanovic, 1st Edition, 2002.
2. Fundamentals of Multimedia Ze- Nian Li, Mark S.Drew, Pearson Education (LPE), 1st Edition, 2009.
3. Multimedia Systems John F. Koegel Bufond Pearson Education (LPE), 1st Edition, 2003.
4. Digital Video Processing – A. Murat Tekalp, PHI, 1996.
5. Video Processing and Communications – Yaowang, Jorn Ostermann, Ya-QinZhang, Pearson,2002

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E-CAD AND VLSI LAB

List of Experiments

Design and implementation of the following CMOS digital/analog circuits using **Cadence / Mentor Graphics / Synopsys / GEDA /Equivalent** CAD tools. The design shall include Gate-level design, Transistor-level design, Hierarchical design, Verilog HDL/VHDL design, Logic synthesis, Simulation and verification, Scaling of CMOS Inverter for different technologies, study of secondary effects (temperature, power supply and process corners), Circuit optimization with respect to area, performance and/or power, Layout, Extraction of parasitics and back annotation, modifications in circuit parameters and layout consumption, DC/transient analysis, Verification of layouts (DRC, LVS)

E-CAD programs:

Programming can be done using any complier. Down load the programs on FPGA/CPLD boards and performance testing may be done using pattern generator (32 channels) and logic analyzer apart from verification by simulation with any of the front end tools.

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 Multiplexer/ Demultiplexer, comparator
7. Design of Full adder using 3 modeling styles
8. Design of flip flops: SR, D, JK, T
9. Design of 4-bit binary, BCD counters (synchronous/ asynchronous reset) or any sequence counter
10. Finite State Machine Design

VLSI programs:

1. Introduction to layout design rules
2. Layout, physical verification, placement & route for complex design, static timing analysis, IR drop analysis and crosstalk analysis of the following:

- Basic logic gates
- CMOS inverter
- CMOS NOR/ NAND gates
- CMOS XOR and MUX gates
- CMOS 1-bit full adder
- Static / Dynamic logic circuit (register cell)
- Latch
- Pass transistor

1. Layout of any combinational circuit (complex CMOS logic gate)- Learning about data paths
2. Introduction to SPICE simulation and coding of NMOS/CMOS circuit
3. SPICE simulation of basic analog circuits: Inverter / Differential amplifier
4. Analog Circuit simulation (AC analysis) – CS & CD amplifier
5. System level design using PLL

Note: *Any* ***SIX of*** *the above experiments from each part are to be conducted (Total 12)*

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MICROWAVE ENGINEERING AND DIGITAL COMMUNICATIONS LAB

Note: Minimum 12 Experiments to be conducted

Part – A: Microwave Engineering Lab (Any 6 Experiments):
1. Reflex Klystron Characteristics
2. Gunn Diode Characteristics
3. Directional Coupler Characteristics
4. VSWR Measurement
5. Measurement of Waveguide Parameters
6. Measurement of Impedance of a given Load
7. Measurement of Scattering parameters of a Magic Tee
8. Measurement of Scattering parameters of a Circulator
9. Attenuation Measurement
10. Microwave Frequency Measurement

Part – B: Digital Communication Lab (Any 6 Experiments):
1. PCM Generation and Detection
2. Differential Pulse Code Modulation
3. Delta Modulation
4. Time Division Multiplexing of 2 Band Limited Signals
5. Frequency shift keying: Generation and Detection
6. Phase Shift Keying: Generation and Detection
7. Amplitude Shift Keying: Generation and Detection
8. Study of the spectral characteristics of PAM, QAM
9. DPSK :Generation and Detection
10. QPSK : Generation and Detection

Equipment required for Laboratories:
Microwave Engineering Lab:
Microwave Bench set up with Klystron Power Supply
Microwave Bench set up with Gunn Power Supply
Micro Ammeter
VSWR meter
Microwave Components
Digital Communication Lab:
RPS: 0-30V
CRO: 0-20MHz
Function Generators: 0-1MHz
RF Generators: 0-100MHz
Experimental Kits /Modules

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CELLULAR AND MOBILE COMMUNICATIONS
(ELECTIVE-III)

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

Unit II
Fundamentals Of Cellular Radio System Design: Concept of frequency reuse, Co-channel interference, Co-channel Interference reduction factor, Desired C/I from a normal case in a omni directional antenna system, system capacity, Trunking and grade of service, Improving coverage and capacity in cellular systems- Cell splitting, Sectoring, Microcell zone concept.

Unit III
Co-Channel Interference: Measurement of real time Co-Channel interference, Design of antenna system, Antenna parameters and their effects, Diversity techniques-Space diversity, Polarization diversity, Frequency diversity, Time diversity.

Unit-IV
Non-Co-Channel Interference
Adjacent channel interference, Near end far end interference, Cross talk, Effects on coverage and interference by power decrease, Antenna height decrease, Effects of cell site components, UHF TV interference.

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

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

Unit-VII
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-VIII
Handoffs and Dropped Calls
Handoff initiation, Types of handoff, Delaying handoff, Advantages of handoff, Power difference handoff, Forced handoff, Mobile assisted and soft handoff. Intersystem handoff, Introduction to dropped call rates and their evaluation.

TEXT BOOKS:

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

REFERENCES

1. Principles of Mobile Communications – Gordon L. Stuber, Springer International, 2nd Edn., 2001.
2. Modern Wireless Communications-Simon Haykin, Michael Moher,Pearson Eduction, 2005.
3. Wireless communications theory and techniques, Asrar U. H .Sheikh, Springer, 2004.
4. Wireless Communications and Networking, Vijay Garg, Elsevier Publications, 2007.
5. Wireless Communications – Andrea Goldsmith, Cambridge University Press, 2005.

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SATELLITE COMMUNICATIONS
(ELECTIVE –III)

Unit – I
Introduction: Origin of Satellite Communications, Historical Back-ground, Basic Concepts of Satellite Communications, Frequency allocations for Satellite Services, Applications, Future Trends of Satellite Communications.

Unit – II
Orbital Mechanics And Launchers: Orbital Mechanics, Look Angle determination, Orbital perturbations, Orbit determination, Launches and Launch vehicles, Orbital effects in communication systems performance.

Unit – III
Satellite Subsystems: Attitude and orbit control system, telemetry, tracking, Command and Monitoring, Power Systems, Communication Subsystems, Satellite antennas, Equipment reliability and Space qualification.

Unit – IV
Satellite Link Design: Basic transmission theory, system noise temperature and G/T ratio, Design of down links, Up link design, Design of satellite links for specified C/N, System design examples.

Unit – V
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 – VI
Earth Station Technology: Introduction, Transmitters, Receivers, Antennas, Tracking systems, Terrestrial Interface, Primary Power test methods.

Unit – VII
Low Earth Orbit and Geo-Stationary Satellite Systems: Orbit considerations, Coverage and Frequency Consideration, Delay & Throughput considerations, System considerations, Operational NGSO Constellation Designs.

Unit – VIII
Satellite Navigation & Global Positioning System: Radio and Satellite Navigation, GPS Position Location principles, GPS Receivers and Codes, Satellite Signal Acquisition, GPS Navigation Message, GPS Signal Levels, GPS Receiver Operation, GPS C/A code accuracy, Differential GPS.

TEXT BOOKS:

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

REFERENCES:

1. Satellite Communications: Design Principles – M. Richharia, BS Publications, 2nd Edition, 2003.
2. Satellite Communication - D.C Agarwal, Khanna Publications, 5th Ed.
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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BIO MEDICAL INSTRUMENTATION
(ELECTIVE–III)

UNIT – I:
Components of Medical Instrumentation System. Bioamplifier. Static and dynamic characteristics of medical instruments. Biosignals and characteristics. Problems encountered with measurements from human beings.

UNIT – II:
Organisation of cell. Derivation of Nernst equation for membrane Resting Potential Generation and Propagation of Action Potential, Conduction through nerve to neuromuscular junction.

UNIT – III:
Bio Electrodes – Biopotential Electrodes-External electrodes, Internal Electrodes. Biochemical Electrodes.

UNIT – IV:
Mechanical function, Electrical Conduction system of the heart. Cardiac cycle. Relation between electrical and mechanical activities of the heart.

UNIT – V:
Cardiac Instrumentation: Blood pressure and Blood flow measurement. Specification of ECG machine. Einthoven triangle, Standard 12-lead configurations, Interpretation of ECG waveform with respect to electro mechanical activity of the heart.

UNIT – VI:
Therapeutic equipment.: Pacemaker, Defibrillator, Shortwave diathermy. Hemodialysis machine.

UNIT – VII:
Neuro-Muscular Instrumentation: Specification of EEG and EMG machines. Electrode placement for EEG and EMG recording. Intrepretation of EEG and EMG.

UNIT – VIII:
Respiratory Instrumentation: Mechanism of respiration, Spirometry, Pnemuotachograph 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. Biomedical Telemetry – by Mackay, Stuart R., John Wiley.

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ARTIFICIAL NEURAL NETWORKS
(ELECTIVE-I)

UNIT I
Introduction - what is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks

UNIT II
Learning Process – Error Correction learning, Memory based learning, Hebbian learing, Competitive, Boltzmann learning, Credit Asssignment Problem, Memory, Adaption, Statistical nature of the learning process

UNIT III
Single layer perceptrons – Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perceptron –convergence theorem, Relation between perceptron and Bayes classifier for a Gaussian Environment

UNIT IV
Multilayer Perceptron – Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Comuter experiment, feature detection

UNIT V
Back Propagation - back propagation and differentiation, Hessian matrix, Generalization, Cross validation, Network pruning Techniques, Virtues and limitations of back propagation learning, Accelerated convergence, supervised learning.

UNIT VI
Self Organization Maps – Two basic feature mapping models, Self organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive patter classification

UNIT VII
Neuro Dynamics – Dynamical systems, stability of equilibrium states, attractors, neurodynamical models, manipulation of attractors as a recurrent network paradigm

UNIT VIII
Hopfield Models – Hopfield models, computer experiment

TEXT BOOK:
1. Neural networks A comprehensive foundations, Simon Hhaykin, PHI edition.

REFERENCES:

1. Artifical neural networks - B.Vegnanarayana Prentice Halll of India P Ltd 2005
2. Neural networks in Computer intelligence, Li Min Fu TMH 2003
3. Neural networks James A Freeman David M S kapura pearson education 2004
4. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

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IV Year B.Tech. ECE - II Sem **L T/P/D C**
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INTERNETWORKING
(ELECTIVE-VI)

Unit I:
Internetworking Concepts: Principles of internetworking, Connectionless Interconnection, Application level Interconnection, Network level interconnection, Interconnection through IP routers.
Network Models: Layered Tasks, The OSI Model, Layers in OSI Model, TCP/IP Protocol suite, Addressing.

Unit II:
Connecting devices: Passive hubs, repeaters, active hubs, Bridges, Two layer Switches, Routers, Three layer switches, Gateway, Backbone Networks. IP Datagram, fragmentation, options, IPv4 Addresses-Introduction, Classful addressing, Classless Addressing, Mobile IP-Addressing, Agents, Three phases, Inefficiency in Mobile IP, IPv6 protocol-Introduction, packet format,

Unit III:
TCP**:** TCP Services, TCP features, segment, A TCP connection, UDP- Introduction, User datagram, UDP Services: process-to-process communication, connectionless services, flow control, error control, congestion control, encapsulation and decapsulation.

Unit IV:
TCP Flow control-opening and closing windows, shrinking windows, silly window syndrome, TCP error control-checksum, acknowledgement, retransmission, out-of-order segments. TCP Congestion control- congestion window, congestion policy.

Unit V:
Stream Control Transmission Protocol: Introduction, SCTP services: process-to-process communication, multiple streams, multi homing, full-duplex communication, connection-oriented service. SCTP features: transmission sequence number, stream identifier, packets, acknowledgement number, flow control, error control, Packet format.

Unit VI:
Unicast Routing Protocols: Intra and Inter-domain Routing, Distance Vector Routing, RIP, Link State Routing, OSPF, Path Vector Routing, BGP, Multicast Routing- Unicast - Multicast- Broadcast, Multicast Applications, Multicast Routing.

Unit -VII:
Domain Name System (DNS)- Name Space, Domain Name Space, Distribution of Name Space, File Transfer (FTP and TFTP)- File Transfer Protocol (FTP), TFTP, Network Management-SNMP- Concept, Management Components, World Wide Web and HTTP-Architecture, web documents, HTTP transaction, Electronic Mail- *Architecture, Message transfer agent:* SMTP.

Unit-VIII:
Multimedia: Digitizing audio and video, Network security, security in the internet firewalls. Audio and video compression, Streaming stored audio/video, Streaming live audio/video, Real-time interactive audio/video, RTP.

TEXT BOOKS:
1. TCP/IP Protocol suite: Behrouz A. Forouzan, TMH, 4th Edition, 2010.
2. Internetworking with TCP/IP -- Douglas. E.Comer, Volume I, PHI, 2000.

REFERENCES:
1. Data communication & Networking: B.A. Forouzan, TMH, 4th Edition, 2008.
2. Data and Computer Communications, William Stallings, 8th Edition. Pearson Education, 2007.

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RADAR SYSTEMS
(ELECTIVE-VI)

UNIT I
Basics of Radar : Introduction, Maximum Unambiguous Range, Simple form of Radar Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications. Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise, Modified Radar Range Equation, Illustrative Problems.

UNIT II
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, System Losses (qualitative treatment), Illustrative Problems.

UNIT III
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

UNIT IV
FM-CW Radar, Range and Doppler Measurement, Block Diagram and Characteristics, (Approaching/ Receding Targets), FM-CW altimeter, Multiple Frequency CW Radar.

UNIT V
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.

UNIT VI
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 VII
Detection of Radar Signals in Noise : Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.

UNIT VIII
Radar Receivers – Noise Figure and Noise Temperature, Displays – types. Duplexers – Branch type and Balanced type, Circulators as Duplexers. Introduction to Phased Array Antennas – Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Applications, Advantages and Limitations.

TEXT BOOK:
Introduction to Radar Systems – Merrill I. Skolnik, TMH Special Indian Edition, 2nd ed., 2007.

REFERENCES:

1. Introduction to Radar Systems – Merrill I. Skolnik, 3rd ed., TMH, 2001.
2. Radar : Principles, Technology, Applications – Byron Edde, Pearson Education, 2004.
3. Radar Principles – Peebles, Jr., P.Z., Wiley, New York, 1998.

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SPREAD SPECTRUM COMMUNICATIONS
(ELECTIVE-VI)

Unit I
Introduction to spread spectrum systems: Fundamental concepts of spread spectrum systems, Pseudo noise sequences, Direct sequence spread spectrum, Frequency hop spread spectrum, Hybrid direct sequence frequency hop spread spectrum, Code division multiple access.

Unit II
Binary shift register sequences for spread spectrum systems: Introduction, Definitions, Mathematical background and sequence generator fundamentals, Maximal length sequences, Gold codes.

Unit III
Code tracking loops: Introduction, Optimum tracking of wideband signals, Base band delay-lock tracking loop, Tau-dither non- coherent tracking loop, Double dither non-coherent tracking loop.

Unit IV
Initial synchronization of the receiver spreading code: Introduction, Problem definition and the optimum synchronizer, Serial search synchronization techniques, Synchronization using a matched filter, Synchronization by estimated the received spreading code.

Unit V
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,

Unit VI
Multi-user detection in CDMA cellular radio: Optimal multi-user detection, Linear suboptimal detectors, Interference combat detection schemes, Interference cancellation techniques.

Unit VII
Performance of spread spectrum systems in jamming environments: Spread spectrum communication system model, Performance of spread spectrum systems without coding.

Unit VII
Performance of spread spectrum systems with forward error correction: Elementary block coding concepts, Optimum decoding rule, Calculation of error probability, Elementary convolution coding concepts, Viterbi algorithm, Decoding and bit-error rate.

TEXT BOOKS:

1. Rodger E ziemer, Roger L. Peterson and David E Borth, " Introduction to spread spectrum communication- Pearson, 1st Edition, 1995.
2. Mosa Ali Abu-Rgheff," Introduction to CDMA wireless communications." Elsevier publications, 2008.

REFERENCES:

1. George R. Cooper, Clare D. Mc Gillem," Modern Communication and Spread Spectrum," McGraw Hill, 1986.
2. Andrew j. viterbi," CDMA; Principles of spread spectrum communication," Pearson Education, 1st Edition, 1995.
3. Kamilo Feher," Wireless Digital Communications," PHI, 2009.
4. Andrew Richardson," WCDMA Design Handbook," Cambridge University Press, 2005.
5. Steve Lee - Spread Spectrum CDMA , McGraw Hill, 2002.

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III Year B.Tech. CSE -II Sem	**L**	**T/P/D**	**C**
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NETWORK SECURITY

UNIT - I
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, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

UNIT - II
Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC.

UNIT - III
Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service.

UNIT - IV
Email privacy: Pretty Good Privacy (PGP) and S/MIME.

UNIT - V
IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT - VI
Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT - VII
Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3.
Intruders, Viruses and related threats.

UNIT - VIII
Firewall Design principles, Trusted Systems. Intrusion Detection Systems.

TEXT BOOKS :
1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and Ryan Permeh, Wiley Dreamtech

REFERENCES :
1. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning.
2. Network Security - Private Communication in a Public World by Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
3. Cryptography and network Security, Third edition, Stallings, PHI/Pearson
4. Principles of Information Security, Whitman, Cengage Learning.
5. Cryptography and network Security,B.A.Forouzan,D.Mukhopadhyay,2nd edition,TMH.
6. Introduction to Cryptography, Buchmann, Springer.
7. Fundamentals of Network Security by Eric Maiwald (Dreamtech press)
8. Information Systems Security,Godbole,Wiley Student Edition.
9. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH

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IV Year B.Tech. ECE - II Sem **L T/P/D C**
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RF CIRCUIT DESIGN
(ELECTIVE-V)

Unit-I: Introduction
Importance of RF Design-Dimensions and Units-Frequency Spectrum-RF Behaviour of Passive Components: High Frequency Resistors, High Frequency Capacitors. High Frequency Inductors.-Chip Components and circuit board considerations: Chip Resistors, Chip Capacitors, and Surface Mount Inductors.

Unit-II: Review of Transmission Lines
Types of Transmission Lines-Equivalent Circuit representation-R, L, C, G parameters of different line configurations-Terminated Lossless Transmission lines-Special Terminations: Short Circuit, Open Circuit and Quarter Wave Transmission Lines- Sourced and Loaded transmission Lines: Power Considerations, Input Impedance Matching, Return Loss and Insertion Loss.

Unit-III: Single and Multi-Port Networks
The Smith Chart: Reflection Coefficient, Normalised Impedance-Impedance Transformation: Standing wave Ratio, Special Transformation Conditions-Admittance Transformation-Parallel and Series RL & RC Connections-Basic Definitions of Single and Multi-Port Networks-Interconnecting Networks.

Unit-IV: RF Filter Design
Scattering Parameters: Definition, Meaning, Chain Scattering Matrix, Conversion Between S- and Z-parameters, Signal Flow Chart Modeling, Generalization-Basic Resonator and Filter Configurations: Low Pass, High Pass, Band Pass and Band Stop type Filters-Filter Implementation using Unit Element and Kuroda's Identities Transformations-Coupled Filters.

Unit-V: Active RF Component Modelling
RF Diode Models: Nonlinear and Linear Models-Transistor Models: Large Signal and Small Signal BJT Models, Large Signal and Small Signal FET Models- Scattering Parameter Device Characterization.

Unit-VI: Matching and Biasing Networks
Impedance Matching Using Discrete Components: Two Component Matching Networks, Forbidden Regions, Frequency Response and Quality Factor, T and Pi Matching Networks-Amplifier Classes of Operation and Biasing Networks: Classes of Operation and Efficiency of Amplifiers, Biasing Networks for BJT, Biasing Networks for FET.

Unit-VII: RF Transistor Amplifier Design
Characteristics of Amplifiers- Amplifier Power Relations: RF Source, Transducer Power Gain, Additional Power Relations-Stability Considerations: Stability Circles, Unconditional Stability, And Stabilization Methods-Unilateral and Bilateral Design for Constant Gain- Noise Figure Circles- Constant VSWR Circles.

Unit-VIII: RF Oscillators and Mixers
Basic Oscillator Model: Negative Resistance Oscillator, Feedback Oscillator Design, Design steps, Quartz Oscillators- Fixed Frequency High Frequency Oscillator -Basic Characteristics of Mixers: Concepts, Frequency Domain Considerations, Single Ended Mixer Design, Single and Double Balanced Mixers.

TEXT BOOKS:

1.RF Circuit Design – Theory and applications by Reinhold Ludwig, Pavel Bsetchko – Pearson Education India, 2000.
2.fRadio Frequency and Microwave communication circuits – Analysis and Design by Devendra K.Misra – Wiley Student Edition – John Wiley & Sons, Inc.

REFERENCES:

1 Radio Frequency and Microwave Electronics – illustrated by Matthew M. Radmanesh – PEI.
2 RF Circuit Design – Christopher Bowick, Cheryl Aljuni and john Biyler, Elsevier science, 2008.
3. Secrets of RF Circuit Design by Joseph J.Carr, TMH, 2000.
4. Design of RF and Microwave Amplifiersand Oscillators, Peter L.D. Abrif, Artech House, 2000.
5. The Design of CMOS Radio Frequency Integrated circuits by Thomas H.Lee , 2/e – CambridgeUniversity Press, 2004.

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WIRELESS COMMUNICATIONS AND NETWORKS
(ELECTIVE-V)

Unit I
Introduction To Wireless Communication Systems: Evolution of mobile radio communications, Examples of wireless communication systems, Paging systems, Cordless telephone systems, Comparison of various wireless systems.

Unit II
Modern Wireless Communication Systems: Second generation cellular networks, Third generation wireless networks, Wireless in local loop, Wireless local area networks, Blue tooth and Personal area networks.

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

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

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

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

Unit VII
Wireless Lan: Historical overviews of the LAN industry, Evolution of the WLAN industry, Wireless home networking, IEEE 802.11. The PHY Layer, MAC Layer, wireless ATM, HYPER LAN, HYPER LAN – 2.

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

TEXT BOOKS:

1. Theodore S. Rappaport , "Wireless Communications and Applictions," Pearson Education - 2003.
2. Upen Dalal, "Wireless Communications," Oxford University Press, 2010.
3. Kaveh Pahlavan, Prashant Krishnamoorthy, "Principles of Wireless Networks, - A united approach," Pearson Education, 2002.

REFERENCES:

1. P.Nicopolitidis, M.S.Obaidat, G.I. papadimitria, A.S. Pomportsis, "Wireless Networks," John Wiley & Sons, 2003.
2. X.Wang and H.V.Poor, "Wireless Communication Systems," Pearson education, 2004.
3. Dr.Sunil Kumar S. Manvi, Mahabaleshwar S. Kakkasageri,"Wireless and Mobile Networks: concepts and Protocols," Wiley India, 2010.
4. Jon W. Mark and Weihua Zhqung," Wireless Communication and Networking," PHI, 2005.
5. Jochen Schiller, "Mobile Communications," Pearson Education,2nd Edition, 2003.

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IV Year B.Tech. ECE - II Sem **L T/P/D C**
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DIGITAL DESIGN THROUGH VERILOG HDL
(ELECTIVE-V)

Unit I
Introduction to Verilog HDL: Verilog as HDL, Levels of Design description, Concurrency, Simulation and Synthesis, Function Verification, System tasks, Programming Language interface, Module, Simulation and Synthesis tools

Unit II
Language Constructs and Conventions: Introduction, Keywords, Identifiers, White space Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data types, Scalars and vectors, parameters, operators.

Unit III
Gate Level Modeling: Introduction, AND Gate Primitive, Module structure, other gate primitives, illustrative examples, tristate gates, array of instances of primitives, Design of Flip –Flops with gate primitives, Delays, Strengths and Construction resolution, Net types, Design of basic circuit.

Unit IV
Behavioral Modeling: Introduction, Operations and assignments, functional bifurcation, 'Initial' construct, 'always' construct, Assignments with Delays, 'wait' construct, multiple always block, Designs at behavioral level, blocking and non- blocking assignments, the 'case' statement, simulation flow 'if' an 'if-else' constructs, 'assign- de-assign' construct, 'repeat' construct, for loop, ' the disable' construct, 'while loop', for ever loop, parallel blocks, ' force- release, construct, Event.

Unit V
Modeling at Dataflow Level: Introduction, Continuous assignment structure, delays and continuous assignments, assignment to vectors, operators.
Switch level modeling: Basic transistor switches, CMOS switches, bi directional gates, time delays with switch primitives, instantiation with 'strengths' and ' delays', strength contention with Trireg nets.

Unit VI
System Tasks, Functions and Compiler Directives: Parameters, Path delays, module parameters, system tasks and functions, file based tasks and functions, computer directives, Hierarchical access, User defined Primitives.

Unit VI
Sequential Circuit Description: Sequential models – feedback model, capacitive model, implicit model, basic memory components, functional register, static machine coding, sequential synthesis

Unit VIII
Component Test and Verification: Test bench- combinational circuit testing, sequential circuit testing, test bench techniques, design verification, assertion verification.

TEXT BOOKS:
1. T R. Padmanabhan, B Bala Tripura Sundari, Design through verilog HDL, Wiley, 2009.
2. Zainalabdien Navabi, Verilog Digital System Design, TMH, 2nd edition.

REFERENCES:
1 Fundamentls of Digital Logic with Veilog design by Stephen Brown, Zvonkoc Vranesic, TMH, 2nd edition, 2010
2. Digital Logic Design using Verilog , State machine & synthesis for FPGA, Sunggu Lee, Cengage Learning ,2009
3 Verilog HDL - Samir Palnitkar, 2nd Edition, Pearson Education, 2009
4. Advanced Digital Design with the Verilog HDl – Michel D. Ciletti, PHI, 2009

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PATTERN RECOGNITION
(ELECTIVE-V)

UNIT I
PATTERN PREPROCESSING AND FEATURE SELECTION: Introduction, distance measures, clustering transformation and feature ordering, clustering in feature selection through entropy minimization, features selection through orthogonal expansion, binary feature selection.

UNIT II: PATTERN RECOGNITION OVER VIEW:
Pattern recognition, classifications description, patterns and features extraction with examples training and learning in PR systems, pattern recognition approaches

UNIT III: STATISTICAL PATTERN RECOGNITION-I:
Introduction to statistical pattern recognition, the Gaussian case and class dependence, discriminant functions, classifier performance, risk and errors

UNIT IV: STATISTICAL PATTERN RECOGNITION-II:
Bays classified decision-For Bayes classifier, Bayes classifier for normal patterns. Trainable pattern classifiers-determineistic approach perceptron approach reward-punishment concept Gradient approach,- Gradient Descent algorithms-LMSE Algorithms-Multi category classification.

UNIT V: SYNTACTIC PATTERN RECOGNITION:
Recognition with strings: String matching, Edit Distance, Computational complexity, string matching with errors, string matching with the "Don't-Care" symbol, Grammatical methods: Grammars, Types of string grammars, a grammar for pronouncing numbers, recognition using grammars, Grammatical Inference, Rule based methods: Learning rules

UNIT-VI: HIDDEN MARKOV MODELS:
First-order Markov models, first-order Hidden Markov models, hidden Markov model computation, evaluation, HMM decoding, learning.

UNIT-VII: UNSUPERVISING LEARNING AND CLUSTERING:
Clustering concepts- cluster seeking algorithms – maximum distance. Clustering techniques to directly obtain linear classifiers. Formulation of unsupervised learning problems, clustering for unsupervised learning: LVQ, clustering strategies K-means algorithm, min-max clustering.

UNIT-VIII: SUPERVISING LEARNING:
Clustering Concepts – Cluster Seeking Algorithms, Maximum distance, clustering techniques to directly obtain linear classifiers.

TEXT BOOKS:

1. Pattern Classification - Richard duda, Hart, David strok, John Wiley, 2nd edition, 2008
2. Pattern Recognition: Statistical structure and neural approaches - sRobert Schalkoff, Wiley , 2007
3. Pattern Recognition principles -Tou.Rafael. Gonzalez, Pearson education.1978, 1st Edition.

REFERENCES:

1. Pattern recognition and Image analysis - Gose Johnsonbaught. Jost PHI, 2008
2. Pattern Recognition: Concepts, Methods and Applications - J.P.Marques de Sa, Springer, 2008.
3. Pattern Recognition - Rajjan Shingal, Oxford, 2009.

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INDUSTRY ORIENTED MINI PROJECT

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PROJECT WORK

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COMPREHENSIVE VIVA