PROFILE OF DEPARTMENT OF ECE

The Department of Electronics & Communication Engineering came into existence in 1985 immediately when the institute was founded. The department aims at training up Youngman and women for careers in Engineering, synthesizing conventional and modern engineering thinking with a global outlook. The academic programme that the Department offers focuses itself on an innovative design that blends creativity and analytical skills, system orientation and a process oriented learning. The Department strives to deliver quality education and to keep pace with the changes, growth and advances in the area of Electronics & Communication Engineering with the help of the existing committed and competent Faculty, high quality infrastructure and a good learning environment.

The Department set up laboratories in various areas of Electronics & Communication Engineering to cater to the ever changing practical training requirements of the students. They are also being upgraded and modernized from time to time such that the new gives place to the obsolete.

The alumni of the Department hold top positions in the best of companies, both in India and abroad, such as CTS,TCS, MOTOROLA, INTEL, TEXAS, IBM, WIPRO, SATYAM, INFOSYS, ECIL, BHEL, TATA-CELLULAR, among others.

Projects:

The Department has a good track record in completing Projects. Some of the projects include:

- Modernization of Microwave & Advanced Communication Engineering Laboratory at an expenditure of Rs. 6.5 Lakhs under AICTE MODROBS Scheme.
- Modernization of Microprocessor Laboratory involving an amount of Rs. 6.5 lakhs sanctioned by AICTE under MODROBS Scheme.
- A student project scheme “Real time text to speech conversion” carried out at ECIL, Hyderabad sponsored by APCOST, Hyderabad.
- APCOST, Hyderabad sponsored under student project scheme “Microprocessor Controlled Robot Arm”.
- Simulated Laser Rifle based on Microprocessor” carried out in the college for NCC cadets, Guntur under student project programme.

- "MODROBS – Modernization of Communication Engineering Laboratory", funded by AICTE, worth Rs. 13 lakhs.
- Research Project "Design of array Antennas for the generation of shaped beams", funded by UGC, worth Rs. 11.67 lakhs

The Department organizes Seminars and Guest Lectures on a regular basis by experts to bring practical bias to the class room discussion and to facilitate students to interact with them for improving their effectiveness in the era of sweeping change. Besides, the department of ECE arranges visits to industrial establishments from time to time to expose the students to practical situations.

Facilities

a) Infrastructure facilities:

The institute is well equipped with all the infrastructural requirements to meet both academic and non-academic needs of the students.

b) Laboratories:

The laboratory courses have been designed specific to the related theory subjects including advanced topics in theory.

The Laboratories of ECE Department have been re-organized into:

a) Basic Electronics Lab
b) Digital Electronics Lab
c) Electronics Engineering – II Lab
d) Communication Engineering Lab
e) Computer Simulation Lab
f) Microprocessor Lab
g) Microwave & Advanced Communication Engineering Lab
h) VLSI Lab
i) Microcontrollers Lab
j) Digital Systems Lab

The Department is equipped with a library that has a collection of 512 books, research papers, theses, engineering project reports etc. A computer Center has been established exclusively for ECE students with a total of 48 systems, all are of P-IV type. The Digital Systems lab has 40 P-IV Computers & 1 Server. The Microprocessors & Controller Lab has 40 P-IV Computers.

Special classes are being conducted regularly for the students to help excel in various competitive examinations like, GATE, GRE, TOEFL, Engineering Services exam etc. The Department facilitates the students to acquire technical communication skills, in addition to soft inter-personal skills. The department curriculum has been designed to inculcate these traits through classroom teaching, experimental learning & discussions, invited lectures from promising industrial and scientific personalities.

In order to disseminate knowledge, the department has been organizing a good number of National Level MEETs inviting students from all over the country to participate in various competitions like paper presentations, quizzes, software contests etc. Further, the department has an ECE Association, IETE student Forum which provide a platform for students to participate in various events like seminars, elocutions, debates, group discussions, quizzes etc., as these activities are essential for their all round development. These activities help the students to improve their leadership, organizing and communication skills.

The department conducts at regular intervals seminars, workshops and student paper contests to enrich the knowledge of the students and staff. In the last few years, the Department organized:

a) AICTE – ISTE sponsored short term training programme on Wireless and Mobile Communications.
b) AICTE sponsored seminar on Challenges in VLSI design.
c) National Workshop on VLSI design.
d) National level student paper contests.
e) National Conference on Signal Processing & Communication Systems

Faculty:

The Department of ECE is presently endowed with adequate number of Faculty, drawn from among the very best in the profession. At present, there are two Professors, seven Assistant Professors and 17 Lecturers working in the Department with great commitment and devotion for the cause of professional Engineering education.

ACHARYA NAGARJUNA UNIVERSITY: NAGARJUNA NAGAR

REVISED REGULATIONS FOR
FOUR - YEAR B.TECH. DEGREE COURSE
(CREDIT BASED SYSTEM)

(Effective for the batch of students admitted into first year B.Tech. from the academic year 2011-2012).

1.0. MINIMUM QUALIFICATIONS FOR ADMISSION:

A candidate seeking admission into First Year of B.Tech. Degree Course should have passed either Intermediate examination conducted by the Board of Intermediate Education, Andhra Pradesh with Mathematics, Physics, and Chemistry as optional subjects (or any equivalent examination recognized by the Acharya Nagarjuna University) or Diploma in Engineering in the relevant branch conducted by the State Board of Technical Education & Training of Andhra Pradesh (or equivalent Diploma recognized by Acharya Nagarjuna University).

The selection is based on the rank secured by the candidate at the EAMCET / ECET (FDH) examination conducted by A.P. State Council of Higher Education.

The candidate shall also satisfy any other eligibility requirements stipulated by the University and / or the Government of Andhra Pradesh from time to time.

2.0. BRANCHES OF STUDY:

2.1. The B.Tech. Course is offered in the following branches of study at one or more of the affiliated colleges:

1 Biotechnology
2 Chemical Engineering
3 Civil Engineering
4 Computer Science & Engineering
5 Electrical & Electronics Engineering
6 Electronics & Communication Engineering
7 Electronics & Instrumentation Engineering
8 Information Technology
9 Mechanical Engineering

2.2 The first year of study is common to all branches of Engineering except for Chemical Engineering and Biotechnology.

2.3 In addition to the core electives, an open elective (non departmental elective) is to be offered in the first semester of fourth year by all branches of B.Tech. courses.

3.0. DURATION OF THE COURSE AND MEDIUM OF INSTRUCTION:

3.1 The duration of the course is four academic years consisting of two semesters in each academic year where as annual pattern is followed for first year. The medium of instruction and examination is English.

3.2 The duration of the course for the students (Diploma Holders) admitted under lateral entry into II B.Tech. is three academic years consisting of two semesters in each academic year. The medium of instruction and examination is English.

4.0. MINIMUM INSTRUCTION DAYS:

The first year shall consist of a minimum number of 180 instruction days and each semester of 2nd, 3rd and 4th years shall consist of 90 days of instruction excluding the days allotted for tests, examinations and preparation holidays.

5.0 EVALUATION:

The performance of the students in each year/ semester shall be evaluated subject wise

5.1. The distribution of marks between sessional work (based on internal assessment) and University Examination will be as follows:

Nature of the subject	Sessional Marks	University Exam. Marks
Theory subjects	30	70
Design and / or Drawing	30	70
Practicals	**30**	**70**
Mini projects/Seminar	**100**	**-**
Project work	50	**150 (**Viva voce)

5.2. In the First Year, there shall be three Mid Term Examinations and three Assignment Tests in theory subjects, conducted at approximate equal intervals in the academic year. Assignment questions shall be given at least one week in advance and the students shall answer the question(s) specified by the concerned teacher just before the commencement of the Assignment Test. A maximum of 18 Sessional marks (75% approx) shall be awarded based on the best two performances out of the three Mid Term Exams and a maximum of 7 (25% approx) marks for the best two Assignment Tests out of the three Assignment Tests conducted.

For Drawing subject (Engineering Graphics), 7 marks shall be awarded based on day-to-day class work and the remaining 18 marks based on the best two performances in the three Mid Term Exams. No separate Assignment Tests will be held for this subject.

The remaining 5 marks out of the 30 marks earmarked for the internal sessional marks are allotted for attendance in the respective theory and drawing subjects in a graded manner as indicated in ***clause* 7.2** from I year to IV year.

In each of the Semesters of 2^{nd}, 3^{rd} and 4^{th} years, there shall be two Mid Term examinations and two Assignment Tests in every theory subject. The Sessional marks for the midterm examinations shall be awarded giving a weightage of 14 marks out of 18 marks (75% approx) to that midterm examination in which the student scores more marks and the remaining 4 marks (25% approx.) for other midterm examination in which the student scores less marks. Similarly a weightage of 5 marks (75% approx) out of 7 marks earmarked for assignment tests shall be given for the assignment in which the student scores more marks and remaining 2 marks (25% approx) shall be given for the assignment test in which the student scores less marks.

For Drawing subjects, there shall be only two Mid Term examinations in each semester with no Assignment Tests. In case of such subjects a maximum of seven marks shall be given for day-to-day class work and the remaining maximum 18 marks shall be awarded to the Mid Term examinations taking into account the performance of both the Mid Term examinations giving weightage of 14 marks for the Mid Term Examination in which the student scores more marks and the remaining 4 marks for the other midterm examination. A weightage of 5 marks will be given in the total sessional marks of 30 for attendance in all theory and drawing subjects as indicated in ***clause* 7.2.**

5.3. The evaluation for Laboratory class work consists of weightage of **20** marks for day to day laboratory work including record work and 10 marks for internal laboratory examination including Viva-voce examination.

In the case of Project work, the sessional marks shall be awarded based on the weekly progress and based on the performance in a minimum of two Seminars and the Project Report submitted at the end of the semester. The allotment of sessional marks for Seminars and for day-to-day class work shall be **20 and 30.**

NOTE : A student who is absent for any Assignment / Mid Term Exam, for any reason whatsoever, shall be deemed to have scored zero marks in that Test / Exam and no make-up test / Exam shall be conducted.

5.4. A student who could not secure a minimum of 50% aggregate sessional marks is not eligible to appear for the year-end / semester-end University examination and shall have to repeat that year/ semester.

6.0. LABORATORY / PRACTICAL CLASSES:

In any year/semester, a minimum of 90 percent experiments / exercises specified in the syllabi for laboratory course shall be conducted by the students, who shall complete these in all respects and get the Record certified by the concerned Head of the Department for the student to be eligible to face the University Examination in that Practical subject.

7.0. ATTENDANCE REGULATIONS:

7.1 Regular course of study means a minimum average attendance of 75% in all the subjects computed by totaling the number of hours / periods of lectures, design and / or drawing, practicals and project work as the case may be, held in every subject as the denominator and the total number of hours / periods actually attended by the student in all the subjects, as the numerator.

7.2 A Weightage in sessional marks upto a maximum of 5 marks out of 30 marks in each theory subject shall be given for those students who put in a minimum of 75% attendance in the respective theory in a graded manner as indicated below:

Attendance of 75% and above but less than 80%	- 1 mark
Attendance of 80% and above but less than 85%	- 2 marks
Attendance of 85% and above but less than 90%	- 3 marks
Attendance of 90% and above	- 5 marks

7.3 Condonation of shortage in attendance may be recommended on genuine medical grounds, up to a maximum of 10% provided the student puts in at least 65% attendance as calculated in ***clause* 7.1** above and provided the principal is satisfied with the genuineness of the reasons and the conduct of the student.

7.4 A student who could not satisfy the minimum attendance requirements, as given above, in any year / semester, is not eligible to appear for the year end or semester end examinations and shall have to repeat that year/semester.

8.0 DETENTION:

A student, who fails to satisfy either the minimum attendance requirements as stipulated in *Clause-7*, or the requirement of minimum aggregate sessional marks as stipulated in *Clause 5*, shall be detained. Such a student shall have to repeat the same year / semester as the case may be subsequently and satisfy the above requirements afresh to become eligible to appear for the year-end / semester-end University examination.

9.0. UNIVERSITY EXAMINATION:

9.1. For each theory, design and/or drawing subject, there shall be a comprehensive University Examination of three hours duration at the end of First year / each Semester of 2nd, 3rd and 4th years, except where stated otherwise in the detailed Scheme of Instruction.

Question paper setting shall be entrusted to external examiners from the panels approved by the respective Boards of Studies.

9.2. For each Practical subject, the University examination shall be conducted by one internal and one external examiner appointed by the Principal of the concerned college and the University respectively, the duration being that approved in the detailed Schemes of Instruction & Examination.

9.3 Viva-voce Examination in Project Work shall be conducted by one internal examiner and one external examiner to be appointed by the University.

10. **AWARD OF CREDITS**

Credits are awarded for each Theory/Practical Subjects. Each theory subject is awarded 4 credits and each practical subject is awarded 2 credits. Project work is awarded 10 credits. However for some important theory subjects more than 4 credits may be awarded by individual boards. The total number of credits for all the four years put together should be in the range of 218-224 for any branch.

10.1 AWARD OF GRADES

S.No.	Range of Marks	Grade	Grade Points
1	≥85%	S	10.0
2	75%-84%	A	9.0
3	65%-74%	B	8.0
4	55%-64%	C	7.0
5	45%-54%	D	6.0
6	40%-44%	E	5.0
7	≤39%	F(Fail)	0.0
8	The grade 'W' represents withdrawal/absent (subsequently changed into pass or E toS or F grade in the same semester)	W	0.0

10.2 A Student securing 'F' grade in any subject there by securing 0 grade points has to reappear and secure at least 'E' grade at the subsequent examinations in that subject.

10.3 After Ist year/each semester, Grade sheet will be issued which will contain the following details:

- **The list of subjects for the 1st year/each semester and corresponding credits and Grades obtained**
- **The Grade Point Average(GPA) for the 1st year/ each semester and**
- **The Cumulative Grade Point Average(CGPA) of all subjects put together up to that semester from first year onwards**

GPA is calculated based on the fallowing formula:

$$\frac{\text{Sum of [No.Credits X Grade Points]}}{\text{Sum of Credits}}$$

CGPA will be calculated in a similar manner, considering all the subjects enrolled from first year onwards.

11.0 CONDITIONS FOR PROMOTION

11.1. A student shall be eligible for promotion to II B.Tech. Course if he / she satisfies the minimum requirements of attendance and sessional marks as stipulated in Clauses 5 and 7, irrespective of the number of backlog subjects in I B.Tech.

11.2. A student shall be eligible for promotion to III B.Tech. Course if he / she **secures a minimum of 70% of the total number of credits from one regular and one supplementary examinations of I B.Tech.**, (including practical subject) in addition to satisfying the minimum requirements of attendance and sessional marks stipulated in *Clauses 5 and 7* in II/IV B.Tech.

11.3. A student shall be eligible for promotion to IV B.Tech. course if he/she **secures a minimum of 70% of the total number of credits from two regular & two supplementary examinations of I B.Tech. and two regular & one supplementary examinations of II B.Tech. 1st semester and one regular & one supplementary examinations of II B.Tech. 2nd semester** (including practical subjects) in addition to satisfying the minimum requirements of attendance and sessional marks stipulated in *Clauses 5 and 7* in III B.Tech.

11.4. A student (Diploma Holder) admitted under lateral entry into II B.Tech. shall be eligible for promotion to IV B.Tech. course if he/she secures a minimum of 70% of the total number of credits from two regular & one supplementary examinations of II B.Tech. 1st semester and one regular & one supplementary examinations of II B.Tech. 2nd semester (including practical subjects) in addition to satisfying the minimum requirements of attendance and sessional marks stipulated in *Clauses 5 and 7* in III B.Tech.

12.0 ELIGIBILITY FOR AWARD OF B.TECH. DEGREE

The B.Tech. Degree shall be conferred on a candidate who has satisfied the following requirements.

12.1 The candidate must have satisfied the conditions for pass in all the subjects of all the years as stipulated in *clause 10.*

12.2. Maximum Time Limit for completion of B.Tech Degree

A Student, who fails to fulfill all the academic requirements for the award of the degree within eight academic years from the year of admission, shell forfeit his/her seat in B.Tech. course.

12.3 A student (Diploma Holder) admitted under lateral entry into II B.Tech., who fails to fulfill all the academic requirements for the award of the degree within six academic years from the year of admission, shell forfeit his/her seat in B.Tech. course.

13.0 AWARD OF CLASS

A candidate who becomes eligible for the award of B.Tech. Degree as stipulated in *Clause 12* shall be placed in one of the following Classes.

S.No.	Class	CGPA
1	First Class With Distinction	8.0 or more
2	First Class	6.5 or more but less than 8.0
3	Second Class	5.0 or more but less than 6.5
4	Pass Class	4.5 or more but less than 5.0

14.0. IMPROVEMENT OF CLASS

14.1. A candidate, after becoming eligible for the award of the Degree, may reappear for the University Examination in any of the theory subjects as and when conducted, for the purpose of improving the aggregate and the class. But this reappearance shall be within a period of two academic years after becoming eligible for the award of the Degree.

However, this facility shall not be availed of by a candidate who has taken the Original Degree Certificate. Candidates shall not be permitted to reappear either for Sessional Examination or for University Examinations in Practical subjects (including Project Viva-voce) for the purpose of improvement.

14.2. A single **Grade sheet** shall be issued to the candidate after incorporating the **Credits and Grades** secured in subsequent improvements.

14.3. A consolidated **Grade Sheet** shall be issued to the candidate indicating the **CGPA of all the four years put together** along with the Provisional Certificate.

15. AWARD OF RANK

The rank shall be awarded based on the following:

15.1. Ranks shall be awarded in each branch of study for the top ten percent of the students appearing for the Regular University Examinations or the top ten students whichever is lower.

15.2. Only such candidates who pass the Final year examination at the end of the fourth academic year after admission as regular final year students along with the others in their batch and become eligible for the award of the Degree shall be eligible for the award of rank. The University Rank will be awarded only to those candidates who complete their degree within four academic years.

15.3. For the purpose of awarding rank in each branch, **the CGPA calculated based on the Grades** secured at the first attempt only shall be considered.

15.4. Award of prizes, scholarships, or any other Honors shall be based on the rank secured by a candidate, consistent with the desire of the Donor, wherever applicable.

16.0 SUPPLEMENTARY EXAMINATIONS

In addition to the Regular University Examinations held at the end of 1st year / each semester, Supplementary University Examinations will be conducted during the academic year. Such of the candidates taking the Regular / Supplementary University examinations as Supplementary candidates may have to take more than one University Examination per day.

17.0 TRANSITORY REGULATIONS

17.1. Candidates who studied the four-year B.Tech. Degree Course under Revised Regulations (RR)/ **Credit based Regulations(CR**) but who got detained in any year for want of attendance / minimum aggregate sessional marks may join the appropriate year / semester in the Semester system applicable for the batch and be governed by the Regulations of that batch from then on.

17.2. University Examinations according to **RR / CR** shall be conducted in subjects of each year five times after the conduct of the last set of regular examinations under those Regulations.

17.3. Candidates who have gone through the entire course of four academic years and have satisfied the attendance and minimum aggregate sessional marks **in 1st year/each semester under RR/CR**, but who are yet to pass some subjects even after the five chances stated in *Clause 17.2*, shall appear for the equivalent subjects in the Semester system, specified by the University / Board of Studies concerned.

18. 0 AMENDMENTS TO REGULATIONS

The University may, from time to time, revise, amend, or change the Regulations, Schemes of Examinations, and / or Syllabi.

ACHARYA NAGARJUNA UNIVERSITY
SCHEME OF INSTRUCTION AND EXAMINATION
w.e.f. 2011-2012(semester System)
I/IV B.Tech. (All Branches) ANNUAL PATTERN (for I B.Tech. only)
(Except Chemical Engg. And Bio-Technology)

Sl. No.	Course Details		Scheme of Instruction		Scheme of Examination			Credits
	Code No.	Subject Name	Periods per week		Maximum Marks		Total Marks	
			Lecture + Tutorial	Drawing / Practical	Sessional	University		
1.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 101	Mathematics-I	3	--	30	70	100	4
2.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 102	Mathematics-II	3	--	30	70	100	4
3.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 103	Engineering Physics	3	--	30	70	100	4
4.	CE/CSE/ECE/EEE/ EI/IT/ME – 104	Engineering Chemistry	3	--	30	70	100	4
5.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 105	Professional Communication Skills	3	--	30	70	100	4
6.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 106	C Programming and Numerical Methods	3	--	30	70	100	4
7.	CE/CSE/ECE/EEE/ EI/IT/ME – 107	Engineering Mechanics	3+1	--	30	70	100	4
8.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 108	Engineering Graphics*	2+4	--	30	70	100	4
9.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 151	Physics Lab	--	3	30	70	100	2
10.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 152	Chemistry Lab	--	3	30	70	100	2
11.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 153	Workshop Practice	--	3	30	70	100	2
12.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 154	Computer Programming Lab	--	3	30	70	100	2
	TOTAL		23+5	12	360	840	1200	40

* Two different question papers will be set for the University Examination. One question paper for CE,ME,EEE,Ch.E and BT branches and the University Examination will be conducted in Morning Session. The second question paper will be set for ECE,EI,CSE & IT branches and the University exam will be conducted in Evening Session

ACHARYA NAGARJUNA UNIVERSITY
SCHEME OF INSTRUCTION AND EXAMINATION
w.e.f. 2011-2012(semester System)
ELECTRONICS & COMMUNICATION ENGINEERING BRANCH
II/IV B.TECH - I SEMESTER

II / I Semester:

Sl. No.	COURSE DETAILS		Scheme of Instruction		Scheme of Examination			Credits
	Code No.	Subject Name	Periods per week		Maximum Marks		Total Marks	
			Lecture+ Tutorial	Practical	Sessional	University		
1	EC/EI/EE-211	Mathematics-III	4	-	30	70	100	4
2	BT/CHE/ EC/EE/EI-212	Environmental Studies	4	-	30	70	100	4
3	EC/EE/EI-213	Circuit Theory	4+1	-	30	70	100	4
4	EC/EE/EI-214	Electronic Devices and Circuits	4	-	30	70	100	4
5	EC-215	Electronic Magnetic Field Theory And Transmission Lines	4	--	30	70	100	4
6	EC/EE/EI-216	Digital Logic Design	4+1	-	30	70	100	4
7	EC/EI-217	Electrical Technology	4	-	30	70	100	4
8	EC-251	Electronic Devices & Circuits Lab	-	3	25	50	75	2
9	EC/EI-252	Digital Logic Design Lab	-	3	25	50	75	2
TOTAL			**28+2**	**6**	**260**	**590**	**850**	**32**

ACHARYA NAGARJUNA UNIVERSITY
SCHEME OF INSTRUCTION AND EXAMINATION
w.e.f. 2011-2012(semester System)
ELECTRONICS & COMMUNICATION ENGINEERING BRANCH
II/IV B.TECH - II SEMESTER

II / II Semester:

Sl. No.	COURSE DETAILS		Scheme of Instruction		Scheme of Examination			Credits
	Code No.	Subject Name	Periods per week		Maximum Marks		Total Marks	
			Lecture + Tutorial	Practical	Sessional	University		
1	EC/EE/ EI-221	Mathematics-IV	4	-	30	70	100	4
2	EC/EE/ EI-222	Data Structures Using C ++ (EC,EEE, EI)	4+1	-	30	70	100	4
3	EC/EE/ EI-223	Electronic Circuit Analysis	4	-	30	70	100	4
4	EC-224	Electronic Measurements and Instrumentation	4	-	30	70	100	4
5	EC-225	Network Analysis & Synthesis	4+1	-	30	70	100	4
6	EC/EI-226	Signals and Systems	4+1	-	30	70	100	4
7	EC-261	Electronic Circuits and Analysis Lab	-	3	25	50	75	2
8	EC-262	Signals and Systems Lab	-	3	25	50	75	2
9	EC/EE/ EI-263	Data Structures Lab	-	3	25	50	75	2
TOTAL			**24+3**	**9**	**255**	**570**	**825**	**30**

ACHARYA NAGARJUNA UNIVERSITY
SCHEME OF INSTRUCTION AND EXAMINATION
w.e.f. 2011-2012(semester System)
ELECTRONICS & COMMUNICATION ENGINEERING BRANCH
III/IV B.TECH - I SEMESTER

III / I Semester:

Sl. No.	COURSE DETAILS		Scheme of Instruction		Scheme of Examination			Credits
	Code No.	Subject Name	Periods per week		Maximum Marks		Total Marks	
			Lecture + Tutorial	Practical	Sessional	University		
1	EC-311	Professional Ethics and Human Values	4	-	30	70	100	4
2	EC/EE/ EI-312	Linear Control Systems	4+1	] -	30	70	100	4
3	EC/EI-313	Computer Organization & Operating Systems	4	-	30	70	100	4
4	EC/EE/ 314	Linear Integrated Circuits and Applications	4	-	30	70	100	4
5	EC-315	Pulse Circuits	4	-	30	70	100	4
6	EC-316	Analog Communications	4+1	-	30	70	100	4
7	EC-351	Analog Communications Lab	4	-	30	70	100	2
8	EC-352	Electronics Circuit Simulation Lab	-	3	25	50	75	2
9	EC-353	Pulse Circuits and IC's Lab	-	3	25	50	75	2
TOTAL			**28+2**	**6**	**260**	**590**	**850**	**30**

ACHARYA NAGARJUNA UNIVERSITY
SCHEME OF INSTRUCTION AND EXAMINATION
w.e.f. 2011-2012(semester System)
ELECTRONICS & COMMUNICATION ENGINEERING BRANCH
III/IV B.TECH - II SEMESTER

III / II Semester:

Sl. No.	COURSE DETAILS		Scheme of Instruction		Scheme of Examination			Credits
	Code No.	Subject Name	Periods per week		Maximum Marks		Total Marks	
			Lecture + Tutorial	Practical	Sessional	University		
1	EC-321	Digital Communications	4	-	30	70	100	4
3	EC/EE/EI-322	Microprocessors and Microcontrollers	4+1	-	30	70	100	4
4	EC/EE/EI-323	Digital Signal Processing	4+1	-	30	70	100	4
5	EC-324	Antennas and Wave Propagation	4	-	30	70	100	4
6	EC-325	Computer Networks	4	-	30	70	100	4
	EC-326	ELECTIVE -I	4	-	30	70	100	4
7	EC/EE/EI-361	Microprocessors and Microcontroller Lab	-	3	25	50	75	2
8	EC-362	Digital Communications Lab	-	3	25	50	75	2
9	EC-363	Communication Skills Lab	-	3	25	50	75	2
TOTAL			**24+3**	**9**	**255**	**570**	**825**	**30**

Elective-I

a) T.V.Engineering
b) Data base Management Systems
c) Biomedical Engineering
d) d)Artificial Engineering

ACHARYA NAGARJUNA UNIVERSITY
SCHEME OF INSTRUCTION AND EXAMINATION
w.e.f. 2011-2012(semester System)
ELECTRONICS & COMMUNICATION ENGINEERING BRANCH
IV/IV B.TECH - I SEMESTER

IV / I Semester:

Sl. No.	COURSE DETAILS		Scheme of Instruction		Scheme of Examination			Credits
	Code No.	Subject Name	Periods per week		Maximum Marks		Total Marks	
			Lecture+ Tutorial	Practical	Sessional	University		
1	EC/EE/EI-411	Industrial Management	4	-	30	70	100	4
2	EC/EI-412	Digital Image Processing	4	--	30	70	100	4
3	EC-413	Microwave and Radar Engineering	4	-	30	70	100	4
4	EC/EI-414	VLSI Design	4	-	30	70	100	4
5	EC-415	**Elective-II:**	4	-	30	70	100	4
6	EC-416	**Elective –III:**	4	-	30	70	100	4
7	EC-451	VHDL Lab	-	3	25	-	25	2
8	EC-452	Digital Signal Processing Lab	-	3	25	50	75	2
9	EC-453	Term Paper / Mini Project	-	3	25	50	75	2
TOTAL			**24**	**9**	**255**	**520**	**775**	**30**

Elective II
a) Applied Electronics
b) Basic Communication

Elective-III
a.DSP Processors
b. Neural Networks
c. Speech Signal Processing
d. Satellite communication

ACHARYA NAGARJUNA UNIVERSITY
SCHEME OF INSTRUCTION AND EXAMINATION
w.e.f. 2011-2012(semester System)
ELECTRONICS & COMMUNICATION ENGINEERING BRANCH
IV/IV B.TECH - II SEMESTER

IV / II Semester:

Sl. No.	COURSE DETAILS		Scheme of Instruction		Scheme of Examination			Credits
			Periods per week		Maximum Marks			
	Code No.	Subject Name	Lecture+ Tutorial	Practical	Sessional	University	Total Marks	
1	EC-421	Mobile & Cellular Communications	4	-	30	70	100	4
2	EC-422	Optical Communications	4	-	30	70	100	4
3	EC-423	Telecommunications Switching Networks	4	-	30	70	100	4
4	EC-424	**Elective-IV**	4	-	30	70	100	4
5	EC-461	Microwave and Optical Communication Lab	-	3	25	50	75	2
6	EC-462	Project and Viva voce	-	3	50	100	150	10
TOTAL			**16**	**6**	**195**	**430**	**625**	**28**

Elective IV

1. Embedded Systems
2. Advanced Digital Signal Processing
3. HDL Programming
4. Java Programming

CE/CSE/ECE/EEE/EI/IT/ME – 101
MATHEMATICS – I
w.e.f: 2011-2012 batch

Credits: 4

Unit-I

Differential Calculus:

Rolle's Theorem(without proof), Lagrange's Mean value theorem (without proof), Taylor's theorem (without proof), Maclaurin's series, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers.

Unit-II

Multiple Integrals :

Double integrals, Change of order of integration , Double integrals in polar coordinates, Area enclosed by plane curves, Triple integrals, Volume of solids, Change of variables.

Ordinary differential equations (first order): Introduction, Linear and Bernoulli's equations, Exact equations, equations reducible to exact equations, Orthogonal trajectories, Newton's law of cooling, Heat flow, Rate of Decay of Radio-Active Materials

Unit-III

Ordinary differential equations (higher order):

Linear Differential equations: Definition, Theorem, Operator D, Rules for finding the complementary function, Inverse operator, Rules for finding the particular integral, Working procedure to solve the equation, Linear dependence of solutions, Method of variation of parameters, Equations reducible to linear equations, Cauchy's homogeneous linear equation, Legendre's linear equation, Simultaneous linear equations with constant coefficients.

Unit-IV

Fourier Series: Introduction and Euler's formulae, Conditions for a Fourier expansion, Functions having points of discontinuity, Change of interval, Even and Odd functions, Half range series Typical wave forms and Parseval's formulae, Complex form of the Fourier series Practical harmonic analysis.

Text Book: [1]. Higher Engineering Mathematics by B.S. Grewal,

Khanna publishers, 40^{th} edition.

Reference Books: [1]. Advanced Engineering Mathematics by kreyszig.

[2]. Engineering Mathematics by Babu Ram

CE/CSE/ECE/EEE/EI/IT/ME – 102

MATHEMATICS - II

w.e.f: 2011-2012 batch

Credits: 4

Unit-I

Matrices:

Rank of a matrix, vectors, Consistency of linear system of equations, Linear transformations, Characteristic equations, Properties of eigen values, Cayley- Hamilton theorem (without proof), Reduction to diagonal form reduction of Quadratic forms to canonical form, Nature of a quadratic form, Complex matrices.

Unit-II

Beta Gamma functions, error function.

Statistics: Method of least squares, Correlation, co-efficient of correlation (direct method only), lines of regression.

Vector Calculus:

Scalar and vector point functions, Del applied to scalar point functions. Gradient

Unit-III

Vector Calculus:

Del applied to vector point functions, Physical interpretation of divergence, Del applied twice to point functions, Del applied to products of point functions, Integration of vectors, Line integral, Surfaces, Green's theorem in the plane (without proof), Stoke' s theorem (without proof), Volume integral, Gauss divergence Theorem (without proof), Cylindrical Coordinates, Spherical polar coordinates.

Unit-IV

Laplace Transforms : Introduction, Transforms of elementary functions, Properties of Laplace Transforms, existence conditions, Transforms of derivatives, Integrals, multiplication by t^n, division by t, Evaluation of integrals by Laplace Transforms, Inverse transforms, convolution theorem, Application to Differential equations with constant coefficients, transforms of unit step function, unit impulse function, periodic function.

Text Book: [1] Higher Engineering Mathematics by B.S.Grewal

Khanna publishers, 40^h edition.

Reference Books:

[1] Engineering Mathematics by Babu Ram

[2] Advanced Engineering Mathematics by Erwin Keyszing John willy and sons.

CE/CSE/ECE/EEE/EI/IT/ME – 103

Engineering Physics (Common for ALL Branches)

Subject Code: **103** Lectures: 3

Credits: 4

UNIT-I

Ultrasonics 20 Periods

Production of Ultrasonics by Piezo electric oscillator method, Detection by Acoustic grating method, Applications - Pulse echo technique, ultrasonic imaging and some general applications.

Applied Optics

Interference: Stokes principle (Phase change on reflection), Interference in thin films due to reflected light (Cosine law), (uses of air films in wedge method and Newton's rings experiments - qualitative treatments only) Michelson's interferometer: Principle, construction working and applications (Determination of wavelength of monochromatic source & for resolution of two closely lying wavelengths).

Lasers: Laser characteristics, Spontaneous and Stimulated emissions, Basic requirements of a laser, Population inversion – Solid state laser (Ruby laser), Gas (He-Ne) laser, Semiconductor (GaAs) laser, Applications of lasers.

Holography: Principle, recording, reproduction and applications.

Fiber optics: Structure of optical fiber, Types of optical fibers, Numerical aperture, Fiber optics in communications and advantages.

UNIT –II **15 Periods**

Electromagnetism

Gauss's law in electricity (statement & proof), Coulomb's law from Gauss law, Circulating charges and Cyclotron principle & working, Hall effect and its uses, Gauss law for magnetism, Faraday's law of electromagnetic induction, Lenz's law, induced electric fields, Inductance, energy stored in a magnetic field, Displacement current, Maxwell's equations (qualitative treatment), electromagnetic wave equation and Velocity, Electromagnetic oscillations(qualitative treatment),

Electron Theory of Solids

Failure of classical free electron theory, quantum free electron theory, Fermi- dirac (analytical) distribution function and its temperature dependence, Fermi energy.

UNIT-III **20 Periods**

Principles of Quantum Mechanics

Dual nature of light, Matter waves & properties, de Broglie's concept of matter waves, Davisson and Germer experiment, Heisenberg's uncertainty principle and applications (non-existence of electron in nucleus, finite width of spectral lines). One dimensional time independent Schrodinger's wave equation, Physical significance of the wave function, Particle in a box (one dimensional).

Band theory of Solids

Bloch theorem, Kronig-Penny model (Qualitative treatment), Origin of energy band formation in solids, effective mass of electron, concept of hole.

Dielectric and Magnetic Materials

Electric dipole moment, polarization, dielectric constant, polarizability, types of polarizations, internal fields (qualitative), Clausius-Mossotti

equation, Frequency dependence of polarization, Ferroelectrics and their applications.

Origin of magnetic moment of an atom, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Hysteresis curve, soft and hard magnetic materials, Ferrites and their applications.

UNIT –IV

Advanced Materials of Physics **15 Periods**

Optoelectronic devices: Qualitative treatments of Photo diode, LED and LCD; Solar cell and its characteristics. Electro-optic and Magneto-optic effects (Kerr and Faraday effects).

Superconductivity: First experiment, critical parameters (T_c, H_c, I_c), Meissner effect, types of superconductors, BCS Theory (in brief) and Applications of superconductors.

NanoTechnology : Introduction to nano materials, nano scale, surface to volume ratio, fabrication of nanomaterials, sol-gel and chemical vapour deposition methods, Carbon nano tubes-preparation and properties (thermal, electrical and mechanical - in brief), some applications of nanomaterials.

TEXT BOOKS

1. Engineering Physics – M.R.Srinivasan, New Age International.
2. Physics Part I and II – Halliday and Resinck, John Wiley & sons (Asia).

REFERENCE BOOKS

1. Concepts of Modern Physics – Aurther Beiser (TMG)
2. Engineering Physics – Gaur & Gupta , Dhanpati Rai Publications, New Delhi.
3. Modern Engineering Physics – A.S.Vasudeva, S.Chand & Co., New Delhi
4. Materials science – M.Vijaya and G.Rangarajan, TMH, New Delhi

CE/CSE/ECE/EEE/EI/IT/ME – 104

Engineering Chemistry

(**Common to all branches except Chemical Engineering and Bio-Tech)**

Lectures: 3 Periods/ week Sessional Marks: 30

University Exam. Marks: 70 University Exam. : 3 hrs

Credits:4

UNIT-I (18 periods)

WATER TECHNOLOGY: Various impurities of Water, WHO guidelines, Hardness units and determination by EDTA method (simple problems), water treatment for drinking purpose-sedimentation, coagulation, filtration (slow sand filter), various methods of chlorination, breakpoint chlorination.

Water treatment for industrial purpose: Boiler troubles, scales, sludges, caustic Embrittlement, boiler corrosion, priming and foaming- causes and prevention, Internal conditioning -Phosphate, Calgon and carbonate treatment, External conditioning-Lime Soda process (simple problems), softening by ion exchange process, Desalination of brackish water by electro dialysis and reverse osmosis**.**

GREEN CHEMISTRY: Introduction, Principles and applications.

UNIT-II (18 periods)

POLYMERS:

Monomer functionality, degree of polymerization, Tacticity, classification of polymerization- addition, condensation and co-polymerization, mechanism of free radical polymerization.

Plastics- Thermoplastic and thermosetting resins, preparation, properties and uses of Bakelite, polyesters, Teflon and PVC. Compounding of plastics.

Conducting polymers: Polyacetylene, mechanism of conduction, examples and applications.

Rubber- Processing of latex, Drawbacks of natural rubber- Vulcanization, Synthetic rubbers- Buna-S and Buna-N, polyurethane rubber and silicone rubber.

NANOMATERIALS: Introduction to nanochemistry, preparation of nanomaterials-carbon nanotubes and fullerenes and their engineering applications.

UNIT-III **(18 periods)**

Phase Rule: Statement and explanation of the terms involved, one component water system, condensed phase rule- construction of phase diagram by thermal analysis, simple eutectic system (Pb-Ag system only).

Electrochemical Energy Systems: Types of electrochemical energy systems, electrochemistry of primary batteries (Lachlanche or dry cell), Secondary cells (Lead Acid cell, Ni-Cd cell), Lithium batteries (Li-MnO_2 ,Lithium organic electrolyte) and their advantages.

Corrosion and its control: Introduction, electrochemical theory of corrosion,dry corrosion, corrosion due to differential aeration, Types of corrosion-galvanic corrosion (galvanic series), Pitting, Stress and microbiological corrosion, Factors affecting corrosion-oxidizers, pH, over voltage and temperature.

Protection methods: Cathodic protection, (Impressed current and sacrificial anode) anodic protection, corrosion inhibitors- types and mechanism of inhibition, metallic coatings-Galvanisation.

UNIT-IV **(18 periods)**

Fuels: Classification of fuels, calorific value-units and determination (Bomb calorimeter). Coal- Ranking and analysis, carbonization of coal (using Beehive oven)

Petroleum based**:** Fractional distillation, cracking, reforming, composition and uses of petrol, diesel **,** CNG and LPG.

Composites: Introduction, Constituents of Composites, Types –Fibre reinforced, Particulate and layered composites and their applications.

Lubricants: Classification –liquid lubricants-Viscosity index, Flash point, Fire point, Cloud point, Pour point, oiliness. Solid lubricants –Graphite and Molybdenum sulphide, Additives.
Liquid crystals: Structure of liquid crystal forming compounds, Classification and applications.

Text Book recommended:

1. Engineering Chemistry, P.C. Jain and Monika Jain, Dhanpat Rai and Co., New Delhi

Reference Books :

1. A Text Book of Engineering Chemistry, S.S. Dara, 10^{th} Edition, S.Chand and Co.

2. Principles of Polymer Science, P.Bahadur and N.V. Sastry, Narora Publishing House

3. A Text Book of Engineering Chemistry, Shashi Chawla, Dhanpat Rai and Co.

PROFESSIONAL COMMUNICATION SKILLS

BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 105

Lectures: 3 Periods/week Sessional Marks: 30

University Exam: 3 Hrs. University Examination Marks: 70

COURSE OBJECTIVE:

The course aims to inculcate a sense of professionalism among the students while emphasizing on the basic aspects of the language learning such as grammar and vocabulary building. It also aspires to train the students to meet the global challenges.

UNIT-1: SPEECH BUILDING

This arena refreshes the students in the usage of grammar and basics of communication in English. It also helps them start building up their vocabulary.

1. Speaking about oneself
2. Sentence and its types
3. Positive, Negative and Interrogative Sentences, Speaking in formal and informal contexts, Asking for opinion, Asking for information, Requesting and Seeking permission; Emphasising a point
4. A list of 100 Basic Words
5. One word substitutes

UNIT- II: BASIC LANGUAGE SKILLS

The emphasis is on Grammar and development of written and oral communication skills among students and equips them with the skills to overcome the cut throat competition in formal and informal situations in the present world.

1. Parts of speech
2. Tenses
3. Letter writing (Personal and Business)
4. Situational Dialogues
5. A list of 100 Basic Words

UNIT- III: ADVANCED LANGUAGE SKILLS

To develop two specific skills i.e. speaking and writing, using correct and good vocabulary to improve the communicative competence of learners in their discipline with glamour.

1. Antonyms
2. Paragraph Writing
3. Technical terms
4. Reading Comprehension
5. Correction of Sentences

UNIT- IV: COMMUNICATION SKILLS

Communication skills aim at making students familiar with various aspects of corporate world and the importance of verbal communication. It also provides intensive instruction in the practice of professional writing.

1. Essay writing
2. Corporate Information
3. Idioms
4. E-mail etiquette

Prescribed Textbook:

- Communication Skills for Engineers, K.R. Lakminarayana and T. Murugavel, Scitech Publications. ISBN: 9788183711548.

Reference Books:

Communication Skills for Professionals, Nira Konar, PHI Publication.

- Competitive English for Professional Courses, J.K.Gangal, S.Chand Publication.
- English for Technical Communication: Volume 1&2 by K.R. Lakminarayana , Scitech Publications.
- Effective Technical Communication, M.Ashraf Rizvi,Tata Mc Graw Hill.
- Advanced Technical Communication, Kavita Tyagi, Padma Misra, PHI Publication.
- Word Power Made Handy, Dr. Shalini Verma,S.Chand Publication.

CE/CSE/ECE/EEE/EI/IT/ME – 106 **L T P M**

C PROGRAMMING AND NUMERICAL METHODS

3 0 0 100

Credits:4

UNIT-1 **(16 Periods)**

Computer Basics: The Computer System, Generations of Computer, Classification of Computer, Block diagram of digital Computer, Inside the Computer-Processor, Memory, External Ports, PCI Card, Formatting Hard disk, Understanding BIOS, BIOS Commands, Networking Basics, Internet Basics, Basics of S/W-OS fundamentals, Algorithm, Flowchart, Programming Paradigms.

C-Basics: C-character set, Data types, Constants, Expressions, Structure of C program, Operators and their precedence & associativity, Basic input and out put statements, Control Structures, Simple programs in C using all the operators and control structures.

UNIT-II **(16 Periods)**

Functions: Concept of a function, passing the parameters, automatic variables, scope and extent of variables, storage classes, recursion, iteration vs recursion, types of recursion, Simple recursive and non recursive programs, Towers of Hanoi problem.

Arrays: Single and multidimensional Arrays, Character array as a string, string functions, Programs using arrays and string manipulation.

UNIT-III **(16 Periods)**

Pointers: Pointers declarations, Pointer expressions, Pointer parameters to functions. Pointers, Pointers and array, Pointer arithmetic.

Structures: Declaring and using structures, operations on structures, structures and arrays, user defined data types,, pointers to structures.

Files: Introduction, file structure, file handling functions, file types, file error handling, Programs using file functions.

UNIT-IV **(16 Periods)**

Numerical Methods: Types of Errors, General formula, numerical method for finding roots of an algebraic equation of one variable, successive bisection method, false position method, Newton Raphson method, secant method. Guass elimination method, Guass siedal method, Lagrange interpolation.

General Quadrature formula, Simpsons rule, Euler's method, general method for deriving differentiation formula, differentiation of Lagrange's polynomial, differentiation of Newton polynomial, Taylors Series, Ranga Kutta Method.

Text Books:

1. C Programming and Numerical Methods - Ajay Mithal - Pearson
2. Computer Oriented Numerical Methods -V.Raja Raman - PHI

References :

1. Programming with C-Gottfried-Schaums Outline Series-TMH
2. C Programming- Behrouz A forouzan – CENGAGE Learning
3. Computer Programming – Kanthane –Pearson Education
4. Elementary Numerical Methods - C.D. Conte

5. Introduction to Numerical Methods - S.S.Sastry

CE/CSE/ECE/EEE/EI/IT/ME – 107

ENGINEERING MECHANICS

(Common to all branches except Chemical Engg.& Biotechnology branches)

Lectures/Tutorials:3/1Periods/Week Sessional marks: 30

University Exam. : 3 Hours University exam. Marks : 70

Credits:4

UNIT – I

Concurrent Forces In A Plane

Principles of statics ; composition and resolution of forces ; equilibrium of concurrent forces in a plane ; method of projections ; Method of moments.

Parallel Forces In A Plane

Couple ; general case of parallel forces in a plane ; center of parallel forces and centre of gravity ; Centroids of composite plane figures and curves; Centre of gravity of three-dimensional bodies.

UNIT – II

General Case Of Forces In A Plane

Composition of forces in a plane ; Equilibrium of forces in a plane ; Plane trusses – method of joints , Method of sections

Friction

Static and kinetic friction, Laws of friction; Applications of static friction.

Principle Of Virtual Work

Equilibrium of Ideal systems

UNIT – III

Rectilinear Translation

Kinematics of rectilinear motion ; Principles of dynamics ; Differential equation of rectilinear motion ; Motion of a particle acted upon by a constant force ; D'Alemberts principle ; Momentum and impulse ; Work and energy ; Ideal systems – conservation of energy ; direct central impact

Moments Of Inertia Of Plane Figures

Moment of inertia of a plane figure with respect to an axis in its plane ; Moment of Inertia with respect to an axis perpendicular to the plane of the figure ; Parallel axis theorem.

UNIT – IV

Curvilinear Translation

Kinematics of curvilinear motion ; Differential equations of curvilinear motion ; D'Alembert's principle in curvilinear motion ; Work and Energy.

Moments Of Inertia Of Material Bodies

Moment of inertia of a rigid body ; Moment of inertia of a lamina ; Moments of inertia of three-dimensional bodies.

Rotation Of A Rigid Body About A Fixed Axis

Kinematics of rotation ; Equation of motion for a rigid body rotating about a fixed axis;

Work and energy

NOTE

Two questions of 14 marks each will be given from each unit out of which one is to be answered. Fourteen questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK

1. Engineering mechanics by S. Timoshenko , D. H. Young and J. Rao Tata McGraw-Hill Publishing Company Ltd.

REFERENCE BOOKS

1. Engineering mechanics by J. L. Meriam and L. Kraige , John Wiley & Sons
2. Vector mechanics for engineers by Beer and Johnston, Tata McGraw-Hill Publishing Company Ltd.
1. Engineering Mechanics by Hibbler and Gupta , Pearson Education

CE/ CSE/ECE/EEE/EI/IT/ME -108
ENGINEERING GRAPHICS
(Common to all branches)

Lectures	: 3+3 Periods / week	Sessional Marks	: 30
University Exam.	: 3 hrs.	University Exam. Marks	: 70

Credits:4

NOTE:

1) Unit VI not to be included in the university theory examination. This unit is only for internal assessment
2) University Examination Question paper consists of FIVE questions, TWO questions from each unit with internal choice. (To be taught & examined in First angle projection)

UNIT I

GENERAL: Use of Drawing instruments, Lettering .-Single stroke letters, Dimensioning- Representation of various type lines. Geometrical Constructions. Representative fraction. (3+9)

CURVES :

Curves used in Engineering practice - conic sections - general construction and special methods for ellipse, parabola and hyperbola. cycloidal curves – cycloid, epicycloid and hypocycloid; involute of circle and Archemedian spiral. (9+15)

UNIT II

METHOD OF PROJECTIONS: Principles of projection - First angle and third angle projection of points. Projection of straight lines. Traces of lines.

(6+12)

PROJECTIONS OF PLANES : Projections of planes, projections on auxiliary planes. (4+8)

UNIT III

PROJECTIONS OF SOLIDS : Projections of Cubes, Prisms, Pyramids, Cylinders and Cones with varying positions.

(4+8)

SECTIONS OF SOLIDS: Sections of Cubes, Prisms, Pyramids, cylinders and Cones.true shapes of sections. (Limited to the Section Planes perpendicular to one of the Principal Planes).

(6+12)

UNIT IV

DEVELOPMENT OF SURFACES: Lateral development of cut sections of Cubes,Prisms,Pyramids,Cylinders and Cones. (4+8)

ISOMETRIC PROJECTIONS : Isometric Projection and conversion of Orthographic Projections into isometric views. (Treatment is limited to simple objects only). (4+8)

UNIT V

ORTHOGRAPHIC PROJECTIONS: Conversion of pictorial views into Orthographic views. (Treatment is limited to simple castings).

(6+12)

UNIT VI

(Demonstration only)

COMPUTER AIDED DRAFTING(Using any standard package): Setting up a drawing: starting , main menu (New, Open, Save, Save As etc.), Opening screen, error correction on screen, units, co-ordinate system, limits, grid, snap, ortho.

Tool bars: Draw tool bar, object snap tool bar, modify tool bar, dimension tool Bar

PRACTICE OF 2D DRAWINGS: Exercises of Orthographic views for simple solids using all commands in various tool bars.

(4+8)

TEXT BOOK:

- Engineering Drawing by N.D. Bhatt & V.M. Panchal. (Charotar Publishing House, Anand).
- AutoCAD 14 for Engineering Drawing Made Easy(Features AutoCAD 200) by P.Nageswara Rao

REFERENCE BOOK:

- Engineering Drawing by Prof.K.L.Narayana & Prof. R.K.Kannaiah.
- Engineering Graphics with AutoCAD 2002 by James D. Bethune

PHYSICS PRACTICALS

CE/CSE/ECE/EEE/EI/IT/ME – 151

w.e.f academic year 2011-'12 (Common for all branches)

Internal marks – 30 **External marks – 70**

Periods per week – 03 **Credits:2**

Any 15 experiments from the following list

LIST OF EXPERIMENTS

1. Compound pendulum –Determination of acceleration due to gravity (g)
2. Interference fringes - measurement of thickness of a foil / diameter of Wire using wedge method.
3. Sensitive galvanometer - Determination of figure of merit
4. Newton's rings – Measurement of radius of curvature of plano convex lens
5. Lissajous' figures –Calibration of an audio oscillator
6. Photo cell – I-V Characteristic curves and determination of stopping potential
7. Diffraction grating – Measurement of wavelengths
8. Torsional pendulum- Determination of rigidity modulus of the wire material.
9. Carey- Foster's bridge: Determination of specific resistance/Temperature coefficient of resistance.

10. Photo voltaic cell - Determination of **fill-factor**
11. Variation of magnetic field along the axis of a current carrying circular coil.
12. Series l LCR resonance circuit - Determination of "Q" factor.
13. Thomson's method - determination of **e/m** of an electron.
14. Determination of a.c. Frequency – Sonometer.
15. Prism/Grating - Determination of dispersive power.
16. To determine the wavelength of Laser source.
17. Hall effect – Determination of Hall coefficient.
18. Determination of energy band gap.
19. Determination of Numerical Aperture of an optical fiber.
20. Determination of Amplitude and Frequency of an AC signal using a CRO.

CE/CSE/ECE/EEE/EI/IT/ME – 152

CHEMISTRY LABORATORY

(Common for all branches)

Lectures: 3 Periods/week Sessional Marks: 30

University Examination: 3 hours. University Examination Marks: 70

Credits:2

Note: Minimum of twelve experiments have to be conducted out of the list of experiments given below.

List of Experiments:

- Estimation of total alkalinity of water sample
- Standardization of HCl solution b. Estimation of alkalinity
- Determination of purity of washing soda
- Estimation of Chlorides in water sample

  a) Standardization of $AgNO_3$ solution b) Estimation of Chlorides
- Determination of Total Hardness of water sample:

  a) Standardization of EDTA solution b) Determination of Total Hardness

Estimation of Magnesium

a) Standardization of EDTA solution b) Estimation of Magnesium

- Estimation of Mohr's salt-permanganometry

  a) Standardization of $KMnO_4$ solution b) Estimation of Mohr's salt

- Estimation of Mohr's salt –Dichrometry
  a) Standardization of $K_2Cr_2O_7$ solution b) Estimation of Mohr's salt
- Analysis of soil sample:
  a) Estimation of Ca and Mg b) Estimation of Organic matter
- Determination of available chlorine in bleaching powder-Iodometry
  a)Standardization of Hypo solution b) Determination of Available chlorine
- Determination of Iodine in Iodized salt
- Determination of Iron (Ferrous and Ferric) in an iron ore by Permanganometry
- Determination of Zn using Potassium ferrocyanide
- Conductometric titration of an acid vs. base
- pH metric titrations of an acid vs. base

Demonstration Experiments:

- Potentiometric titrations: Ferrous vs. Dichromate

16. Spectrophotometry: Estimation of Mn/Fe

CE/CSE/ECE/EEE/EI/IT/ME – 153

WORKSHOP PRACTICE

(Common to all branches)

Lectures	: 2 Periods / week	Sessional Marks	: 30
University Exam.	: 3 hrs.	University Exam. Marks	: 70

Credits: 2

Minimum four experiments should be conducted from each trade

1. Carpentry

To make the following jobs with hand tools

a) Lap joint

b) Lap Tee joint

c) Dove tail joint

d) Mortise & Tenon joint

e) Gross-Lap joint

2. Welding using electric arc welding process / gas welding.

The following joints to be welded.

a) Lap joint

b) Tee joint

c) Edge joint

d) Butt joint

e) Corner joint

3. Sheet metal operations with hand tools.

a) Preparation of edges like Saw edge, wired edge, lap seam, grooved seam
b) Funnel
c) Rectangular Tray
d) Pipe joint
e) Electronic Component joining Techniques like use of crimping tool, soldering of electronic components, strain guage, thermo couples, use of computer networking tools..

4. House wiring

a) One lamp by one switch
b) Two lamps by one switch
c) Wiring of Tube light
d) Stair case wiring
e) Go-down wiring

L T P M

Fundamentals of H/W & S/W and

C-Programming Lab

CE/CSE/ECE/EEE/EI/IT/ME – 154

0 0 3 100

Credits:2

CYCLE-I Basics of Hardware and Software Exercises:

1. Explore Mother Board components and Layouts, identifying external ports and interfacing, identifying PCI cards and interfacing.
2. Partitioning and formatting Hard disks.
3. Install and Uninstall system and application software.
4. Understand BIOS configuration.
5. Connect computers in a network.
6. Assemble a Computer and troubleshoot a Computer.
7. Operating system commands
    a. Directory Related Utilities.
    b. File and Text Processing Utilities.
    c. Disk, Compress and Backup Utilities.
    d. Networking Utilities and
    e. Vi editor

CYCLE-II Programming Exercises:

1. Write a program to read x, y coordinates for 3 points and then calculate the area of a triangle formed by them and print the coordinates of the three points and the area of the triangle. What will be the output from your program if the three given points are in a straight line?

2. Write a program, which generates 100 random integers in the range of 1 to 100. Store them in an array and then print the arrays. Write 3 versions of the program using different loop constructs. (eg. For, while, and do write).

3. Write a set of string manipulation functions e.g. for getting a sub-string from a given position. Copying one string to another, reversing a string, adding one string to another.

4. Write a program which determines the largest and the smallest number that can be stored in different data types of like short, int., long, float and double. What happens when you add 1 to the largest possible integer number that can be stored?

5. Write a program, which generates 100 random real numbers in the range of 10.0 to 20.0, and sort them in descending order.

6. Write a function for transposing a square matrix in place (in place means that you are not allowed to have full temporary matrix).

7. First use an editor to create a file with some integer numbers. Now write a program, which reads these numbers and determines their means and standard deviation.

8. Write a program for implementing students management system(attendance, marks and fees reports) using structures and pointers.

9. Implement bisection method to find the square root of a given number to a given accuracy.

10. Implement Newton Raphson method to determine a root of polynomial equation.

11. Given a table of x and corresponding f(x) values, write a program which will determine f(x) value at an intermediate x value using Lagrange's interpolation.

MATHEMATICS – III

(CE/CS/EC/EEE/EI/IT/ME 211)

w.e.f: 2011-2012 batch

Unit-I

Partial Differential Equations :

Introduction, Formation of Partial Differential Equations, Solutions of a Partial Differential Equations, Equations solvable by direct Integration, Linear Equations of the first Order, Non-Linear Equations of the first Order using Charpit's Method, Homogeneous Linear Equations with Constant Coefficients, Rules for finding the Complementary Function, Rules for finding the Particular Integral, Non-Homogeneous Linear Equations.

Unit-II.

Integral Transforms:

Introduction, Definition, Fourier Integral Theorem (without proof), Fourier sine and cosine integrals, Complex form of the Fourier Integral, Fourier Transforms, Properties of Fourier Transforms, Finite Fourier sine and cosine transforms, Convolution theorem (without proof), Parseval's Identity for Fourier Transforms (without proof).

Solution of Algebraic and Transcendental Equations : Introduction, Bisection method, Newton- Raphson Method, Solutions of Simultaneous Linear Equations: Direct Methods of Solution- factorization method (LU – decomposition method), Iterative Methods of Solution - Gauss-Seidel Iteration Method.

Unit-III

Finite Differences and Difference Equations: Introduction, Finite Difference operators, Symbolic relations, Differences of a polynomial, factorial notation, Newton's forward and backward difference interpolation Formulae, Central Difference Interpolation Formulae: Gauss's Forward and Stirling's formulae, Interpolation with Unequal Intervals: Lagrange's Interpolation , inverse interpolation. Difference Equations: Introduction, Formation, Linear difference equations - Rules for Finding the Complementary Function, Rules for Finding the Particular Integral.

Unit-IV

Numerical Differentiation: Finding First and Second order Differentials using Newton's formulae , Numerical Integration : Trapezoidal rule , Simpson's one-third rule, Numerical Solutions of Ordinary Differential Equations (first order): Euler's Method, Picard's Method, Runge- Kutta Method of fourth order, Simultaneous equations(R K method). Numerical Solutions of Partial Differential Equations: Classification of Partial Differential Equation of second order, Solutions of Laplace's and Poisson's Equations by iteration methods.

Text Book :

Higher Engineering Mathematics, B.S.Grewal, 40th edition, Khanna publishers

Reference Books:

[1] A textbook of Engineering Mathematics by N.P. Bali

[2] Advanced Engineering Mathematics by Erwin Kreyszig John willy and sons.

BT/CHE/EC/EE/EI- 212 ENVIRONMENTAL STUDIES

(Common for all branches)

Lectures: 4 Periods / week	Sessional Marks:30
University Examination: 3 hours	University Examination Marks: 70
	No. of credits : 4

UNIT-I

Introduction:
Definition, Scope and Importance.

Natural Resources:

Forest Resources: Use and over-exploitation, Deforestation, Mining, dams and their effects on forests and tribal people.

Water Resources: Use and over-utilization of surface and ground water, floods and droughts, Water logging and salinity, Dams – benefits and problems, Conflicts over water.

Energy resources: Energy needs, Renewable and non-renewable energy sources.

Land resources: Land as a resource, land degradation, soil erosion & desertification, Effects of modern agriculture on land resources.

Ecosystems:
Definition, Structure and functions of an Ecosystems, Biogeochemical cycles-water, carbon, nitrogen and water cycles, Types-Forest, Greenland, Desert,Aquaticecosystem.

UNIT-II

Biodiversity and its Conservation:

Definition, Value of biodiversity. Bio-geographical classification of India, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to bio-diversity, Endemic and endangered species of India, Conservation of biodiversity.

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Environmental Pollution: Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, nuclear pollution, Solid waste management.

UNIT-III

Social Issues and Environment:

From unsustainable to sustainable development, Population growth and environment, Green revolution, Rain water harvesting, watershed management, cloud seeding, Resettlement and rehabilitation of people - problems and concerns, Environmental Impact Assessment.

Climate Changes:

Global warming & Green house effect, Acid rain, Ozone layer depletion.

UNIT-IV

Environmental acts:

Prevention and Control of Water pollution & Air Pollution act, Environmental protection act, Wild life protection act, Forest Conservation act.

International Conventions:

Stockholm Conference 1972, Earth Summit 1992. Copenhagen Summit 2009.

Case Studies:
Chipko movement, Narmada Bachao Andolan, Silent Valley Project, Madhura Refinery and Taj Mahal, Chernobyl Nuclear Disaster, Ralegaon Siddhi, Florosis and Bhopal Tragedy.

Field work:
Visit to a local area to document environmental assets – river/ forest/ grassland / hill /mountain.
Study of local environment-common plants, insects, birds.
Study of simple ecosystems – pond, river, hill, slopes etc.
Visits to industries, water treatment plants, effluent treatment plants.

Text Books

1. Environmental Studies, by Dr. Suresh K. Dhameja, Published by S.K. Kataria & Sons, Ludhiana.

Reference Books

1. Environmental studies by Anubha Kaushik and C.P.Kaushik., New Age International Publishers, New Delhi.
2. T Benny Joseph, Environmental Studies, the Tata McGraw-Hill Publishing Company Limited, New Delhi.

EC/EE/EI 213	CIRCUIT THEORY	L	T	P	M
		4	1	0	100

UNIT – I

INTRODUCTION OF CIRCUIT ELEMENTS:

Basic definition of the unit of Charge, Voltage, Current, Power and Energy, Circuit concept, Active and Passive circuit elements; Ideal, Practical and dependent sources and their V-I characteristics, Source transformation, Voltage and Current division; V-I characteristics of Passive elements and their series / parallel combination; Star Delta transformation, Energy stored in Inductors and Capacitors Kirchhoff's Voltage law and Kirchhoff's Current law.

GRAPH THEORY:

Introduction to Graph Theory, Tree, Branch, Link, Cutset and loop matrices, relationship among various matrices and parameters, Mesh and Nodal Analysis

UNIT – II

INTRODUCTION TO ALTERNATING CURRENTS AND VOLTAGES:

Instantaneous, Peak, Average and RMS values of various waveforms; Crest factor, Form factor; Concept of phase and phase difference in sinusoidal waveforms; Phase relation in pure resistor, Inductor and capacitor; Impedance diagram, phasor diagram, series and parallel circuits, compound Circuits.

POWER AND POWER FACTOR
Computation of active, reactive and complex powers; power factor.

UNIT – III

NETWORK THEOREMS:

Superposition theorem, Thevenin's and Norton's theorems, Reciprocity, Compensation, Maximum power transfer theorems, Tellegan's and Millman's theorems, Application of theorems to DC circuits. Sinusoidal steady state Mesh and Node Analysis. Application of network theorems to AC circuits.

RESONANCE:

Series resonance, Impedance and phase angle, voltages and currents, bandwidth and Q factor and its effect on bandwidth, magnification, parallel resonance, resonant frequency, variation of impedance with frequency , Q factor, magnification, reactance curves in parallel resonance.

UNIT – IV

TRANSIENTS AND LAPLACE TRANSFORMS:

Steady state and transient response, DC and Sinusoidal response of an R-L, R-C, R-L-C circuits.
Laplace Transforms of typical signals, periodic functions, Inverse transforms, Initial and final value theorems, Application of Laplace transforms in circuit analysis.

PSPICE:

Introduction to PSpice: D.C Analysis and control statements, dependent sources, DC Sweep, AC Analysis and control statements, Transient analysis.

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TEXT BOOKS:

1. William H. Hayt, Jack E. Kemmerly and Steven M. Durbin, Engineering Circuit Analysis, 6th Edition,TMH, 2002.
2. M.E.Vanvalkenburg, Network Analysis, 3rd Edition, PHI, 2003.
3. A Sudhakar and Shyam Mohan SP, Circuits and Networks: Analysis and Synthesis, 4th Edition, TMH, 2010

REFERENCE BOOKS:

1. Franklin F.Kuo, Network Analysis and Synthesis, 2nd Edition, John Wiley & Sons, 2003.
2. Mahmood Nahvi and Joseph Edminister, Electric Circuits, 4th Edition, Schaum's outline series, TMH, 2004.

EC/EE/EI -214

ELECTRONIC DEVICES AND CIRCUITS

UNIT I

ENERGY BANDS AND CURRENT CARRIERS IN SEMICONDUCTORS: Allowed and Forbidden Energy Bands, Electrical Conduction In Solids, Density of States Function, Statistical Mechanics, Charge Carriers in Semiconductors, Dopant Atoms and Energy Levels, The Extrinsic Semiconductor, Statistics of Donors and Acceptors, Charge Neutrality, Fermi Level, Carrier Drift, Carrier Diffusion, Graded Impurity Distribution, T he Hall Effect, Carrier Generation and Recombination, Characteristics of Excess Carriers

UNIT II

THE PN JUNCTION DIODE: Basic Structure of the PN Junction, Zero applied Bias, Reverse applied Bias, Non-Uniformly Doped Junctions, PN Junction Current, Generation-Recombination Currents, Junction Break Down, Capacitances of The Diode

SPECIAL DIODES AND RECTIFIERS: LED, Tunnel Diode, Photodiode, Half Wave, Full Wave, and Bridge Rectifiers

UNIT III

The BIPOLAR TRANSISTORS: The Bipolar Transistor Action, The Modes of Operation, Minority Carrier Distribution, Low-Frequency Common-Base Current Gain, Nonideal Effects, CE, CB, and CC Characteristics, Photo Transistor

TRANSISTOR BIASING: The Operating Point, Fixed Bias and Self Bias, Bias Stability, Stability Factors, Thermal Runaway, Analysis of Transistor circuits at DC

UNIT IV

FUNDAMENTALS OF THE METAL-OXIDE-SEMICONDUCTOR FIELD-EFFECT TRANSISTOR: The Two Terminal MOS Structure, Capacitance-Voltage Characteristics, The Basic MOSFET Operation, Non-ideal Effects

THE JUNCTION FIELD-EFFECT TRANSISTOR: JFET Concepts, The Device Characteristics, Non-ideal Effects

TEXT BOOKS:

1. Donald A. Neamen, Semiconductor Physics and Devices, 3rd Edition,TMH,2003
2. Jacob Millman and Christos C. Halkias, Integrated Electronics, TMH, 1972

REFERENCE BOOKS:

1. Kanaan Kano, Semiconductor Devices, PHI, 1998
2. Ben G Streetman and Sanjay Banerjee, Solid State Electronic Devices, 5th Edition,2000
3. GSN Raju, Electronic Devices and Circuits, 1st edition, IK International Publishers, 2006

EC-215

ELECTROMAGNETIC FIELD THEORY AND TRANSMISSION LINES

UNIT – I

Electrostatics –I:

The experimental law of coulomb, Electric field intensity, Field due to a continuous volume charge distribution, Field of a line charge, sheet of charge. Electric Flux Density, Guass's law , Applications of Gauss law, Divergence, Maxwell's First equation (Electrostatics), Energy expended in moving a point charge in an electric field, The line integral, Definition of potential and potential difference. The potential field of a point charge, system of charges, potential gradient, the dipole and Energy density in electrostatic field.

UNIT – II

Electrostatics – II:

The nature of dielectric materials, boundary conditions for perfect dielectric materials. Capacitance. Several capacitance examples. Capacitance of a two wire line. Derivations of Poisson's and Laplace's equations, Examples of the solution of Laplace's equation. Current and current density, continuity of current, conductor properties and boundary conditions

UNIT – III

The Steady Magnetic Field: Biot-Savart Law, Ampere's Circuital Law, Magnetic Flux and Magnetic Flux Density, The scalar and vector magnetic potentials

Magnetic Forces and Materials: Force on a moving charge, Force on a differential current element, Force between differential current elements, Force and torque on a closed circuit, The nature of magnetic materials,

Magnetization and Permeability. Magnetic boundary conditions. Potential energy in magnetic fields.

UNIT – IV

Time Varying Fields and Maxwell's Equations: Faraday's law, Displacement current, Maxwell's equations in point form, integral form.

The Uniform Plane Wave: Wave propagation in free space, dielectrics. Pointing theorem and wave power. Propagation in good conductors: skin effect. Wave polarization. Reflection of uniform plane waves at normal incidence. Plane wave propagation in general directions. Plane wave reflection at oblique incidence angles.

Trasmission Lines: The Transmission Line equations, Transmission line parameters, some Transmission line examples. Graphical methods (Smith Chart). Several practical problems.

TEXT BOOKS:

1) W H Hayt, J A Buck Engineering Electromagnetics, 7th Edition TMH, 2006.

2) Mathew NO Sadiku, Elements of Electromagnetics, Oxford University Press, 2003.

3) G S N Raju, Electromagnetic Field Theory and transmission lines, 1st Edition, Pearson Education India,2005.

REFERENCE BOOKS:

1) Joseph A Edminister, Theory and Problems of Electromagnetics, 2nd Edition, Schaum's Outline Series, Mc-Graw Hill International, 1993

2) EC Jordan and KG Balmain, Electromagnetic Waves and Radiating Systems, PHI 2003.

EC/EE/EI-216

DIGITAL LOGIC DESIGN

UNIT-I

NUMBER SYSTEMS AND CODES: Decimal, Binary, Hexadecimal Number Systems and their Conversions Arithmetic Additions Subtraction using the method of Complements, Multiplication and Division Codes: BCD, Excess-3, Gray and Alphanumeric Codes

BOOLEAN ALGEBRA: Boolean Expressions and Theorems, Logic Gates, Universal Gates, Canonical and Standard forms, Boolean functions, Simplification of Boolean functions using K maps, Minimal Functions and their properties, Tabulation Method Nand and Nor Implementations Two Level and Multi Level

UNIT-II

COMBINATIONAL LOGIC CIRCUITS: EX-OR EX-NOR Circuits, General Design procedure for Combinational Logic Circuits, Design and Applications of Binary Adders and Subtractors, Comparators, Encoders, Decoders Multiplexers and Demultiplexers, Design of BCD to 7 Segment Decoder, Parity Generator and Checker, BCD Adder /Subtractor, Carry Look Ahead Adders

UNIT-III

SEQUENTIAL LOGIC CIRCUITS: Lathes, Characteristic Table, Characteristic Equation, Excitation Table, State table and State Diagrams for SR, JK, Master Slave JK, D and T flip-flops, Conversion from one type of Flip-Flop to another, Shift Registers Analysis and Synthesis of Sequential Circuits, Sequence Generator, Sequence Detector, Parity Generator

COUNTERS USING FLIP-FLOPS: Design of Ripple Counters, Synchronous Counters Up/Down Counters using Flip-Flops

UNIT-IV

SYNCHRONOUS SEQUENTIAL CIRCUITS: Basic Design Steps, Sate Assignment Problem, Mealy State Model, Serial Adder Example, State Minimization, Design of a Counter using the Sequential Circuit Approach, FSM as an Arbiter Circuit, Analysis of Synchronous Sequential Circuits, ASM Charts, Formal Model for Sequential Circuits

IC LOGIC FAMILIES: RTL, DTL, TTL, ECL and IIL families and their comparison

TEXT BOOKS:

1. M Morris Mano and Micael D. Ciletti, Digital Design, Pearson Education, 2008
2. Digital Principles and Design, Donald D. Givone,TMH,2003

REFERENCE BOOKS:

1. Thomas L. Floyd, Digital Fundamentals,7th Edition, Pearson Education,2000
2. Charles H. Roth Jr., Fundamentals of Logic Design, Jaico Publications,1992
3. Taub and Schilling, Digital Integrated Electronics, McGraw Hill,1977

EC/EI 217	ELECTRICAL TECHNOLOGY	L	T	P	M
		4	0	0	100

UNIT – I

DC MACHINES:

Construction, Principle and operation of DC generator, EMF equation, Methods of excitation, DC motor principle, Back EMF, Torque equation, Load characteristics of DC shunt, series and compound generators, Motors, Losses and Efficiency, Applications of speed control, Swinburne's test, Three-point starter.

UNIT – II

Introduction to polyphase system, Advantages, relationship between phase and line values for star and delta connection system.

TRANSFORMERS:

Principle and Operation on no-load and load, Phasor diagrams, Equivalent circuit, Regulation, Losses and Efficiency, OC and SC tests, Auto transformers, Elementary treatment of 3 phase transformer connections, Star/star, Delta/star connections.

UNIT – III

THREE PHASE INDUCTION MOTORS:

Construction, Rotating magnetic field, Principle of operation of Induction Motors, Torque equation, Torque-slip characteristics, Types of starters.

SINGLE PHASE INDUCTION MOTORS:

Construction, Starting methods, Fractional Horse Power motors for tape recorders and teleprinters.

STEPPER MOTORS: Principle, Construction, Working and different types

UNIT – IV

SYNCHRONOUS MACHINES:

Principle and constructional features of an alternator, EMF equation, Regulation- Synchronous impedance method, Synchronous motors, Principle of operation, Methods of starting and applications.

TEXT BOOKS:

1. Edward Hughes, Electrical Technology, 6th Edition, Longman Group, 1987

2. JB Gupta, A Course in Electrical Technology, S K Kataria & Sons, 2003

3. PC Sen, Principles of Electrical Machines and Power Electronics, John Wiley, 1989

REFERENCE BOOKS:

1. Vincent Del Toro, Fundamentals of Electrical Engineering, Pearson Education
2. H Cotton, Advanced Electrical Technology, AH Wheeler & Co., 1990
3. Eugene C Lister, Electric Circuits and Machines, New York, MCGraw-Hill, 1975
4. B.L Theraja & A.K.Theraja, A Text Book of Electrical Technology, 23rd Revised Edition, S.Chand & Company Ltd., New Delhi, 2005.

EC 251 ELECTRONIC DEVICES LABORATORY

1. Study of C.R.O
2. Characteristics of Silicon and Germanium diodes
3. Characteristics of Zener diode and regulator
4. Characteristics of Common Base configuration
5. Characteristics of Common Emitter configuration
6. Characteristics of Emitter follower circuit
7. Drain and Transfer Characteristics of JFET
8. Drain and Transfer Characteristics of Depletion MOSFET
9. Drain and Transfer Characteristics of Enhancement MOSFET
10. Design and verification of Self bias circuit
11. Characteristics of LDR and Thermistor
12. Characteristics of source follower circuit
13. Characteristics of Photo transistor
14. Design and verification of collector to base bias circuit
15. Design and verification of Current Source Bias Circuit

EC/EI 252 DIGITAL LOGIC DESIGN LABORATORY L T P M

0 0 3 75

1. Realization of Gates using Discrete Components.
2. Realization of Gates using Universal Building Block (NAND only).
3. Design of Combinational Logic Circuits like Half-adder, Full-adder, Half-Sub tractor and Full-Sub tractor.
4. Verification of 4-bit Magnitude Comparator.
5. Design of Decoders like BCD – Decimal decoder.
6. Applications of IC Parallel Adder (1's & 2's compliment addition).
7. Design of Code Converters (Binary to Gray).
8. Design of Multiplexers/De Multiplexers.
9. Verification of Truth Table of Flip-Flops using Gates.
10. Design of Shift register (To Verify Serial to parallel, parallel to Serial , Serial to Serial and parallel to parallel Converters) using Flip-Flops.
11. Design of Ring & Johnson Counters using Flip-Flops.
12. Conversion of Flip-Flops (JK-T, JK – D).
13. Design of Binary/Decade Counter.
14. Design of Asynchronous Counter, Mod Counter, Up Counter, Down Counter & Up/Down Counter.
15. Design of Synchronous Counter, Mod Counter, Up Counter, Down Counter & Up/Down Counter.

NOTE: A minimum of 10 (Ten) experiments have to be performed and recorded by the candidate to attain eligibility for University Practical Examination.

MATHEMATICS-IV

EE/EC/EI 221 **w.e.f: 2011-2012 batch**

UNIT-I:

Complex Analysis:

Introduction, Continuity, Cauchy's- Riemann equations, Analytic Functions, Harmonic functions, Orthogonal system.

UNIT-II:

Complex Integration:

Cauchy's Integral Theorem, Cauchy's Integral Formulae, Poisson's Integral Formula, Taylor's Series, Laurent's Series, Zeros and Singularities.

UNIT-III:

Calculation of residues, Evaluation of real definite integrals(by applying the residue theorem).

Series Solutions of differential equations: Introduction, Series solution, Validity of series solution, General method (Frobenius method) forms of series solution.

UNIT-IV:

Series solution of Bessel's and Legendre's equations, Recurrence formulae, Generating functions, Rodrigue's formula, Orthogonality of Bessel's functions and Legendre polynomials.

Text Book:

1. Higher Engineering Mathematics by B.S.Grewal , Khanna publishers, 40^{th} edition.

Reference Book:

1. Advanced Engineering Mathematics,8th Edition, By Erwin Kreyszig, JohnWiley,2000

EC/EE/EI - 222

DATA STRUCTURES USING C++	**L**	**T**	**P**	**M**
	4	**1**	**0**	**100**

UNIT – I

PRINCIPLES OF OBJECT ORIENTED PROGRAMMING: Concepts, benefits of OOPS, Object oriented Languages, Applications of OOPs.

TOKENS, EXPRESSIONS AND CONTROL STRUCTURES: Introduction, Tokens, Keywords, Basic Data Types, User defined data types, Derived data types, Declaration of variables, Operators in C++, Types, Scope resolution operator, Member dereferencing operator, Memory management operator, Type cast operator.

UNIT – II

FUNCTIONS: Function prototyping, Call by reference, Return by reference, Inline function, Function Overloading, Friend and Virtual functions.

CLASSES AND OBJECTS: Specifying a class, Defining member functions, Memory allocation for objects, Friendly functions, Pointer to members.

CONSTRUCTORS AND DESTRUCTORS – Introduction.

Type conversions, Operator overloading and inheritance and virtual functions.

UNIT – III

LINKED LISTS: List operations and their implementation using arrays, Linked list operations and their implementations, Single linked, Double linked and Circular linked lists.

STACKS: Logical operations on stack, Stack implementations with arrays and linked lists, Stack applications.

QUEUES: Queue operations, Queue implementation with arrays and linked lists, Queue applications.

UNIT – IV

SORTING METHODS: Insertion sort, Shell sort, Merge sort, Quick sort, Heap sort, Radix sort and their implementations.

SEARCHING METHODS: Binary Search, Hashing methods and applications.

TREES: Logical operations on Trees, Binary Tree Traversals, Binary Search Tree ADT,

TEXT BOOKS:

1. E Balaguruswamy, object oriented programming using c++Programming ANSI C, PHI, 1993.
2. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, The Benjamin &Cummings, Addison Wesley, 1997
3. Trembley and Sorenson, An Introduction to Data Structures with Applications, Tata McGraw Hill, 1997.

REFERENCES :

1. Dital and Dital c+ programming
2. S Tanenbaum, Data Structures Using C, PHI, 1992.

EC/EE/EI - 223

ELECTRONIC CIRCUIT ANALYSIS

UNIT I

BASIC BJT AND FET AMPLIFIERS: MOSFET DC Circuit Analysis, The MOSFET Amplifier, The Common Source Amplifier, The Common Drain Amplifier, The Common Gate Configuration, Single-Stage Integrated Circuit MOSFET Amplifiers, Multistage Amplifiers, Basic JFET Amplifiers, Analog Signals and Linear Amplifiers, The Bipolar Linear Amplifiers, Common-Emitter Amplifiers, Common-Collector Amplifier, Common-Base Amplifier, Multistage Amplifiers

UNIT II

FREQUENCY RESPONSE: Amplifier Frequency Response, System Transfer Functions, Transistor Amplifiers with Circuit Capacitors, Bipolar Transistor Frequency Response, The FET Frequency Response, High Frequency Response of Transistor Circuits

UNIT III

OUTPUT STAGES AND POWER AMPLIFIERS: Power Amplifiers, Power Transistors, Classes of Amplifiers, Class-A Power Amplifiers, Class-AB Push-Pull Complementary Output Stages

INTEGRATED CIRCUIT BIASING AND ACTIVE LOADS: Bipolar Transistor Current Sources, FET Current Sources, Circuits with Active Loads, Small Signal Analysis of Active Load Circuits

UNIT IV

FEEDBACK: Introduction to Feedback, Basic Feedback Concepts, Ideal Feedback Topologies, Voltage Amplifiers, Current Amplifiers, Transconductance Amplifiers, Transresistance Amplifiers

OSCILLATORS: Barkausen Criterion, The Phase Shift Oscillator, Resonant Circuit Oscillator and Crystal Oscillator.

TEXT BOOKS:

4. Donald A. Neamen, Electronic Circuits Analysis and Design, 3rd Edition,TMH,2007
5. Jacob Millman and Christos C. Halkias, Integrated Electronics, TMH, 1972

REFERENCE BOOKS:

3. Adel S. Sedra and Kenneth C. Smith, Microelectronic Circuits, 5th Edition, Oxford University Press, 2004
4. Paul R Gray, Gray J. Hurst, Stephen H. Lewis and Robert G. Meyer, Analysis and Design of Analog Integrated Circuits,4th edition, John Wiley and Sons,2001

EC-224	L	T	P	M
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION	**4**	**0**	**0**	**100**

UNIT – I

MEASURENT AND ERROR: Definitions, Accuracy and precision, Types of errors, Statistical analysis, Probability of errors, Limiting Errors.

DIRECT CURRENT INDICATING INSTRUMENTS: DC ammeters, DC voltmeters, Series type ohmmeter, Shunt type ohmmeter, Multimeter, Calibration of DC Instruments.

DC & AC BRIDGES: Wheatstone, Kelvin, Guarded Wheatstone, Maxwell, Hay, Schering and Wein bridges, Wagner ground connection.

UNIT – II

ELECTRONIC INSTRUMENTS FOR MEASURING BASIC PARAMETERS:

AC voltmeters using rectifiers, True RMS responding voltmeter, Electronic multimeter, Digital voltmeters: Ramp, Stair case ramp, Integrating, Successive approximation, Quantizing error; Frequency counter, Universal counter.

CATHODE RAY OSCILLOSCOPE: Introduction, Cathode ray oscilloscope, Storage and sampling oscilloscopes, Digital storage oscilloscope, Spectrum analyzer.

UNIT – III

TRANSDUCERS:

Introduction, Classification of transducers, Analog transducers, Resistive transducers, Potentiometers, Strain gauges, Types of strain gauges, Resistance strain gauges, Semiconductor strain gauges, Resistance thermometers, Thermistors, Application of Thermistors, Thermo couple construction, Measurement of thermocouple output, Compensating circuits,

Advantages and disadvantages of thermocouples, Variable inductance type transducer, Variation of self inductance, Variation of mutual inductance, Linear variable differential transformer, Rotary variable differential transformer, Capacitive transducers, Piezo-electric transducers, Digital transducers, Shaft Encoder.

UNIT – IV

DATA ACQUISITION SYSTEMS: Digital Data Acquisition System, Various ways of multiplexing, Computer controlled instrumentation.

BIO-MEDICAL MEASUREMENTS: Bioelectric signals (ECG,EMG,ERG,EOG) and electrodes. Elementary Principles of Electrocardiograph, Electromyograph, Electroencephalograph.

TEXT BOOKS:

1. W D Cooper & A D Helfrick, Electronic Instrumentation and MeasurementTechniques, PHI, 1998

2. A K Sawhney, Electrical and Electronics Measurement and Instrumentation, Dhanpat Rai, 2000

3. R S Khandpur, Hand Book of Biomedical Engineering, TMH, 2002

REFERENCE BOOKS:

1. C S Rangan, G R Sarma and V S V Mani, Instrumentation Devices and Systems,TMH, 1997

2. H S Kalsi, Electronic Instrumentation, TMH, 1995

3.John G.Webster,Medical Instrumentation: Application and Design,3rd Edition, Wiley India Ltd, 2003

EC 225 NETWORK ANALYSIS AND SYNTHESIS

L	T	P	M
4	1	0	100

UNIT – I

NETWORK FUNTIONS: Poles and Zeros, Network functions for the one port and two port, Poles and zeros of network functions, Restrictions on pole and zero locations for driving point functions and transfer functions, Time domain behavior from the pole zero plot.

TWO PORT NETWORK PARAMETERS: Two port network, Open circuit impedance, Short circuit admittance (Y), Transmission, Inverse transmission, Hybrid and inverse hybrid parameters, Relation between parameter sets, Interconnection of two port networks, Lattice networks, Image parameters.

UNIT – II

ATTENUATORS: Symmetrical and Asymmetrical attenuators, T-type attenuator, P-type attenuator, Lattice attenuator, Bridged T attenuator, L-type attenuator.

FILTERS: Characteristic impedance of symmetrical networks, Properties of symmetrical networks, Filter fundamentals, Pass and stop bands, Characteristic impedance, Constant K low pass filter, Constant K high pass filter, m - derived T section, m – derived Section, Variation of characteristic impedance over the pass band, Termination with m-derived half section, Band pass filters, Filter circuit design, Filter performance.

UNIT – III

FILTER DESIGN: The filter design problem, The approximation problem in network theory, The maximally flat low pass filter approximation, other low-pass filter approximations, Transient response of low pass filters, Magnitude and phase normalization, Frequency transformation.

UNIT – IV

NETWORK SYNTHESIS: Positive real functions, Positive real function properties, Testing driving point functions, Driving point function synthesis with two LC,RL,RC (Both caur and foster froms) elements, Two port network synthesis by ladder development, series and parallel realistions.

TEXT BOOKS:

1. M.E.Vanvalkenburg, Network Analysis, 3rd Edition PHI, 2003.
2. A Sudhakar and Shyam Mohan SP, Circuits and Networks: Analysis and Synthesis, 3rd Edition, TMH, 2006.
3. John D Ryder, Networks, Lines and Fields, 2nd Edition, PHI, 2003.
4. Franklin F. Kuo, Network Analysis and Synthesis, 2nd Edition, Wiley India Ltd.,2005.

REFERENCE BOOKS:

1. M.E Vanvalkenburg, Introduction to Modern Network Systhesis, 2nd Edition, Wiley India Ltd,1986.
2. Vasudev K Atre, Network Theory and Filter Design, 2nd Edition, Wiley Estern,2002.

EC/EI 226	SIGNALS AND SYSTEMS	L	T	P	M
		4	1	0	100

UNIT – I

SIGNAL ANALYSIS: Introduction to signals and systems, Classification of signals and systems (both discrete and continuous); Approximation of a function by a set of mutually orthogonal functions, Evaluation of mean square error, Orthogonality in complex functions, Trigonometric and Exponential Fourier series, Representation of a periodic function by Fourier series, Fourier transform, Properties of Fourier transforms, Fourier transform of simple functions. Sampling theorem - statement and proof, Aliasing.

UNIT – II

SIGNAL TRANSMISSION THROUGH LINEAR NETWORKS: Linear time-invariant system, Time response, Convolution and it's graphical interpretation, Causality and stability, Paley-Wiener criterion, Frequency response, Filter characteristics of linear systems, Conditions for distortionless transmission, Relation between bandwidth and rise time.

SPECTRAL DENSITY AND CORRELATION: Energy and power spectral density, Properties, Auto-correlation and Cross-correlation functions, Properties of correlation function, Parseval's theorem.

UNIT – III

NOISE: Sources of Noise, Thermal Noise, Noise power spectral density, Noise calculation, Multiple sources-Superposition Of power spectra, Noise calculations in Passive circuits, Equivalent noise bandwidth, Noise-Figure of an amplifier, Power density and available power density, Effective input noise temperature, Effective noise temperature, Noise Figure in terms of available gain, Cascaded stages, Measurement of Noise Figure.

UNIT – IV

PROBABILITY& RANDOM VARIABLES: Definition of probability, Axioms of probability, Joint probability, Conditional probability, Total probability, Bayes‘ theorem, Independent events, Random variables, discrete and continuous, Probability Distribution Function, Probability Density Function, Guassian Random variable, Conditional distribution and density functions, Mean ,Variance and standard deviation of a random variable, Characteristic function.

RANDOM PROCESSES: Random process concept , stationarity and independence, correlation functions, Gaussian random process and Poisson random process, power density spectrum and its properties, relationship between power spectrum and autocorrelation function.

TEXT BOOKS:

1. B P Lathi, Signals, Systems and Communications, BSP, 2003

2. P.Z Peebles, Jr, Probability, random variables and random signal principles, TMH.

3. Simon Haykin, Signals and Systems, John Wiley, 2004

REFERENCE BOOKS:

1. A V Oppenheim, A S Wilsky and IT Young, Signals and Systems, PHI/ Pearson, 2003

2. David K Cheng, Analysis of Linear Systems, Narosa Publishers, 1990.

EC/EI261 **ELECTRONIC CIRCUITS ANALYSIS LABORATORY**

Experiments Based on Electronic Circuits

1. Study of Full Wave Rectifier with and without Filters.
2. Frequency Response of Common Emitter Amplifier.
3. Frequency Response of Common Source Amplifier.
4. Measurement of Parameters of Emitter Follower and Source Follower; RI, AV, AI & RO.
5. Two Stage RC-Coupled Amplifier.
6. Study of Cascode Amplifier.
7. Current series feedback topology

Experiments Based on Networks

8. Constant K Low-Pass and High-Pass Filter.
9. Constant K Band-Pass and Band-Elimination Filters.
10. M-Derived Low-Pass and High-Pass Filters.
11. T And Π Attenuators.
12. Measurement of Impedance, Admittance and Transmission Parameters.
13. Measurement of Image and Iterative Impedance of Symmetrical and Asymmetrical Networks.
14. Design of Constant Resistance and Bridged T-Equalisers.

EC-262

SIGNALS AND SYSTEMS (LABORATORY)

1. Write a program to generate the discrete sequences (i) unit step (ii) unit impulse (iii) ramp (iv) periodic sinusoidal sequences. Plot all the sequences.

2. Find the Fourier transform of a square pulse .Plot its amplitude and phase spectrum.

3. Write a program to convolve two discrete time sequences. Plot all the sequences. Verify the result by analytical calculation.

4. Write a program to find the trigonometric Fourier series coefficients of a rectangular periodic signal. Reconstruct the signal by combining the Fourier series coefficients with appropriate weightings.

5. Write a program to find the trigonometric and exponential fourier series coefficients of a periodic rectangular signal. Plot the discrete spectrum of the signal.

6. Generate a discrete time sequence by sampling a continuous time signal. Show that with sampling rates less than Nyquist rate, aliasing occurs while reconstructing the signal.

7. The signal x(t) is defined as below. The signal is sampled at a sampling rate of 1000 samples per second. Find the power content and power spectral density for this signal.

$$x(t) = \begin{cases} \cos(2\pi \times 47t) + \cos(2\pi \times 219t), & 0 \le t \le 10 \\ 0, & \text{otherwise} \end{cases}$$

8. Write a program to find the magnitude and phase response of first order low pass and high pass filter. Plot the responses in logarithmic scale.

9. Write a program to find the response of a low pass filter and high pass filter, when a speech signal is passed through these filters.

10. Write a program to find the autocorrelation and cross correlation of sequences.

11. Generate a uniformly distributed length 1000 random sequence in the range (0,1). Plot the histogram and the probability function for the sequence. Compute the mean and variance of the random signal.

12. Generate a Gaussian distributed length 1000 random sequence . Compute the mean and variance of the random signal by a suitable method.

13. Write a program to generate a random sinusoidal signal and plot four possible realizations of the random signal.

14. Generate a discrete time sequence of N=1000 i.i.d uniformly distributed random numbers in the interval (-0.5,-0.5) and compute the autocorrelation of the sequence.

15. Obtain and plot the power spectrum of the output process when a white random process is passed through a filter with specific impulse response .

Text Book: Contemporary Communication Systems using MATLAB by John G.Proakis, M.Salehi, Cengage Learning Publisher.

EC/EE/EI-263

DATA STRUCTURES LABORATORY

1. Over Loading Functions
2. Objects and Classes
3. Arrays
4. Overloading Operators
5. Inheritance
6. Virtual Functions
7. Linear list-Three programs.
8. Linear and Binary search.
9. Stacks - Two programs.
10. Queues - One program.
11. Linked Lists - Two programs.
12. Heap - One program.
13. Sorting - One program on (a) Quick sort (b) Heap sortt
14. Sorting - One program on (a) Radix sort (b) Merge sort.
15. Binary Tree-One program.
16. Tree Traversal-One program.

NOTE: A minimum of 10(Ten) programs, with One program from each Head, have to be performed and recorded by the candidate to attain eligibility for University Practical Examination.

EC 311 PROFESSIONAL ETHICS AND HUMAN VALUES **L T P M**

4 0 0 100

UNIT – I

Human Values: Morals, Values and Ethics, Integrity, Work Ethic, Service Learning, Civic Virtue, Respect for Others, Living Peacefully, caring, Sharing, honesty, Courage, Valuing Time, Co-operation, Commitment, Empathy, Self Confidence, Character, Spirituality.

UNIT – II

Engineering Ethics: Senses of 'Engineering Ethics', Variety of model issues, Types of inquiry, Moral dilemmas, Moral Autonomy, Kohlberg's theory, Gilligan's theory, Consensus and Controversy, Professions and Professionalism, Professional Ideals and Virtues, Theories about right action, Self-interest, customs and Religion, Uses of Ethical Theories.

UNIT – III

Engineering as Social Experimentation: Engineering as Experimentation, Engineers as responsible Experimenters, Codes of Ethics, A Balanced Outlook on Law.

Safety, Responsibility and Rights: Safety and Risk-Assessment of Safety and Risk , risk Benefit analysis and reducing risk.

Collegiality and Loyalty , Respect for Authority , Collective Bargaining - Confidentiality , Conflicts of Interest , Occupational Crime , Professional Rights , employee Rights , Intellectual Property Rights (IIPR) , Discrimination.

UNIT – IV

Global Issues: Multinational Corporations , Environmental Ethics , Computer Ethics , Weapons Development , Engineers as Managers , consulting Engineering , Engineers as Expert Witnesses and Advisors, Moral Leadership,Sample Code of Ethics like ASME, ASCE, IEEE, Institution of engineers (India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers (IETE), India, etc.

TEXT BOOKS:

1. Mike Martin and Roland Schinzinger, Ethics in Engineering, McGraw Hill, New York 1996.
2. Govindarajan. M, Natarajan. S, Senthilkumar. V.S, Engineering Ethics, PHI, 2004.

REFERENCE BOOKS:

1. Charles D Fleddermann, Engineering Ethics, Prentice Hall, New Jersey, 2004
2. Charles E Harris, Michael S Pritchard and Michael J Rabins, Engineering Ethics Concepts and Cases, Thomson Learning, United States, 2000.
3. John R Boatright, Ethics and the Conduct of Business, PHI,New Delhi, 2003. Edmund G Seebauer and Robert L Barry, Fundamentals of ethics for Scientists and Engineers, Oxford University Press, 2001.

EC/EE/EI 312	LINEAR CONTROL SYSTEMS	L	T	P	M
		4	1	0	100

UNIT – I

Introduction: Basic concept of simple control system, open loop – closed loop control systems. Effect of feedback on overall gain – stability sensitivity and external noise. Types of feedback control systems – Linear time invariant, time variant systems and non-linear control systems.

Mathematical models and Transfer functions of Physical systems: Differential equations – impulse response and transfer functions – translational and rotational mechanical systems. Transfer functions and open-loop and closed-loop systems. Block diagram representation of control systems – black diagram algebra – signal flow graph – Mason's gain formula-

Components of Control Systems: DC servo motor – AC servo motor – synchro transmitter & receiver.

UNIT – II

Time domain analysis: Standard test signals – step, ramp, parabolic and impulse response function – characteristic polynomial and characteristic equations of feedback systems – transient response of first order and second order systems to standard test signals. Time domain specifications – steady state response – steady state error and error constants. Effect of adding poles and zeros on over shoot, rise time, band width – dominant poles of transfer functions.

Stability Analysis in the complex plane: Absolute, relative, conditional, bounded input – bounded output, zero input stability, conditions for stability, Routh – Hurwitz criterion.

UNIT – III

Frequency domain analysis: Introduction – correlation between time and frequency responses – polar plots – Bode plots – Nyquist stability criterion – Nyquist plots. Assessment of relative stability using Nyquist criterion – closed loop frequency response.

UNIT – IV

Root locus Technique: Introduction – construction of root loci – Introduction to Compensation Techniques

State space analysis: Concepts of stat, state variables and state models – digitalization – solution of state equations – state models for LTI systems. Concepts of controllability and Observability.

TEXT BOOKS:

1. B.C. Kuo, Automatic control systems, 7th edition, PHI.
2. I.J.Nagrath & M Gopal, Control Systems Engineering, 3rd edition, New Age International.
3. K. Ogata, Modern Control Engineering, 3rd edition, PHI.

REFERENCE BOOKS:

1. Schaum Series, Feedback and Control Systems, TMH
2. M.Gopal, Control Systems Principles and Design, TMH
3. John Van de Vegta, Feedback Control Systems, 3rd edition, Prentice Hall,1993.

L	T	P	M
4	0	0	100

EC/EI-313 COMPUTER ORGANIZATION AND OPERATING SYSTEMS

UNIT – I

REGISTER TRANSFER AND MICRO-OPERATIONS: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations, Arithmetic Logic Shift Unit.

BASIC COMPUTER ORGANISATION AND DESIGN: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instruction, Input-Output and Interrupt, Design of Basic Computer, Design of Accumulator logic.

MICRO PROGRAMMED CONTROL: Control Memory, Address Sequencing, Micro-Program example, Design of Control Unit.

UNIT – II

CENTRAL PROCESSING UNIT: General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC).

COMPUTER ARITHMETIC: Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating-point Arithmetic Operations.

MEMORY ORGANISATION: Memory Devices, Semiconductor Memories, Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory.

UNIT - III

OVERVIEW OF OPERATING SYSTEMS:
Introduction, Computer systems structures, Operating system structures.

PROCESS MANAGEMENT: Process: Process Concepts, Process Scheduling, Operation on Process, Co-operating Process, Threads, Inter process communication.

CPU SCHEDULING: Scheduling criteria, Scheduling algorithm, Multiprocessor scheduling, Real time scheduling, Algorithm evaluation

UNIT – IV

STORAGE MANAGEMENT*:* MEMORY MANAGEMENT:-Logical Vs Physical address space, Swapping, Contiguous allocation, Paging Segmentation, Segmentation with Paging

VIRTUAL MEMORY: Performance of Demand Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing, Demand Segmentation
CASE STUDIES: Features of Linux OS

TEXT BOOK:

1. M..Morris Mano, Computer System Architecture, 3rd Edition, PHI, 2003.
2. Silberschatz and Galvin, Operating System Concepts, Fourth Edition, John Wiley & Sons, 2002. (For Units III & IV)

REFERENCE BOOKS

1. William Stallings, Operating Systems, Fourth Edition, Pearson Education/PHI, 2003
2. Timothy Budd, An Introduction to Object Oriented Programming, Second Edition, Pearson Education, 2002

EC/EE- 314

LINEAR ICs AND APPLICATIONS

UNIT – I

OPERATIONAL AMPLIFIERS:

Operational amplifier and block diagram representation, op-amp with negative feedback. Block diagram representation of feedback configurations, voltage series feedback amplifier, voltage shunt feedback amplifier, differential amplifier with one op-amp, input offset voltage, input bias current, input offset current, total output offset voltage, frequency response of op-amp, stability, slew rate.

OP-AMP APPLICATIONS:

The summing amplifier, Differential and instrumentation amplifiers, Voltage to current and current to voltage conversion, The Op-amp with complex impedances, Differentiators and integrators, Non Linear Op Amp circuits, Precision rectifiers.

UNIT – II

OSCILLATORS: Oscillator principles, Oscillator types, Frequency stability, Phase shift oscillator, Wein bridge oscillator, Quadrature oscillator, Square-wave generator, Triangular wave generator, Saw tooth wave generator, Voltage controlled oscillator.

COMPARATORS: Introduction to comparator, Basic comparator, Zero-crossing detector, Schmitt Trigger, Comparator characteristics, Limitations of Op-Amps as comparators, Voltage limiters.

UNIT – III

CLIPPERS, CLAMPERS & CONVERTERS: Positive and negative clippers, Positive and negative clampers, Absolute value output circuit, Peak detector, Sample and hold circuit. D/A conversion fundamentals, Weighted resistor summing D/A Converter, R-2R Ladder D/A converter, A/D conversion: Ramp converters, Successive Approximation A/D converters, Dual slope converters, Parallel A/D converters. Tracking A/D converters.

UNIT – IV

APPLICATIONS OF SPECIAL ICS: The 555 timer, 555 as Monostable and Astable Multivibrator and applications. Phase Locked Loops, Operating principles, Monolithic PLLs, 565 PLL applications, A 723 Voltage Regulator and its design.

ACTIVE FILTERS: Active LP and HP filters, Band pass filters: Wideband, Narrow Band pass filters, Band stop filters, State variable filters, All pass filters.

TEXT BOOKS:

1) Rama Kant A. Gayakwad, Op-Amps and Linear Integrated Circuits, 4th Edition, PHI/ Pearson Education, 2003.
2) D.Roy and Choudhury, Shail B.Jain, Linear Integrated Circuits, 2nd Edition, New Age International, 2003.
3) Denton J Dailey, Operational Amplifiers and Linear Integrated Circuit Theory and Applications,

REFERENCE BOOK:

1. J.Michael Jacob, Applications and Design with Analog Integrated Circuits, 2nd Edition, PHI, 2003.

EC315	PULSE CIRCUITS	L	T	P	M
		4	1	0	100

UNIT – I

LINEAR WAVE SHAPING:

Responses of RC-high pass circuit and low pass circuits to sinusoidal, step, pulse, square, ramp and exponential inputs, Criteria for good differentiation and integration, Uncompensated and compensated attenuators, Ringing circuit.

UNIT – II

NON-LINEAR WAVE SHAPING:

Clipping circuits with diodes, Multi-diode circuits, Transient and steady state response of a diode clamping circuit, Clamping circuit theorem, Practical clamping circuits, Transistor as switch, Design of Transistor switch, Transistor Switching Times

UNIT – III

MULTIVIBRATORS (using BJTs):

Bistable Multivibrator: Fixed bias and self bias transistor binary, Commutating capacitors, Non-saturated binary, Direct coupled binary, Unsymmetrical and symmetrical triggering of binary, Schmitt Trigger circuit, Collector Coupled Monostable and Astable Multivibrators-operation & design

UNIT –IV

SWEEP CIRCUITS:

Voltage sweep circuits, Deviation from linearity expressed as errors, Exponential and Constant current charging voltage sweep circuits, Principles of Miller and Bootstrap Sweep circuits, Simple current sweep circuit, Need

for a trapezoidal waveform for linearity correction, its generation and application.

TEXT BOOKS:

1. J Millman and H Taub, Pulse, Digital and Switching Circuits, TMH, 2003

2. David A Bell, Solid State Pulse Circuits, 4th Edition, PHI, 2003

3. Mothiki S. Prakash Rao, Pulse Digital & Switching Waveforms, 2nd Edition, TMH.

EC-316

ANALOG COMMUNICATIONS

UNIT – I

AMPLITUDE MODULATION: Time domain description, Frequency domain description, Single tone modulation, Generation of AM wave, Square law modulator, Switching Modulator, Detection of AM waves, Square law detector, Envelope detector, DSB-SC Modulation, Time-domain and frequency domain descriptions of DSB-SC, Generation of DSB-SC: Balanced modulator, Coherent detection of DSB-SC modulated waves, Costas loop, Quadrature-Carrier multiplexing.

SSB AND VSB MODULATIONS: Band-pass transmission, Complex low-pass representation of Narrow-band signals, Concepts of pre-envelope, Complex envelope and Natural envelope, Equivalent low-pass transmission model, Single side band modulation: Frequency domain description, Generation of SSB-SC wave, Frequency-discrimination method, Phase discrimination method, Demodulation of SSB-SC waves, Vestigial side-band modulation, Frequency domain description, Generation of VSB modulated wave, Envelope detection of VSB wave plus carrier, Comparison of AM techniques, Frequency Division Multiplexing (FDM).

UNIT – II

ANGLE MODULATION: Introduction to Angle modulation, Relation between frequency Modulation and phase modulation, Single tone frequency modulation, Spectrum analysis of sinusoidal FM wave, Narrow Band FM and Wide Band FM, Transmission bandwidth of FM waves, Carson's Rule, Generation of FM waves, Indirect FM (Armstrong Method), Direct FM, Demodulation of FM waves, Balanced frequency discriminator – Zero-crossing detector, Linearized model of PLL, FM demodulation employing first order PLL, Practical Considerations, FM limiters, Applications.

UNIT – III

DISCRETE MODULATION: Generation and Demodulation of PAM, PWM and PPM; TDM, Comparison of Discrete Modulation Techniques.

NOISE IN ANALOG MODULATION: AM Receiver model, Signal to noise ratios for coherent reception. DSB-SC receiver, SSC-SC receiver, Noise in AM receivers using envelope detection. AM threshold effect, FM receiver model, Noise in FM reception, Capture effect in FM, Threshold effect, FM threshold reduction, Pre-emphasis and De-emphasis in FM.

UNIT – IV

RADIO TRANSMITTERS:

Frequency allocation for radio communication systems, Block diagrams and functions of radio transmitters for AM and FM systems.

RADIO RECEIVERS:

TRF and super heterodyne receivers, RF, Mixer and IF stages, Choice of IF, Image frequency, Alignment and tracking of radio receivers, AGC, Tone and volume controls, Receiver characteristics and their measurements, FM receivers, Communication receivers, Fading and diversity reception.

TEXT BOOKS:

1. Simon Haykin, Introduction to Analog and Digital Communication Systems, John Wiley and Sons, 3rd Edition, 2001

2. Leon W Couch II, Digital and Analog Communication Systems, Pearson Education, 2004

3. George Kennedy, Electronic Communication Systems, Mc Graw Hill, 4th Edition, 1999

REFERENCE BOOKS:

1. Taub and Schilling, Principles of Communication Systems, TMH, 2nd Edition, 1986

2. Sam Shanmugam, Analog and Digital Communication Systems, John Wiley, 1992.

EC 351 ANALOG COMMUNICATIONS LAB

L	T	P	M
0	0	3	75

1. Amplitude Modulation and Demodulation
2. DSB SC Modulation and Demodulation
3. SSB SC Modulation and Demodulation
4. Frequency Modulation and Demodulation
5. Pre Emphasis - De Emphasis Circuits
6. Verification of Sampling Theorem
7. PAM and Reconstruction
8. PWM and PPM: Generation and Reconstruction
9. Effect of Noise on the Communication Channel
10. Design of Mixer
11. Class-A Power Amplifier
12. RC Phase Shift Oscillator
13. Hartley and Colpitts Oscillators

NOTE: A minimum of 10(Ten) experiments have to be performed and recorded by the candidate to attain eligibility for University Practical Examination

EC-352

ELECTRONIC CIRCUIT SIMULATION LAB

1. Obtain the V-I characteristics of Silicon and Germanium diodes.
2. Design a zener diode voltage regulator.
3. Design and verify the operating point for a self bias circuit.
4. Study the characteristics of a half wave and full wave rectifier.
5. Study the characteristics of a bridge rectifier.
6. Obtain the frequency response of a CE amplifier.
7. Obtain the frequency response of a two stage RC couple CE amplifier.
8. Design and simulate Class A power Amplifier.
9. Simulate a differentiator and integrator using OPAMP.
10. Simulate a low pass and high pass filter using OPAMP.
11. Simulate a RC phase shift and Wein bridge Oscillator using OPAMP.
12. Simulate a constant K low pass and high pass filter.
13. Design and simulate a constant resistance and bridged T equalizer.
14. Simulate an Amplitude Modulator and Demodulator.
15. Simulate a Frequency Modulator and Demodulator.

EC 353	PULSE CIRCUITS AND ICs LAB	L	T	P	M
		0	0	3	75

1. Linear Wave-Shaping.
2. Non-linear Wave-Shaping.
3. Design and Verification of Astable Multivibrator.
4. Design and Verification of Monostable Multivibrator.
5. Design and Verification of Schmitt Trigger(using discrete components and using IC741).
6. Measurement of Op-amp Parameters.
7. Applications of Op-amp (Adder, Subtractor, Integrator, Differentiator).
8. Instrumentation Amplifier using Op-Amp.
9. Waveform Generation using Op-amp (Square, Triangular).
10. Design of Active Filters (LPF&HPF-First Order).
11. Application of 555 Timer (Astable, Monostable, Schmitt Trigger).
12. PLL using 556.
13. Design of IC Regulator using 723.
14. Design of VCO using 566.
15. D-A Converter (R-2R Ladder).

NOTE: A minimum of 10(Ten) experiments have to be performed and recorded by the Candidate to attain eligibility for University Practical Examination

EC - 321

DIGITAL COMMUNICATIONS

UNIT I

PULSE CODE MODULATION: Quantization Process Quantization Noise Pulse Code Modulation Line Codes Noise Considerations in PCM Systems Virtues, Limitations, and Modifications of PCM Delta Modulation Differential Pulse Code Modulation Adaptive Differential Pulse Code Modulation

BASEBAND PULSE TRANSMISSION: Matched Filter and its Properties Error Rate due to Noise Intersymbol Interference Nyquist's Criterion for Distortionless Baseband Binary Transmission Correlative-Level Coding Optimum Linear Receiver Eye Pattern

UNIT II

DIGITAL PASSBAND TRANSMISSION: Geometric representation of Signals Conversion Of The Continuous AWGN Channel into A Vector Channel Likelihood Functions Maximum Likelihood Decoding Correlation Receiver Probability Of Error Passband Transmission Model Coherent BPSK,QPSK,M-PSK Coherent BFSK MSK GMSK Non Coherent BFSK DPSK Comparison of Digital Modulation Schemes

UNIT III

SPREAD APECTRUM MODULATION: PN Sequences A Notion Of Spread Spectrum Direct Sequence Spread Spectrum Spread Spectrum With Coherent BPSK Signal Space Dimensionality and Processing Gain Probability Of Error Frequency Hop Spread Spectrum

FUNDAMENTAL LIMITS IN INFORMATION THEORY: Uncertainity Information and Entropy Source Coding Theorem Data Compaction Discrete Memoryless Channels Mutual Information Channel Capacity Channel Coding Theorem Information Capacity Theorem Data Compression

UNIT IV

ERROR CONTROL CODING: Discrete Memoryless Channels Linear Block Codes Cyclic Codes Convolutional Codes Maximum Likelihood and Sequential Decoding Of Convolutional Codes

TEXT BOOKS:

6. Simon Haykin, Communication Systems, 4th edition John Wiley & Sons, 2001
7. Modern Digital and Analog Communication Systems, 3rd edition, OUP, 1998
8. Leon W Couch II, Digital and Analog Communication Systems, 6th Edition, Pearson, 2004

REFERENCE BOOKS:

5. John G Proakis, Digital Communications,4th Edition, McGraw Hill,2001
6. Bernard Sklar, Digital Communication,2nd Edition, Pearson Education,2001
7. Taub and Schilling, Principles of Communication Systems,2nd Edition,TMH,1986

EC/EE/EI – 322

MICROPROCESSORS AND MICROCONTROLLERS

UNIT – I

Microprocessor: introduction to microcomputers and microprocessors, introduction and architecture of 8086 family, addressing modes, instruction description and assembler directives of 8086 microprocessors.

UNIT – II

8086 programming and system connections: Program development steps, writing programs for use with an assembler, assembly language program development tools, writing and using procedures and assembler macros.

An example of minimum mode system, addressing memory and ports in microcomputer system. 8086 interrupts and interrupt responses.

UNIT – III

Digital Interfacing: Programmable parallel ports, handshake IO, interface Microprocessor to keyboards.

Analog interfacing: DAC principle of operation, specifications and different types of DAC's and interfacing.

Programmable devices: Introduction to Programmable peripheral devices 8255, 8254, 8259, 8251, DMA data transfer, RS232 communication standard.

UNIT – IV

Introduction:- Introduction to microcontrollers, comparing microprocessors and microcontrollers, Architecture:- Architecture of 8051, pin configuration of 8051 microcontroller, hardware input pins, output pins ports and external memory, counters and timers, serial data input and output and interrupts.

Programming & interfacing 8051:- Addressing modes of 8051 microcontroller, Instruction set of 8051 microcontroller, simple programs using 8051 microcontroller.

TEXT BOOKS:

1. Duglus V. Hall, Microprocessor and Interfacing, Revised 2nd Edition, TMH,2006.
2. Kenneth J. Ayala, The 8051 Microcontroller Architecture Programming and Applications, 2nd Edition, Penram International Publishers (I), 1996.

REFERENCE BOOKS:

3. John Uffenbeck, The 80X86 Family, Design, Programming and Interfacing, 3rd Edition, Pearson Education, 2002.
4. Barry Bray, the intel microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium processors, architecture, programming, and interfacing, 6th Edition, PHI edition.
5. Mohammed Ari Mazidi and Janci Gillispie, The 8051 Microcontroller and Embedded Systems, Pearson Education Asia, New Delhi, 2003.

EC/EE/EI 323	DIGITAL SIGNAL PROCESSING	L	T	P	M
		4	1	0	100

UNIT – I

DISCRETE SIGNALS AND SYSTEMS: Introduction to digital signal processing, Advantages and applications, Discrete time signals, LTI system: Stability and causality, Frequency domain representation of discrete time signals and systems

Z-TRANSFORMS: Z-transforms, Region of convergence, Z-transform theorems and properties, Parseval's relation, Relation between Z-transform and Fourier transform of a sequence, Inverse Z transform using Cauchy's integration theorem, Partial fraction method, Long division method, Solution of differential equations using one sided Z-transform, Frequency response of a stable system.

UNIT – II

DFT AND FFT: Discrete Fourier Series, Properties of DFS, Discrete Fourier Transform, Properties of DFT, Linear convolution using DFT, Computations for evaluating DFT, Decimation in time FFT algorithms, Decimation in frequency FFT algorithm, Computation of inverse DFT.

UNIT – III

IIR FILTER DESIGN TECHNIQUES: Introduction, Properties of IIR filters, Design of Digital Butterworth and Chebyshev filters using bilinear transformation, Impulse invariance transformation methods. Design of digital filters using frequency transformation method.

UNIT – IV

FIR FILTER DESIGN TECHNIQUES: Introduction to characteristics of linear phase FIR filters, Frequency response, Designing FIR filters using windowing methods: Rectangular window, Hanning window, Hamming

window, Generalised Hamming window, Bartlett triangular window, Comparison of IIR and FIR filters.

REALISATION OF DIGITAL FILTERS: Direct, Canonic, Cascade, Parallel and Ladder realizations

TEXT BOOKS:

1) Lonnie C Ludeman, Fundamentals of Digital Signal Processing, John Wiley & Sons, 2003.
2) S K Mitra, Digital Signal Processing: A Computer Based Approach, 2nd Edition, TMH, 2003
3) Alan V Oppenheim and Ronald W Schafer, Digital Signal Processing, PearsonEducation/PHI, 2004.
4) P.Ramesh Babu, Digital Signal Processing, 2nd Edition, Scitech Publications, 2004.

REFERENCE BOOKS:

1) Johnny R. Johnson, Introduction to Digital Signal Processing, PHI, 2001.
2) Andreas Antoniou, Digital Signal Processing,TMH, 2006.
3) John G.Proakis, Dimitris G Manolakis, digital Signal Processing: Principles, Algorithms and Applications, Pearson Education / PHI, 2003

EC324 ANTENNAS AND WAVE PROPAGATION L T P M

4 0 0 100

UNIT – I

RADIATION:

Radiation Mechanism, Potential functions-heuristic approach, Maxwell's equation approach, Potential functions for sinusoidal oscillations, Alternating current element, Power radiated by current element, Application to short antennas, Assumed current distribution, Radiation from quarter wave Monopole / half wave dipole, Traveling wave antennas and the effect of the point of feed on standing wave antennas.

UNIT – II

ANTENNA FUNDAMENTALS:

Isotropic, Directional, Omni-directional patterns, Principle patterns, Field regions, Radiation density, Radiation intensity, Directive gain, Power gain, Half power Beam width, Antenna polarisation, Power loss factor, Radiation efficiency, Effective aperture of antenna, Relation between maximum effective aperture and directivity, Friss transmission equation.

ARRAY ANTENNAS

Two element array, Uniform linear array, Side lobe level and beam width of broadside array, Beam width of end fire array, Principle of multiplication of patterns, Effect of earth on vertical patterns, Binomial array, Basic principle of Dolph-Tschebyscheff array.

UNIT – III

CHARATERISTICS OF TYPICAL ANTENNAS:

V and Rhombic antennas, Folded Dipole, Loop antenna, Yagi Uda array, Helical antenna, Log periodic antenna, Pyramidal and conical Horn antenna, Corner reflector antenna, Parabolic reflector antennas - Paraboloid and parabolic cylinder, Cassegrain system of reflectors, Basic principles of slot antennas and micro strip antennas.

UNIT – IV

RADIO WAVE PROPAGATION:

Ground wave Propagation, Earth constants, Space-wave Propagation, Effect of curvature of an Ideal Earth, Variations of Field strength with height in space-wave Propagation, Atmospheric effects in space-wave Propagation, Radio-Horizon, Duct Propagation, Extended-range Propagation resulting from Tropospheric Scattering, lonospheric Propagation, Gyro frequency, Refraction and reflection of Sky Waves by the Ionosphere, Critical Frequency, Skip Distance, Maximum Usable Frequency.

TEXT BOOKS:

1) Edward C Jordan and Keith G Balmain, Electromagnetic Waves and Radiating Systems, 2nd Edition, PHI, 2003

2) Constantine A Balanis, Antenna Theory : Analysis and Design, Harper and Row Publishers, 2002

3) G.S.N.Raju, Antennas and Wave Propagation, 1st Edition, Pearson Publication, Singapore F.E. Terman, Electronic and Radio Engineering, Mc Graw Hill, 1985.

REFERENCE BOOK:

1) J.D.Kraus and Ronald J Marhefka, Antennas For all Applications, TMH, 2003

EC/EI 325	COMPUTER NETWORKS	L	T	P	M
		4	0	0	100

UNIT – I

INTRODUCTION:

Uses of Computer networks, Network Hardware, Network Software, Reference Models (OSI and TCP/IP only).

PHYSICAL LAYER:
Introduction to Guided Transmission Media, Wireless Transmission

UNIT – II

DATA LINK LAYER:
Data Link Layer design issues, Error detection and correction, Elementary Data link Protocols, Sliding window protocols

MEDIUM ACCESS CONTROL SUBLAYER:
The channel Allocation problem, Multiple Access Protocols, Ethernet, Wireless LANs, Broadband wireless, Bluetooth, Data Link Layer Switching.

UNT – III

NETWORK LAYER:
Network layer Design Issues, Routing Algorithms – (The Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing, Routing for Mobile Hosts.)
Congestion Control Algorithms, Quality of Service - (Requirements, Techniques for Achieving Good Quality of Service), Internetworking, The Network layer in the internet- (The IP Protocol, IP Address, Internet Control Protocols, OSPF, BGP).

UNIT – IV

TRANSPORT LAYER:
Elements of Transport Protocols, TCP, UDP,RTP.

APPLICATION LAYER:
DNS, Electronic Mail, The World Wide Web (Architectural Overview only) Multimedia.

TEXT BOOKS:

1. A.S Tanenbaum, Computer Networks, 4th Edition, PHI, 2003
2. Behrouz A. Foruzan, Data communication and Networking, 4th Edition,TMH, 2004.

		L	T	P	M
EC/EE/EI 361	**MICROPROCESSORS AND MICROCONTROLLERS LAB**	**0**	**0**	**3**	**75**

Experiments Based on ALP (8086)

1. Programs on Data Transfer Instructions.
2. Programs on Arithmetic and Logical Instructions.
3. Programs on Branch Instructions.
4. Programs on Subroutines.
5. Sorting of an Array.
6. Programs on Interrupts (Software and Hardware).
7. 8086 Programs using DOS and BIOS Interrupts.

Experiments Based on Interfacing & Microcontroller (8051)

8. DAC Interface-Waveform generations.
9. Stepper Motor Control.
10. Keyboard Interface / LCD Interface.
11. Data Transfer between two PCs using RS.232 C Serial Port
12. Programs on Data Transfer Instructions using 8051 Microcontroller.
13. Programs on Arithmetic and Logical Instructions using 8051 Microcontroller.
14. Applications with Microcontroller 8051.

NOTE: A minimum of 10(Ten) experiments, choosing 5 (Five) from each part, have to be Performed and recorded by the candidate to attain eligibility for University Practical Examination.

EC-362 DIGITAL COMMUNICATION LAB

Experiments based on Hardware :

1. Generation and Detection of PCM.

2. Generation and Detection of ASK.

3. Generation and Detection of FSK.

4. Generation and Detection of PSK&QPSK.

5. Generation and Detection of TDM

6. Generation and Detection of DPSK

7. Delta Modulation and Demodulation.

8. Generation and Detection of DPCM.

Simulation Experiments:

1. Generate a sinusoidal signal with amplitude 2, and $\omega = 1$. Using a uniform PCM scheme, quantize it once to 8 levels and once to 16 levels. Plot the original signal and the quantized signals on the same axis. Compare the resulting SQNR in the two cases.

2. Design a Huffman code for an information source with probabilities p={0.1,0.05,0.21,0.07,0.02,0.2,0.2,0.15}. Determine the efficiency of the code by computing the average codeword length and the entropy of the source.

3. Generate the basic pulse shapes, NRZ, RZ, half sinusoid and raised cosine pulses. Generate eye diagrams of binary polar signaling.

4. Write a program to generate any digital modulation (ASK, PSK,FSK) and demodulation scheme.

5. Determine the output of a convolutional encoder when the information sequence is 10011100110000111.

6. Plot the capacity of an additive white Gaussian Noise channel with a bandwidth of 3000Hz as a function of signal to noise power.

7. Find all the codewords of the (15,11) Hamming code and verify that the minimum distance is equal to 3.

Communication Skills Lab

Course Code: EC: 363

Lectures: 3 Periods/week Sessional Marks: 30

University Exam: 3 hours University Examination Marks: 70

Course Objectives:

The course mainly focuses on to improve the Linguistic Competence, Communicative Competence, Telephonic Skills and Employability Skills of the learners. Activities in the Communication Skills Lab will simulate actual discourses that students will engage in their interaction with their peers, teachers or strangers in their day-to-day situations.

By the time the students complete the course they would be able to identify and use the general features of discourse development, which may be, realized differently in different situations.

Syllabus:

Module-1: Phonetics

a) Introduction to vowels and consonants
b) Introduction to Accent, Intonation and Rhythm

Module-2: Reading skills

a) Reading for main idea.
b) Scanning and skimming the text
c) Inference of lexical and contextual meaning

Module-3: Presentation Skills

a) Debate
b) Paper Presentation:
    i) Identification of source material
    ii) Arrangement of Collected Data
c) Extempore

Module-4: Employability Skills

a) Resume Preparation
    i) Identification of information
    ii) Arrangement of collected data
b) Group Discussions
c) Interview Skills
    i) Dress code
    ii) Behavioral Skills

Module-5: Telephonic Skills

a) Formal &Informal interaction

b) Receiving Messages & Complaints

c) Tone modulation

NOTE: 12 Lab Activities are minimum in Record (125 pages single side book) with contents: Name of the Activity, Source, Skill Improved.

Minimum Requirements:

The Communication Skills Lab shall need two labs. One is Communication Skills Lab with LAN facilitated 60 multimedia systems and English language software suggested by the concern faculty. The other,

Conversational Skills Lab with 6 to 10 round tables, 60 movable chairs and audio-visual Devices with LCD Projector.

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- Clarity Pronunciation Power.
- The Rosetta Stone English Library.
- Dorling Kindersley series of Grammar, Punctuation, Composition etc.
- English in Mind Series: Starter and 1 to 5 work books, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- Language in Use, Foundation Books Pvt. Ltd with CD.
- Mastering English in Vocabulary, Grammar, Spellings, Composition.
- Telephoning in English.
- Oxford Advanced Learner's Compass, 7th Edition.
- Communicate to Conquer: A Handbook of Group Discussions and Job Interviews.

Reference Books: 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. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
2. English Pronouncing Dictionary Daniel Jones Current Edition with CD.

3. Spoken English- R. K. Bansal and J. B. Harrison, Orient Longman 2006 Edn.
4. Speaking English Effectively by Krishna Mohan & NP Singh (Macmillan)
5. 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.
6. A Text book of English Phonetics for Indian Students by T. Balasubramanian (Macmillan)
7. English Skills for Technical Students, WBSCTE with British Council, OL.

DISTRIBUTION AND WEIGHTAGE OF MARKS

Communication Skills Lab Practical Paper:

1. The practical examinations for the Communication Skills Laboratory shall be conducted as per the University norms prescribed for the Core Engineering Practical Sessions.

2. For the ***Communication Skills 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, 10 marks shall be awarded for day-

to-day performance (i.e. according to final Grade in the Record) and 15marks (including 5 Marks for attendance) to be awarded by conducting Internal Lab Test(s) by the teacher concerned. The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department. Of 50 marks, 40 marks shall be equally distributed to LSRW Skills and 10 marks for vice-a-voce.

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EC-326/A

Television Engineering

UNIT I

Video Engineering : Elements of Television system:- Basic block schematic of television transmitter and receiver, camera , picture tube, Scanning, human factor consideration, flicker, interlaced scanning, number of scanning lines, Horizontal and vertical resolution, maximum video frequency, resolution and bandwidth, Composite video signal - vertical and horizontal synchronization Television camera: - Working principle of CCD- its working - Color television camera: block schematic explanation Modulation -Positive and negative modulation and its comparison, high level and low level modulation and its comparison. vestigial side band transmission. Transmission of sound signal.

UNIT II

Colour Television: Compatibility consideration, Color response of human eye, Three color theory, additive mixing of colors, chromaticity diagram, Luminance and chrominance, color difference signal and its generation, Frequency interleaving and Colour burst signal Colour TV picture tubes : CRT,

UNIT III

Principles of LCD displays, LED displays, Plasma displays, 3D television concepts, Cable television, DTH broadcasting.

UNIT IV

Video coding and video compression: Demand for video compression-video image representation quantization of image data intraframe compression techniques; DPCM - DCT based transform coding - Motion compensation –H. 261 video conference coding standard - MEPEG video compression. Digital audio bradcasting- Block schematic explanation-Audio

compression and source encoding – HDTV: pixel transmission rate – video compression for HDTV

Text Books:

1. Multi Media Communication Fred Halsal Pearson Education

2. Basic Television Engineering: Bernad Grob, Mc Graw Hill.

Reference Books:

3. Monochrome and colour television: R R Gulati, Wiley Eastern

4. Discrete time Speech Signal Processing :Thomas Quatieri Pearson Education

5.The Electronics Hand Book :J C Whitaker IEEE press

EC/EI 326/B DATA BASE MANAGEMENT SYSTEMS **L T P M**

4 0 0 100

UNIT – I

Introduction- An Overview of Database Management, database system, database, Data independence, Relational systems and others. Database System Architecture: The three levels of the architecture, Mappings, The database administrator, The database management system, Client/server architecture.

An Introduction to Relational Databases - The relational model, Relations and relvars, Optimization, Base relvars and views, The Relational Model: Relations, Tuples, Relation types, Relation values, Relation variables, SQL facilities.

UNIT-II

An Introduction to SQL: Overview, The catalog, Views, Embedded SQL, Dynamic SQL,

Relational Algebra: Closure revisited, Syntax, Semantics, Examples, Additional operators, grouping and ungrouping, Relational Calculus: Tuple calculus, Examples, Calculus vs. algebra, Computational capabilities, Domain calculus, Query-By-Example,

Integrity: Predicates and propositions, Relvar predicates and database predicates, Checking the constraints, Internal v external constraints, Correctness v consistency, Integrity and views, A constraint classification scheme, Keys, Triggers. Views – concept, View retrievals, View updates, Snapshots .

UNIT – III

Database Design: Functional Dependencies, Basic definitions, Trivial and nontrivial dependencies, Closure of a set of dependencies, Closure of a set of attributes, Irreducible sets of dependencies, Normalization: 1NF, 2NF, 3NF,

BCNF, Nonloss decomposition and functional dependencies, First, second, and third normal forms, Dependency preservation, Boyce / Codd normal form, Further Normalization: Higher Normal Forms, Multi-valued dependencies and fourth normal form, Join dependencies and fifth normal form, Other normal forms, Semantic Modeling: The overall approach, The E/R model, E/R diagrams, Database design with the E/R model.

UNIT – IV

Database Protection: Recovery – Transactions, Transaction recovery, System recovery, Media recovery, Two-phase commit, Savepoints, Concurrency - Three concurrency problems, Locking, The three concurrency problems revisited, Deadlock, Serializability, Intent locking, Security - Discretionary access control, Mandatory access control, Data encryption.

TEXT BOOK:

1. C.J. DATE, An Introduction to Database Systems, 8th Edition, Pearson Edition.

REFERENCE BOOKS:

1. Elmasri Navrate, Fundamentals of Database Systems, Pearson Education

2. Raghurama Krishnan, Data base Management Systems, Johannes Gehrke, 3rd Edition,TATA McGrawHill,

2. Silberschatz, Korth, Data base System Concepts, V edition, McGraw hill.

BIOMEDICAL ENGINEERING **L T P M**

EC 326/C

4 0 0 100

UNIT – I

BASIC CONCEPTS OF MEDICAL INSTRUMENTATION: Generalized Medical Instrument Systems, Classification of Biomedical Instruments, Generalized static characteristics, Dynamic characteristics.
THE ORIGIN OF BIOPOTENTIALS: Electrical activity of excitable cells, Functional Organization of the peripheral Nervous System, ENG, EMG, ECG, ERG, EEG, MEG.

UNIT – II

BIO POTENTIAL ELECTRODES: The Electrode-Electrolyte Interface, Polarization, polarizable and nonpolarizable Electrodes, Internal Electrodes, Electrode Arrays, Microelectrodes, Electrodes for Electric Stimulation of Tissue.
BIOPOTENTIAL AMPLIFIERS: Basic Requirements, The Electrocardiograph, Problems frequently encountered, Amplifiers for other Biopotential Signals, Biotelemetry
MEASUREMENTS OF FLOW AND VOLUME OF BLOOD: Electromagnetic Flow meters, Ultrasonic Flow meters.

UNIT – III

MEDICAL IMAGING SYSTEMS: Radiography, Computed Radiography, Computed Tomography, Magnetic Resonance Imaging, Ultra Sonography, PET.

UNIT – IV

THERAPEUTIC AND PROSTHETIC DEVICES: Cardiac Pacemakers, Defibrillators, Ventilators, Infant Incubators.

ELECTRICAL SAFETY: Macro shock and Micro shock Hazards

TEXT BOOK:

1. John G Webster, Medical Instrumentation –Application and Design,3rd Edition,

EC 326/D ARTIFICIAL INTELLIGENCE L T P M

4 0 0 100

UNIT – I

PROBLEMS, PROBLEM SPACES AND SEARCH: Defining the Problem as a State space Search, Production Systems, Problem Characteristics, Production system characteristics, Issues in the Design of Search Programs.

HEURISTIC SEARCH TECHNIQUES: Generate-and-test, Hill Climbing, Best-First Search, Problem Reduction, Constraint Satisfaction, Means-Ends Analysis.

UNIT – II

KNOWLEDGE REPRESENTATION USING PREDICATE LOGIC: Representing Simple Facts in logic, Representing Instance and Isa Relationships, Computable Functions and Predicates, Resolution, Question answering.

REPRESENTING KNOWLEDGE USING RULES - Procedural versus Declarative Knowledge, Logic Programming, Forward versus Backward Reasoning, Matching, Control Knowledge, Semantic Nets

UNIT – III

Conceptual dependency, Scripts.

Hopfield Networks, Perceptrons, Back propagation networks, generalization, Applications of Neural networks, Expert systems.

UNIT – IV

PROLOG Language: Facts, Objects and predicates, Variables, Rules, Input and Output, Arithmetic Operations, Cut, Fail, Recursion, string operations, Dynamic databases, Lists.

TEXTBOOKS:

1. Elaine Rich & Kevin Knight, Artificial Intelligence, 2nd Edition, (Tata McGraw Hill Edition)
2. Carl Townsend, Introduction to TURBO PROLOG, BPB Publications.

REFERENCE BOOKS:

1. Patrick Henry Winston, Artificial Intelligence, Pearson Education,
2. Russel and Norvig, Artificial Intelligence, Pearson Education, PHI.

EC/EE/EI 411	INDUSTRIAL MANAGEMENT	L	T	P	M
		4	0	0	100

UNIT – I

GENERAL MANAGEMENT:

Principles of scientific management, Brief treatment of managerial functions.

FORMS OF BUSINESS ORGANISATION:

Salient features of sole proprietorship. Partnership, Joint Stock Company, private limited and public limited companies.

UNIT – II

FINANCIAL MANAGEMENT:

Concept of interest, compound interest, equivalent cash flow diagram

ECONOMIC EVALUATION OF ALTERNATIVES:

Basic methods, the annual equivalent method, present worth method, future worth method.

DEPRECIATION:

Purpose, types of depreciation, common methods of depreciation. The straight line method, declining balance method, the sum of the years digits method.

UNIT – III

PERSONNEL MANAGEMENT:

Functions of Personnel Management – Human Resources Planning, Brief treatment of Recruitment, Selection, Placement, Performance Appraisal, Career Development, Training and Development, Compensation. Staff role of Personnel Department, Organization for the Personnel Function. Goals and Plans of the Organization. Motivation and Leadership, Theories of motivation and styles of Leadership.

UNIT – IV

MATERIAL MANAGEMENT:

Purchasing, Objective, Source Selection, Procurement Methods, Inventory Management –EOQ, EPQ, ABC Analysis.

MARKETING MANAGEMENT: Functions of Marketing, Product life cycle, Channels of distribution, Advertising & Sales promotion, Market Research.

TEXT BOOKS:

1. KK Ahuja, Industrial Management, Vol. I & II, Dhanpat Rai, 1978.
2. E.Paul Degarmo, John R Chanda, William G Sullivan, Engineering Economy, Mac Millan Publishing Co, 1979

REFERENCE BOOKS:

1. Philip Kotler, Marketing Management, 11th Edition, Pearson Education, 2004.
2. P. Gopalakrishnan, Hand Book of Materials Management, PHI, 1999

   Heinz Weirich and Harold Koontz, Management, 10th Edition, TMH, 2004.

EC/EI 412	DIGITAL IMAGE PROCESSING	L	T	P	M
		4	0	0	100

UNIT – I

INTRODUCTION:

Origin of Digital Image Processing, Fields that uses Digital Image Processing, Fundamental steps in Digital Image Processing, Components of an Image Processing System.

DIGITAL IMAGE FUNDAMENTLS:

Elements of Visual perception, Image sampling and Quantization, Basic relationships between Pixels, Linear and Non-linear operations.

UNIT – II

IMAGE ENHANCEMENT IN SPATIAL DOMAIN:

Some basic Grey level transformations, histogram processing, enhancement using Arithmetic/Logic operations, Smoothing Spatial Filters, Sharpening Spatial Filters.

IMAGE ENHANCEMENT IN FREQUENCY DOMAIN:

Introduction to Fourier Transform and the Frequency Domain, Smoothing Frequency Domain Filters, Sharpening Frequency Domain Filters.

UNIT – III

IMAGE RESTORATION:

Noise models, Restoration in the presence of Noise, only Spatial Filtering, Periodic Noise reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradations, Inverse Filtering, Wiener Filtering.

IMAGE COMPRESSION:

Fundamentals – Image Compression models – Error Free Compression, Lossy Compression.

UNIT – IV

IMAGE SEGMENTATION:

Detection of discontinuities, Thresholding, Edge based Segmentation and Region based Segmentation

IMAGE REPRESENTATION AND DESCRIPTION:

Representation schemes, Boundary Descriptors, Regional Descriptors.

TEXT BOOK:

1. R C Gonzalez and Richard E Woods, Digital Image Processing, Pearson Education, Second Edition, 2002

REFERENCE BOOKS:

1. A K Jain, Digital Image Processing, PHI, 1989

2. B Chanda and D Dutta Majumder, Digital Image Processing and Analysis, PHI, 2001.

3. MilanSonka, Vaclav Hlavac and Roger Boyle, Image Processing Analysis and Machine Vision, Thomson learning, Second Edition, 2001.

EC-413

Microwave & Radar Engineering

UNIT – I

Microwave Components & Measurements:

Introduction to Rectangular & Cylindrical waveguides, Microwave cavities, Magic Tee, Directional Couplers, Circulators and Isolators. Microwave power measurement, impedance measurements, VSWR measurement & Frequency measurement

UNIT – II

Microwave Devices:

Limitations of Conventional tubes at microwave frequencies. Fundamentals of Two Cavity Klystrons, Reflex Klystrons, Travelling Wave Tube, Cylindrical Magnetron, Cross field Amplifier, Back wave oscillator. Tunnel Diode, GUNN Diode, IMPATT Diode, PIN Diodes, Varactor diodes, Crystal Detectors

UNIT –III

Block diagram of Pulse Radar, Radar range equation, Radar cross section , Doppler effect, CW Radar, FMCW Radar , MTI Radar

UNIT – IV

Types of Tracking Radar Systems, sequential lobing, conical scan and Mono pulse tracking. Super heterodyne Receiver, Types of Duplexers and receiver protectors, types of Displays, Radomes.

TEXT BOOKS:

1. Microwave Devices & Circuits By Samuel Y Liao , 3rd Edition , Pearson Education ,2003

2. Introduction to Radar Systems By Merill Skolnik, 2nd Edition, TMH, 2003

3. Microwave & Radar Engineering by M.Kulakarni, Umesh Publications, 2001.

RFERENCE BOOKS:

1. Foundations for Microwave Engineering By RE Collin, IEEE Press Series, 2003

2. Microwave Engineering By ML Sisodia and V.L. Gupta, New Age International, 2005

EC414

VLSI DESIGN **L T P M**

4 0 0 100

UNIT- I

An introduction to MOS technology: Introduction to IC technology, Basic MOS transistors, NMOS fabrication, CMOS fabrication and BICMOS technology. Basic Electrical Properties of MOS and BICMOS Circuits: Ids versus Vds relationships, threshold voltage Vt, Transconductance gm, Figure of merit uo , Pass transistor, NMOS inverter, Pull-up to pull- down ratio, CMOS inverter, BICMOS inverters, Latch-up in CMOS circuits.

UNIT- II

MOS and BICMOS circuit Design processes: MOS layers, Stick diagrams, Design rules and layout, Sheet resistance Rs, Standard unit of capacitance, The Delay unit, Inverter delays, Propagation delays, Wiring capacitances, Scaling models, Scaling factors for device parameters.

UNIT- III

Subsystem design and layout: Architectural issues, Switch logic, Gate Logic, examples of Structured Design (combinational logic).

Design of an ALU subsystem: Design of 4-bit adder, adder element requirements , a standard adder element ,Implementing ALU functions with an adder. A further consideration of adders**:** Manchester carry chain, carry select adder, carry skip adder.

UNIT- IV

VLSI design flow, Introduction to ASICs, Full Custom ASICs, standard cell based ASICs, Gate array based ASICs, Programmable logic devices, PLAs, PALs, CPLDs and FPGAs.

VHDL Hardware Description Language: Program Structure, Types and Constants, functions and Procedures, Libraries and Packages, Structural Design Elements, Dataflow design Elements, Behavioral design Elements, The Time Dimension and Simulation, Synthesis.

TEXT BOOKS:

1. Douglas A.Pucknell and Kamran Eshranghian, Basic VLSI Design, Third edition, PHI, 2002.

2. Michael John Sebastian Smith, Application Specific Integrated Circuits, Addison Wesley, 2003.

3. J.Bhasker, A VHDL Primer, Pearson Education, Third edition, 1999.

4. John F Wakerly, Digital Design Principles & Practices, 3rd Edition, Pearson Education, 2002.

REFERENCE BOOKS:

1. Neil H E Weste and Kamran Eshranghian, Principles of CMOS VLSI Design, A system perspective, 2nd Edition, Pearson Education, 2002.

2. Stephen Brown and Z Vonko Vranesic, Fundamentals of Digital Logic with VHDL Design, TMH, 2002.

EC – 415/A

APPLIED ELECTRONICS (OPEN ELECTIVE)

UNIT -1

Microphones, Headphones and Headsets, Loud Speakers, Disc Recording and Reproduction , Amplifying Systems Equalizers and Mixers, Electronic Music Synthesizers.

UNIT – II

Commercial Sound, Theatre Sound System, Audio Systems , Color TV standards and Systems, Remote Controls, Video Systems.

UNIT – III

Electronic Gadgets and Home Appliances:

Telecommunication Systems, Switching Systems, Modulation Techniques, Carrier Systems, Fibre Optics

UNIT –IV

Data Services, Mobile Systems, Facsimile fax, Xerography

Text Book:

1. Consumer Electronics by S.P.Bali, Pearson Education, ISBN: 9788131717592.

Ref Books:

1. Consumer Electronics for Engineers by Philip Herbert Hoff, Cambridge University Press (July 28, 1998), **ISBN-10:** 0521582075
2. Digital Consumer Electronics Handbook by Ronadl K.Jurgen, (Editor) by McGraw Hill Professional Publishing, 1997. **ISBN-10:** 0070341435

EC-415/B

Basic Communication

UNIT1

Digital communication and Broadband communications

Digital communication: Digital fundamentals, fundamentals of data communications, data sets and sets and interconnection requirements, network and control consideration. **Broadband communications**: Multiplexing, short and medium-haul systems, long haul systems elements of long distance telephony.

UNIT 2

Microwave tubes and Circuits & Radar systems

Microwave tubes: Microwave triodes, multicavity klystron, reflex klystron, magnetron, travelling-wave tube(TWT) types performance and applications, other microwave tubes like crossed-filed amplifier, backward-wave oscillator. **Radar systems:** Basic principles, pulsed systems, other Radar systems

UNIT 3

Fiber optical technology and Antennas

Fiber optical technology Introduction to light, the optical fiber and fiber cables, fiber optic components and systems, installation, testing and repairing. **Antennas:** Basic considerations, wire radiators in space, terms and definitions, effects of ground on antennas.

UNIT4

Radio receivers and Transmission lines

Radio receivers: Receiver types, AM receivers, Communications Receivers, FM Receivers, Single and independent-Sideband Receivers

Transmission lines: Basic principles, the smith chart and its applications, transmission-line components

TEXT BOOKS:

1) Electronic communication systems by KENNEDY 4th edition

2) Communication Systems by Simon Haykin 3rd edition

REFERENCE BOOKS:

1) Communication systems and techniques by Mischa Schwartz, Willam R.Bennett, Seymour Stein.
2) Communication systems by Marcelo S.Alencar, Valdemar C.da Rocha, Jr.

EC-416/A

L	T	P	M
3	1	0	100

DSP PROCESSOR AND ARCHITECTURES

UNIT – I

Realtime concepts, structural level of processing, digital signal processing and DSP systems, comparission between general purpose processors and DSP processors, examples of DSP processors, motivation for the specialized processors,

UNIT – II

Numeric representation and arithmetic fixed point verses floating point representation, native data word widths, relation between data word size and instruction word sizes, effects of finite word registers.

UNIT – III

Key features of TMS 320 c 6713 processor, architecture and addressing modes of 6713 processor, instruction set of TMS 320 c 6713 processor.

UNIT – IV

Programming the TMS 320 c 6713 processor, implementation of circular convolution, linear convolution , FFT algorithms,. FIR filters, IIR filters and multi rate filters on the DSP processor.

Text Books:

John G Ackenhhusin, Realtime signal processing, Printice Hall of India, 1999.

Phil Lapsly, Jeff Bier, Amit Sheham, dDSP processor fundementals and architectures and features, S Chand & Co. New Delhi.

References:

TMX 32C 67133 User Guide.

EC 416/B **L T P M**

NEURAL NETWORKS

4 0 0 100

UNIT – I

Introduction: History of Neural Networks, Structure and functions of biological and artificial neuron, Neural network architectures, Learning methods, evaluation of neural networks

UNIT – II

Supervised learning – I: Single layer networks, McCulloch – Plus Neuron, Model Perceptron I carning, Delta learning Widrow – Hoff learning rules, linear seperability, Adaline and modifications

UNIT – III

Supervised learning – II: Multi layer networks: Architectures, Madalines, Backpropagation algorithm, importance of learning parameter and momentum term, radial basis functions, polynomial networks

Unsupervised learning: Winner – Take – all learning, out star learning, learning vector quantizers, counter propagation networks, Kohonen self-organizing networks, Grossberg layer, adaptive resonance theory, Hamming Net

UNIT – IV

Assoctative memories: Hebbian learning rule, continuous and discrete, Hopfield networks, recurrent and associative memory, Boltzman machines, Bi-directional associative memory

Applications of neural networks : Optimization, Travelling Salesman, Problem solving simultaneous linear equations, Applications in pattern recognition and Image Processing

TEXT BOOKS:

1. Kishan Mehrotra, Chelkuri K. Mohan, Sanjav Ranka, elements of Artificial Neural Networks, Tenram International
2. J.M. Zurada Introduction to Artificial Neural Systems, Jaico Publications
3. B. Yegnanarayana, Artificial Neural Networks, PHI, New Delhi
4. Waserman: Neural Computing – Theory and Practice.

EC 416/C	SPEECH SIGNAL PROCESSING	L	T	P	M
		4	0	0	100

UNIT – I

PRODUCTION AND CLASSIFICATION OF SPEECH SOUNDS:

Anatomy and Physiology of Speech Production, Categorization of Speech Sounds. Acoustics of Speech Production: Physics of Sound, Uniform tube model, A Discrete-Time model based on Tube Concatenation.

Time-Domain Models for Speech Processing: Short-Time energy, average zero crossing rate, Pitch period estimation using autocorrelation.

UNIT – II

SHORT TIME FOURIER TRANSFORM ANALYSIS AND SYNTHESIS:

Short Time Analysis, Signal estimation from STFT, Frequency Domain Pitch Estimation, A Correlation based Pitch Estimator, Pitch estimation based on a Comb Filter.

DIGITAL REPRESENTATIONS OF THE SPEECH WAVEFORM:

Instantaneous quantization, Delta Modulation, DPCM.

UNIT – III

HOMOMORPHIC SIGNAL PROCESSING:

Homomorphic Systems for Convolution, Complex Cepstrum of Speech-like Sequences, Spectral root Homomorphic Filtering, Short-Time Homomorphic Analysis, Short-time Speech Analysis and Analysis/Synthesis Structures.

UNIT – IV

SPEECH CODING:

Linear Prediction, Error minimization, Autocorrelation method, Levinson Recursion, Lattice filter formulation of the inverse filter. Vector Quantization, Distortion Measure, Sub-band coding

SPEAKER RECOGNITION:

Spectral features for Speaker Recognition, Mel- Cepstrum, Speaker Recognition Algorithms, Minimum – distance classifier.

TEXT BOOKS:

1. Thomas F Quatieri, Discrete-Time Speech Signal Processing Principles and Practice, Pearson Education, 2002.
2. L R Rabiner and R W Schafer, Digital Processing of Speech Signals Pearson Education, 2002.

EC-416/D

SATELLITE COMMUNICATION

UNIT – I

INTRODUCTION AND ORBITAL ASPECTS OF SATELLITE COMMUNICATIONS:

A brief history of Satellite Communications, Types of Orbits, Orbital Mechanics: Developing the Equation of the orbit, Kepler's laws of planetary motion, locating the satellite in the orbit, locating the Satellite with respect to the Earth, Orbital elements, Look angle determination, Orbital perturbations, launch and launch vehicles, Orbital effects in Communication System performance.

UNIT – II

SATELLITE SUBSYSTEMS:

Introduction, Attitude and Orbit Control System (AOCS), Telemetry, Tracking, Command and Monitoring (TTC&M), Power Systems, Communication Subsystems, Satellite Antennas

MULTIPLE ACCESS TECHNIQUES:

Introduction, FDMA, TDMA, DAMA and CDMA Satellite Systems Encoder, Decoder, Comparison between FDMA ,TDMA & CDMA

UNIT – III

SATELLITE LINK DESIGN:

Basic transmission theory, System Noise Temperature and G / T ratio. Design of

Uplink and Down link models, Design of Satellite links for specified C / N ratio.

EARTH STATION TECHNOLOGY:

Earth Station Design, Design of large antennas, Small earth station

Antennas, Propagation Effects on Satellite: Quantifying Attenuation and Depolarization, Rain and Ice Effects, Prediction of Rain Attenuation.

UNIT – IV

VSAT SYSTEMS:

Introduction, overview of VSAT Systems, Network Architectures, One – way Implementation, Split – Two-Way (Split IP) Implementation, Two-Way Implementation, Access Control Protocols, Delay Considerations, Basic Techniques: Multiple Access Selection, Signal Formats, Modulation, Coding, and Interference Issues.

VSAT Earth Station Engineering: Antennas, Transmitters and Receivers, Calculation of Link Margins for a VSAT Star Network, System Design Procedure.

Introduction, GPS Position Location Principles, Position Location in GPS, GPS Time, GPS Receivers and Codes.

TEXT BOOKS:

1) T Pratt and W Bostiain, Satellite Communications, 2nd Edition, John Wiley,
2) W Tomasi, Advanced Electronic Communication Systems, 4th Edition, Pearson Education, 2002.
3) Taub and Schilling, Principles of Communication Systems, TMH, 2003.
4) Simon Haykin, Communication Systems, 4th Edition, John Wiley & Sons, 2004.

REFERENCE BOOKS:

1. D C Agarwal, Satellite Communications, Khanna Publishers, 2003.

2. Robert M Gagliardi, Satellite Communications.

EC-451

VHDL LABORATORY

VHDL Modeling and Synthesis of the following Experiments

1. Logic Gates

2. Combinational Logic

3. JK, D, T, and SR flip-flops with preset and clear inputs

4.4-bit shift register and bidirectional shift register with parallel load

5.4-bit Ripple/Synchronous counters

6.4-bit carry look ahead adder

7. Implementation Moore and Mealy state machines

8. Implementation of two 4-bit numbers multiplication using Booth's algorithm

9. Traffic light controller

10. Implementation of two floating-point numbers addition

11. Implementation of two floating-point numbers multiplication

12. Construct an 8-bit dedicated data path to generate and add the numbers from n down to 1, where 'n' is an 8-bit user input number

13. Construct an 8-bit dedicated control unit to generate and add the numbers from n down to 1, where 'n' is an 8-bit user input number

14.Construct an 8-bit general data path to generate and add the numbers from n down to 1, where 'n' is an 8-bit user input number

15. Construct an 8-bit general control unit to generate and add the numbers from n down to 1, where 'n' is an 8-bit user input number

EC 452	DIGITAL SIGNAL PROCESSING LAB	L	T	P	M
		0	0	3	75

Experiments Based On Tool Boxes

1. Simulation of AM.
2. Simulation of FM.
3. Simulation of LPF and HPF.
4. Fourier Transforms.
5. Simulation of M-ary PSK.
6. Simulation of DPCM.
7. Evaluation of DFT and IDFT of 16 Sample Sequence using DIT Algorithm.
8. Evaluation of DFT and IDFT of 16 Sample Sequence using DIF Algorithm.
9. Design of IIR Butterworth Filter using Impulse Invariant Method.
10. Design of FIR Filter using Windowing Technique.
11. Convolution of Two Signals.
12. Correlation of Two Signals.
13. DFT Analysis of a Noise Corrupted Signal.

NOTE: A minimum of 10(Ten) experiments have to be performed and recorded by the candidate to attain eligibility for University Practical Examination

EC-421

MOBILE AND CELLULAR COMMUNICATIONS

UNIT – I:

INTRODUCTION TO MOBILE COMMUNICATION:

Evolution of Mobile Radio Communication, Mobile Radio Telephony in US and around the world, Examples of Wireless Communication Systems: Paging system, Cordless telephones systems, Cellular telephone Systems, Trends in Cellular Radio and personal Communications

The Cellular concept: Frequency reuse, Channel Assignment strategies, Hand off

Strategies, Interference and system capacity, Improving coverage and capacity in cellular systems.

UNIT – II:

MOBILE RADIO PROPAGATION:

Large Scale Fading: Introduction, Free space propagation model, Relating power to electric field, TheThree basic propagation mechanisms: Reflection, Ground reflection (Two-Ray) model, Diffraction, scattering, Practical Link budget design using path loss models.

Small Scale Fading: Small-scale Multipath Propagation, Impulse response model of a multipath channel, Parameters of mobile multipath channels, Types of small scale fading: Fading effects due to multipath time delay spread and Doppler spread Rayleigh and Ricean distributions.

Equalization: Fundamentals of equalizers, Training a generic adaptive equalizer, Equalizers in a communication receiver, survey of equalization techniques, Linear equalizers, Nonlinear equalizers: Decision feedback equalizers, Maximum likelihood sequence Estimation (MLSE) equalizer.

Diversity Techniques: Space diversity: Selection diversity, feedback, MRC, EGC diversity, Polarization diversity, Frequency diversity, Time diversity, Rake Receiver.

UNIT – III:

WIRELESS NETWORKING (2G):

Global system for mobile(GSM):services and features, system architecture, Radio subsystem ,channel types, Example of a GSM call, Frame structure for GSM, signal processing in system.

CDMA digital cellular standard (IS – 95): Frequency and channel specifications, Forward CDMA channel and Reverse CDMA channel.

UNIT – IV:

WIRELESS NETWORKING (3G)

Mobile Services (2.5G):

GPRS: GPRS Functional groups, architecture, network nodes, procedures, billing.

WAP: WAP Model, WAP Gateway, WAP Protocols, WAP UA prof and caching, wireless bearers for WAP, WAP developer tool kits. Mobile station application execution environment.

Mobile Services (3G):

Paradigm Shifts in 3G Systems, W-CDMA and CDMA 2000,Improvements on core network, Quality of service in 3G,Wireless OS for 3G handset,3G systems and field trials, Other trail systems, Impact on manufacture and operator technologies.

TEXT BOOKS:

1) Theodore S. Rappaport, Wireless Communications Principles and Practice, 2nd Edition, Pearson Education, 2003 (UNIT I, II, III)

2) Yi-BingLin, Imrich Chlamtac, Wireless and Mobile Network architectures, Wiley, 2001(UNIT IV)

REFERENCE BOOKS:

1) Kamilo Feher, Wireless Digital Communications, PHI, 2003

2) W.C.Y. Lee, Mobile Cellular Communications, 2nd Edition, MC Graw Hill, 1995.P. Nicopolitidis, Wireless Networks, Wiley, 2003

EC 422 OPTICAL COMMUNICATIONS L T P M

4 0 0 100

UNIT – I

INTRODUCTION:

Historical development, Elements of an Optical Fiber transmission link, Advantages of Optical Fibers, Applications of Optical Fiber, Ray Theory Transmission, Total internal reflection, Acceptance angle, Critical angle, Numerical Aperture, Fiber types : Step Index, Graded Index : Modes of Propagation : single mode and multimode fibers, Fiber materials.

UNIT – II

TRANSMISSION CHARACTERISTICS OF OPTICAL FIBERS:

Attenuation, absorption, scattering and bending losses in fibers, Dispersion: Intermodel and intramodel.

FIBER OPTIC COMPONENTS:

Splicing, Connectors, Connection losses, Fiber Optic couplers, Fiber Optic Switches.

UNIT – III

OPTICAL SOURCES:

General characteristics, Principles of Light Emission. Light Emitting Diodes types-Planar, Dome, Surface emitting, Edge emitting Super luminescent LED's, Lens coupling to fiber, LED Characteristics – Optical output power & efficiency, output spectrum, modulation bandwidth, reliability. LASER: Working of DH injection laser, DFB laser and Threshold condition for lasing. DETECTORS: Principles of photo detection. PIN Photodiode, Avalanche Photodiode and their characteristics.

UNIT – IV

OPTICAL FIBER SYSTEMS:

Optical Transmitter Circuits - source limitations, LED drive circuits.

Optical Receiver operation-Digital system transmission, error sources, receiver configuration, Preamplifier types, Digital receiver performance-probability of error, Quantum limit, System considerations – Link power budget, rise time budget, Direct intensity modulation, Advanced Multiplexing Strategies – OTDM, WDM.

OPTICAL FIBER MEASUREMENTS:

Numerical Aperture, attenuation, refractive index, dispersion losses, cutback and OTDR.

TEXT BOOKS:

1. John M Senior, Optical Fiber Communications: Principles and Practice, 2nd Edition, PHI, 2002.

2. Henry Zanger and Cynthia Zanger, Fiber Optics: Communication and other Applications, Maxwell Macmillan Edition.

3. JC Palais, Fiber Optic Communications, 2nd Edition, PHI, 2001.

4. W.Tomasi, Advanced Electronic Communication Systems, Pearson Education, 2002.

EC-423

TELECOMMUNICATION SWITCHING NETWORKS

UNIT I

TELECOMMUNICATION SWITCHING SYSTEMS: Evolution of Telecommunications Simple Telephone Communication Basics of Switching System Electronic Space Division Switching Stored Program Control Centralized SPC Distributed SPC Software Architecture Two Stage Networks Three Stage Networks N Stage Networks Time Division Switching Basic Time Division Time Switching Combination Switching Three Stage Combination Switching N Stage Combination Switching

UNIT II

TELEPHONE NETWORKS: Subscriber Loop Systems Switching Hierarchy and Routing Transmission Plan Signaling Techniques In-channel Signaling Common Channel Signaling Network Traffic Load and Parameters Grade Of Service and Blocking Probability

FUNDAMENTAL CONCEPTS OF DATA COMMUNICATIONS: Data Communications Codes Bar Codes Character Synchronization Data Communications Hardware Data Communications Circuits Line Control Unit Serial Interfaces

UNIT III

DATA-LINK PROTOCOLS AND DATA COMMUNICATIONS NETWORKS: Introduction Data Link Protocol Functions Character- and Bit- Oriented Data Link Protocols Asynchronous Data-Link Protocols Synchronous Data-Link Protocols Synchronous Data-Link Control High-Level Data-Link Control Public Switched Data Networks Asynchronous Transfer Mode

DIGITAL T-CARRIERS AND MULTIPLEXING: Time-Division Multiplexing T1 Digital Carrier North American Digital Hierarchy Digital Carrier Line Coding T Carrier Systems European Digital Carrier System Digital Carrier Frame Synchronization Bit Versus Word Interleaving Statistical Time

Division Multiplexing Frequency Division Multiplexing FDM Hierarchy Composite Baseband Signal Formation of a Master Group

UNIT IV

ISDN: What Is ISDN? ISDN Components ISDN Channel Types Basic and Primary Rate Interfaces ISDN Protocols ISDN Features Services and Applications Other ISDN Initiatives

DIALUP AND HOME NETWORKING: What Is Dialup Networking? Analog Modem Concepts DSL Service Cable Modems Home Networking Concepts and Issues

NETWORK CONVERGENCE: What Is Network Convergence? Networking Issues and Convergence Effects of Network Convergence on Business Convergence At Home

TEXT BOOKS:

1) T Viswanathan, Telecommunication Switching Systems and Networks, PHI, 2004
2) Wayne Tomasi, Advanced Electronic Communications Systems, Pearson, 6th Edition, 2004
3) Machael A. Gallo and William M. Hancock, Computer Communications and Networking Tecnologies, Cengage Learning, 1st Edition, 2002

REFERENCE BOOKS:

1) J E Flood, Telecommunications Switching, Traffic and Networks, Person, 1999
2) Ray Horak, Communication Systems and Networks, 3rd Edition, Wiley, 2002

EC-424/A

EMBEDDED SYSTEMS

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UNIT – I

Introduction :
Introduction to Embedded System, Role of processor selection in Embedded Systems, Embedded System project management, design cycle in the development phase for an Embedded System, using of target system or its Emulator and in-Circuit emulator, use of software tools for development of an Embedded Systems.

UNIT – II

RTOS and its overview:
Real Time Operating Systems: Task and Task States, Tasks and Data, Message Queues, Timers and Timer Functions, Events Memory Management , Interrupt Routines in an RTOS environment, Basic Design Using RTOS.

UNIT – III

Embedded system development :
Interfacing of external memory, interfacing of analog and digital blocks, interfacing of different peripheral devices LEDs, LCDs, Graphical LCD, Switches, Relay, Stepper motor, ADC, DAC, and various sensors, introduction to assembler, compiler, cross compilers, and Integrated Development Environment.

UNIT – IV

Net works for Embedded Systems:
The I^2C Bus, The CAN bus, SHARK link ports, Ethernet, Introduction to Bluetooth: specification, Core protocol. IEEE 1149.1 (JTAG) Testability

TEXT BOOKS :

1. The art of programming Embedded systems, Jack G. Ganssle, academic press.
2. Intelligent Embedded systems, Louis L. Odette, Adison Wesly , 1991.
3. J. Starustrup and W. Wolf Hardware software Co Design principles and practice. KJluwer, Academic Publications.

Reference Books:

1. Design with PIC microcontroller bu john B. Pitman, pearson edition.
2. Designing Embedded Systems Hardware : John Catsoulis, Shroff Publications, Distributors New Delhi.
3. Microcenters Architecture Programming, Interfacing and system design by Raj Kamal, Pearson edition.
4. Programming Embedded systems in C and C++, Micheel Barr, Shroff Publications, Distributors New Delhi.

EC 424/B ADVANCED DIGITAL SIGNAL PROCESSING L T P M

4 0 0 100

UNIT – I

Multirate Digital Signal Processing Fundamentals:

The basic Sample Rate Alteration Devices, Multrate structures for Sampling rate conversion, Multistage Design of Decimator and Interpolator. The polyphase decomposition. Arbitrary rate sampling rate converter. Nyquist Filters.

UNIT – II

Multirate Filter Banks and Wavelets:

Digital Filter Banks. Two-Channel Quadrature-Mirror Filter Bank, Perfect reconstruction Two-Channel FIR Filter Banks. L-Channel QMF Banks. Multilevel Filter Banks.

UNIT – III

Adaptive Filters:

Typical applications of Adaptive Filters: Echo cancellation in communication, Equalization of data communication channels, Linear predictive coding, Noise cancellation.Principles of Adaptive Filters

UNIT – IV

Methods of Steepest Descent, Least Mean Square Adaptive Filters: Derivation, Adaptation in stationary SOE, LMS algorithm and Applications of LMS algorithm, Recursive Least Square Adaptive Filters.

TEXT BOOKS:

1. Sanjit K Mitra: Digital Signal Processing, Third Edition, Tata McGraw Hill Edition-2006.

2. D.G.Manolakis, Vinay K.Ingle, S.M.Kogon: Statistical and Adaptive signal processing, McGraw Hill, 2000.

REFERENCE BOOK:

1. P.P.Vaidyanathan: Multirate Systems and Filter Banks, Pearson Education India 2006.

EC 424/C	HDL PROGRAMMING	L	T	P	M
		4	0	0	100

UNIT – I

Introduction to verilog HDL and Level of Abstraction. Hierarchical Modeling Concepts- Design Methodologies Modules and instances. Simulation Demonstration. Basic concepts, Data types, System Tasks and Compiler Directives.

UNIT – II

Modules and Ports- List of ports, Port Declaration, Port Connections Rules, Inputs, outputs, inouts, Gate-Level Modeling-Gate types, Gate Delays and Dataflow Modeling-Continuous Assignments, Delays, Expression, Operators, and Operands, Synthesis Demonstration.

UNIT – III

Behavioral Modeling- Structured Procedures, Procedure Assignment, Timing Controls and Conditional Statements, Tasks and Functions.

UNIT – IV

Logic Synthesis with verilog HDL-Synthesis Design flow, RTL and Test Bench Modeling Techniques and Timing and Path Delay Modeling, Timing Checks, Switch Level Modeling

TEXT BOOK:

1. Samir Palnitkar, Verilog HDL, Pearson Education India, 2001.

EC 424/D	JAVA PROGRAMMING	L	T	P	M
		4	0	0	100

UNIT – I

Introduction to Java, Classes, Inheritance, Packages & Interfaces, Exception handling Multi threaded programming

UNIT – II

Applet class, Event handling, AWT

UNIT – III

Swing, Java database connectivity, Servlets

UNIT – IV

RMI, Networking, Java Beans

TEXT BOOKS:

1. Herbert Schildt, The Complete Reference Java2, Tata McGraw Hill, 5th Edition(for Units- I and II).
2. Deitel & Deitel, JAVA – How to program, Pearson Education (for Units-III&IV).

EC461	MICROWAVE AND OPTICAL COMMUNICATIONS LAB	L	T	P	M
		0	0	3	75

Experiments Based on Microwave Engineering

1. Characteristics of Reflex Klystron
2. Verification of the Expression $1/\lambda_o^2=1/\lambda_g^2+1/\lambda_c^2$
3. Measurement of VSWR using Microwave Bench
4. Measurement of Unknown Impedance Using Microwave Bench
5. Determination of Characteristics of a Given Directional Coupler
6. Measurement of Gain of an Antenna
7. Measurement of Dielectric Constant of a Given Material

Experiments Based on Optical Communication

8. Characteristic of Light Sources/Detectors
9. Fiber Optics Cable: Numerical Aperture Measurement
10. Measurement of Coupling and Bending Losses Of a Fiber
11. Analog Link Set up using a Fiber
12. Digital Link Set up using a Fiber
13. Set up of Time Division Multiplexing using Fiber Optics
14. Study of Cellular Communication.

NOTE: A minimum of 10(Ten) experiments, choosing 5 (Five) from each part, have to be performed and recorded by the candidate to attain eligibility for University Practical Examination.