



## ***FACULTY OF ENGINEERING***

***IASE University***

***Gandhi Vidya Mandir, Sardarshahr (Rajasthan) – 331401,  
INDIA***

**Teaching and Examination Scheme and Syllabus**

for

**BACHELOR OF ENGINEERING  
(Electronics & Communication Engineering)  
(Four-Year Full Time Degree Programme)  
(SEMESTER SCHEME)**

# **Rules And Guidelines For The Students**

1. The Bachelor of ENGINEERING (Electronics & Communication Engineering) course is a four year (Eight Semester) full time integrated degree programme.

## 2. ELIGIBILITY for Admission

A candidate seeking admission to the first year of the Bachelor of Engineering (Electronics & Communication Engineering) course shall be required to have passed 10+2 examination in Science with Physics, Chemistry and Mathematics from any board recognized by Rajasthan Board of Secondary Education, Rajasthan with at least 45% marks in aggregate for general category candidates, and 40% for SC/ST/OBC candidates.

## 3. ADMISSION procedure

Admission to the first year B.E. course shall be made on the basis of marks scored by the candidates in his/her 10+2 examination.

## 4. THE PROGRAMME

The Bachelor of Engineering (Electronics & Communication Engineering) is a four year (Eight semesters) full time degree program. The course structure and program administration are as follows.

## 5. COURSE STRUCTURE

The four year, eight semester teaching consists of Theory (Lectures and Tutorials) and Practicals/Sessionals (Laboratory work, Engineering Graphics, Workshop Practice and Project etc.). Examination will be held at the end of the each semester. Details of these are given in the Teaching & Examination Scheme.

## 6. PROGRAMME ADMINISTRATION

### 6.1 Medium of Instruction

English shall be the medium of instruction and examination.

### 6.2 EVALUATION

(a) Each subject will be evaluated through a theory paper at the end of the semester carrying 100 marks along with continuous evaluation of sessional work, carrying 50 marks. The theory paper shall be of three hour duration. The sessional work will consist of continuous assessment of student's performance by teachers in tutorial classes, and class tests.

(b) Three class tests will be organized in each semester as per the scheme. The higher two out of the marks scored in the three tests will be considered for the sessional marks.

(c) Evaluation of laboratory practical work and Engineering Graphics (Drawing) will be through continuous assessment throughout the semester as well as examination at the end of the semester.

(d) At the end of the sixth semester the student will undergo practical training for a period of at least 45 working days in an industry / research organization related to his / her field of Study. At the end of the training, the student will submit its report to the

Head of the Department within three weeks of the start of the seventh semester. The work of the practical training will be evaluated by a board of two teachers appointed by the Head of the Department. The later will counter sign the marks awarded by the board.

(e) Project: The project work will be carried out in the VII & VIII semester. The topic of the project will be approved by the Head of the Department and the entire project work will be carried out under the guidance of a teacher of the department approved as project supervisor by the Head of the Department. The nature of the project work will consist of varying proportions of designing, fabrication, testing and analysis of results. The project topic can also be taken from a live industrial problem. The report of the completed project shall be signed by the guide and submitted to the Head of the Department on or before the last working day of the eighth semester. The evaluation of the project will be done by a board consisting of two examiners.

## 7. Promotion

- 7.1 The maximum span period of a program is eight years from the date of registration in the program.
- 7.2 The minimum marks for passing the examination for each semester shall be 50% in each practical/ sessional, 40% in End Semester Examination of each theory paper, 50% in training and project, and 45% in the aggregate of all the subjects (theory, sessional and project) of the semester.
- 7.3 A student will be permitted to attend the classes of the second/fourth/sixth/eighth semesters immediately after the examination of the first/third/fifth/seventh semester's examination, as the case may be, provided he/she has appeared in the first/third/fifth/seventh semester examination, respectively.
- 7.4 To be eligible for promotion to the 3<sup>rd</sup> semester of the program a student must have successfully cleared at least 10 subjects out of the 20 subjects including practicals of the first and second semesters taken together.
- 7.5 To be eligible for promotion to the 5<sup>th</sup> semester of the program a student must have successfully cleared at least 12 subjects out of the 23 subjects including practicals and sessionals of the third and fourth semesters taken together.
- 7.6 To be eligible for promotion to the 7<sup>th</sup> semester of the program a student must have successfully cleared at least half the subjects including practicals and sessionals of the fifth and sixth semesters taken together.
- 7.7 A student promoted to the third/fifth/seventh semesters, without having cleared all the papers, will have to appear and pass the backlog papers of the first/third/seventh semesters along with the regular examination of the first/third/fifth semesters and backlog papers of the second/fourth/sixth semesters along with the regular examination of the second/fourth/sixth semesters.
- 7.8 A candidate who has secured minimum marks to pass in each paper but has not secured the minimum marks required to pass in the aggregate for the semester concerned may take re-examination in not more than two papers to obtain the aggregate percentage required to pass the semester. The candidate will have to pay the requisite examination fee in order to be eligible for re- examination. In this case the marks secured by the candidate in the earlier examination in the paper concerned will be cancelled.

### 7.9 (a) Award of Division:

Securing 60% marks and above – I<sup>st</sup> division

Securing 50% and above but below 60% - II<sup>nd</sup> division

Securing 45% and above but below 50% - pass

For first B.E. to 3<sup>rd</sup> B.E. the division will be decided based on the marks obtained in the respective class/ year.

(b) For the declaration of Final B.E. result, marks will be totalled up as follows:

First B.E.:	50% of the marks secured
Second B.E.:	75% of the marks secured
Third B.E.:	100% of the marks secured
Final B.E.:	100% of the marks secured

- A student who has secured 75% marks and above shall be declared to have passed in first division with honors. However, for this the student must have cleared successfully all the subjects in single attempt in the final year period of his/her study.
- Similarly, to be eligible for a gold medal on account of having secured first position, the student must have cleared all subjects in single attempt and passed them with first division.

7.10 For determining merit position of the candidates at the final year level the marks obtained by them in the second, third and final year as described above shall only be considered.

7.11 If a student (who has successfully completed the programme) wishes to reappear in one or more theory papers of the first, second, third, fourth, fifth, sixth, seventh or eighth semesters for the purpose of improving his/her marks, he/she will be permitted to do so on payment of requisite examination fee along with the regular examinations of that semester; however, the total number of such attempts shall not exceed four theory papers during the span period of the programme. For this his/her previous performance in the paper/papers concerned shall be treated as cancelled. The application for such reappearing/re-examination must be submitted before the next examination of the corresponding semester. However, such candidates shall not be considered for award of gold medal.

7.12 A student to be eligible for award of degree has to clear all papers offered during four-year programme within the span period of eight years.

## 8. LATERAL ENTRY

Students who have passed 3 year diploma examination from the Board of Technical Education, Rajasthan, or its equivalent with a minimum of 60% marks can be admitted to the Third Semester of the B. E. programme. However, they will be required to pass a course on Special Mathematics (BE300) for Diploma pass students. Students will have to pass this course before they are admitted to the seventh semester. However, the marks obtained in this course will not be counted for deciding the division of the student.

8. Attendance: All students are required to have 75% attendance in each subject and there must be 75% attendance of the student before he/she could be permitted to appear in the examination.

## 9. RULES FOR CHANGE OF BRANCH FOR THE STUDENTS OF III SEM. B.TECH/ B.E.:

- I The faculty, on the basis of applications received from desirous students up to the date and time notified by the Director, will prepare a merit list of the students. The list will be prepared on the basis of overall merit of the I (Semester) result only and the applications for change of branch will be processed as per the merit list.
- II Request for change from B.E. to B. Tech. programme or vice versa by any student will be considered only if, the candidate fulfills basic admission criteria for the desired programme and using the guidelines below:  
If the candidate is eligible for change from B. Tech. to B.E. & vice-versa is found deficit in the course coverage of first and second semester, he will have to pass the deficit courses before the candidate is admitted to the seventh semester. However, the marks obtained in the deficit courses will not be added for deciding the division of the student.

### **ELIGIBILITY CRITERIA:**

- (a) The students must have passed the I Semester B.Tech./B.E Examination in all components in one attempt with at least 60% marks in aggregate. The student with back papers or whose result has not been declared will not be considered for change of branch.
- (b) In case any student has applied for re-valuation/ re-totalling of his/her marks of I Semester B.Tech/B.E and the result has not been received till the time of change of branch, such a student will not be entitled for change of branch on the basis of his/her subsequently revised result.

### **PROCEDURE:**

- 1) Applications in a specified format (developed by the faculty) for change of branch will be invited by the Director/Principal of the faculty on the basis of the result of I (Semester) B. Tech./ B.E in duplicate, upto the date notified by IASE University. One copy of each such application be sent to IASE University by that date.
- 2) The students would submit a photo copy of I (Semester) Examination mark sheet of that year along with the application. The student may give as many preferences as possible against the vacant seats in respective college.
- 3) A seat matrix shall be prepared by the faculty, as per the details of the vacant seats (admitted through direct admission) in the previous year.
- 4) Due to change of branch, the strength of student in any branch should not fall short of 75% of the enrolled students in that branch in that year. And under no circumstances, due to change of branch, the number of seats in a particular branch in a college shall exceed the sanctioned strength approved by the AICTE, for that batch.
- 5) All students who have applied for the change of branch in-time will be called for counseling by the admission council of the faculty and considered for change of branch as per merit, preference and availability of seat. However, at the time of the counseling, if any student wishes to withdraw his/her application he/she can do so by a written request. In case any student does not present himself/herself for counseling, his/her branch will be changed as per the preference mentioned in the application form, merit and availability of seat.

## 10 RULES FOR THE AWARD OF GRACE MARKS

### A. UNDER GRADUATE/ POST GRADUATE (MAIN/SUPPLYMENTARY EXAMINATIONS UNDER THE FACULTIES OF ENGINEERING & TECHNOLOGY.

Grace marks to the extent of 1% of the aggregate marks prescribed for an examination will be awarded to a candidate failing in not more than 25% of the total number of theory papers, practicals, sessionals, dissertation, viva-voce and the aggregate, as the case may be in which minimum pass marks have been prescribed; provided the candidate passes the examination by the award of such Grace marks. For the purpose of determining the number of 25% of the papers, only such theory papers practicals, dissertation, viva-voce etc. would be considered, of which, the examination is conducted by the University.

N.B.:- If 1% of the aggregate marks or 25% of the papers works out in fraction, the same will be raised to the next whole number. For example, if the aggregate marks prescribed for the examination are 450, grace marks to the extent of 5 will be awarded to the candidate, similarly, if 25% of the total papers is 3.2, the same will be raised to 4 papers which grace marks can be given.

#### GENERAL:-

- A candidate passes in a paper/ practical or the aggregate by the award of grace marks will be deemed to have obtained the necessary minimum for a pass in that paper/ practical or in the aggregate and shown in the marks sheet to have passed by grace. Grace marks will not be added to the marks obtained by a candidate from the examiners nor will the marks obtained by the candidate be subject to any deduction due to award of grace marks in any other paper/ practical or aggregate.
- If a candidate passes the examination but misses First or Second Division by one mark, his aggregate will be raised by one mark so as to entitle him for the first or second division, as the case may be. This one mark will be added to the paper in which he gets the least marks and also in the aggregate by showing +1 in the tabulation register below the marks actually obtained by the candidate. The marks entered in the marks-sheet will be inclusive of one grace mark and it will not be shown separately.
- Non appearance of a candidate in any paper will make him ineligible for grace marks. The place of a passed candidate in the examination list will, however be determined by the aggregate marks he secures from the examiners, and he will not, by the award of grace marks, become entitled to a higher division.
- Distinction won in any subject at the examination is not to be forfeited on the score that a candidate has secured grace to pass the examination.

Note: - The Grace marks will be awarded only, if candidate appears in all the papers prescribed for the examination.

**TEACHING & EXAMINATION SCHEME**  
**for B.E.– Four Year (8 Semester) Full Time Degree Programme**

**B.E. – First Year**

**Semester - I**

S.No.	Course No.	Subject	Period			Examination Scheme				
						Sessional Exam			ESE	TOTAL
						TA	CT	TOT		
(THEORY)			L	T	P					
1	BE101	English	3	1	-	30	20	50	100	150
2	BE102	Engineering Mathematics-I	3	1	-	30	20	50	100	150
3	*BE103/203	Engg. Physics/Engg. Chemistry	3	1	-	30	20	50	100	150
4	BE104	Computer Systems & Programming	3	1	-	30	20	50	100	150
5	BE105	Electrical & Electronics Engg.	3	1	-	30	20	50	100	150
(PRACTICALS/SESSIONALS)										
6	*BE106/208	Engg. Physics/ Engg. Chemistry Lab	-	-	3	50	-	50	50	100
7	BE107	Computer Programming Lab	-	-	3	50	-	50	50	100
8	BE108	Practical Geometry	-	-	3	50	-	50	50	100
9	BE109	Workshop Practice	-	-	3	50	-	50	50	100
10	BE110	Electrical & Electronics Lab	-	-	2	50	-	50	50	100
		Total Hours	15	5	14					

TA – Teacher’s Assessment

CT – Class Test

ESE – End Semester Examination

Total Contact Hours – 34

Total Marks – 1250

\*Half of the intake of the student of the faculty shall study Physics and rest of the students shall study Engineering Chemistry in First Semester. In Second Semester, the students shall interchange the subjects.

**TEACHING & EXAMINATION SCHEME**  
**for B.E.– Four Year (8 Semester) Full Time Degree Programme**

**B.E. – First Year**

**Semester - II**

S.No.	Course No.	Subject	Period			Examination Scheme				
			L	T	P	Sessional Exam			ESE	TOTAL
						TA	CT	TOT		
(THEORY)										
1	BE201	Communication Techniques	3	1	-	30	20	50	100	150
2	BE202	Engineering Mathematics –II	3	1	-	30	20	50	100	150
3	*BE203/103	Engg. Chemistry /Engg. Physics	3	1	-	30	20	50	100	150
4	BE204	Engineering Mechanics	3	1	-	30	20	50	100	150
5	BE205	Mechanical Engineering	3	1	-	30	20	50	100	150
6	BE206	Environmental Studies& Disaster Management	3	1	-	30	20	50	100	150
(PRACTICALS/SESSIONALS)										
7	BE207	Language Lab	-	-	2	45	-	45	30	75
8	*BE208/106	Engg. Chemistry /Engg. Physics	-	-	3	50	-	50	50	100
9	BE209	Environmental Engg. Lab	-	-	2	45	-	45	30	75
10	BE210	Machine Drawing	-	-	3	50	-	50	50	100
11	BE211	Discipline & Extracurricular Activities	-	-	-	-	-	100	-	100
		Total Hours	18	6	10					

TA – Teacher’s Assessment

CT – Class Test

ESE – End Semester Examination

Total Contact Hours – 34

Total Marks – 1350

\*Half of the intake of the student of the faculty shall study Physics and rest of the students shall study Engineering Chemistry in First Semester. In Second Semester, the students shall interchange the subjects.

## TEACHING & EXAMINATION SCHEME

**For B.E. (Electronics & Communication Engineering) – Four Year (8 Semester) Full Time Degree Programme**

**B.E. (ECE) – Second Year**

**Semester –III**

S.No.	Course No.	Subject	Period			Examination Scheme				
			L	T	P	Sessional Exam			ESE	TOTAL
						TA	CT	TOT		
(THEORY)										
1	ECE301	Mathematics-III	3	1	-	30	20	50	100	150
2	ECE302	Electronic Devices & Circuits	3	1	-	30	20	50	100	150
3	ECE303	Circuit Analysis & Synthesis	3	1	-	30	20	50	100	150
4	ECE304	Electronic Measurements & Instrumentation	3	1	-	30	20	50	100	150
5	ECE305	Electronic Materials and processes	3	1	-	30	20	50	100	150
6	ECE306	Data Structure & Algorithms	3	1	-	30	20	50	100	150
(PRACTICALS/SESSIONALS)										
7	ECE307	Electronics Workshop	-	-	2	50	-	50	50	100
8	ECE308	Computer Programming Lab-I.	-	-	2	50	-	50	50	100
9	ECE309	Electronics Lab-I	-	-	2	50	-	50	50	100
10	ECE310	Electronic Measurement & Instrumentation Lab	-	-	2	50	-	50	50	100
11	ECE311	Humanities and Social Science	-	-	2	30	-	30	20	50

TA- Teacher's Assessment

CT- Class Test

ESE- End Semester Examination

Total Contact Hours-34

Total Marks-1350

	BE 300*	Special Mathematics	3	1	-	30	20	50	100	150
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\*This Course of Special Mathematics (BE300) is compulsory for student's having been admitted in B.E after passing Engineering Diploma. Students have to pass this course, however the marks obtained in this will not be counted for deciding the division of the student.

## TEACHING & EXAMINATION SCHEME

**For B.E. (Electronics & Communication Engineering) – Four Year (8 Semester) Full Time Degree Programme**

**B.E. (ECE) – Second Year**

### Semester - IV

S.No.	Course No.	Subject	Period			Examination Scheme				
			L	T	P	Sessional Exam			ESE	TOTAL
						TA	CT	TOT		
(THEORY)										
1	ECE401	Mathematics-IV	3	1	-	30	20	50	100	150
2	ECE402	Analog Electronics	3	1	-	30	20	50	100	150
3	ECE403	Digital Electronics	3	1	-	30	20	50	100	150
4	ECE404	Electromagnetic Field Theory	3	1	-	30	20	50	100	150
5	ECE405	Random Variables & Stochastic Processes	3	1	-	30	20	50	100	150
6	ECE406	Object Oriented Programming	3	1	-	30	20	50	100	150
(PRACTICALS/SESSIONALS)										
7	ECE407	Computer Programming Lab-II.	-	-	2	50	-	50	50	100
8	ECE408	Electronics Lab-II	-	-	3	75	-	75	50	125
9	ECE409	Digital Electronics Lab.	-	-	2	50	-	50	50	100
10	ECE410	Object Oriented Programming Lab	-	-	3	75	-	75	50	125
11	ECE411	Discipline & Cocurricular Activities	-	-	-	-	-	100	-	100

TA- Teacher's Assessment

CT- Class Test

ESE- End Semester Examination

Total Contact Hours-34

Total Marks-1450

**TEACHING & EXAMINATION SCHEME**  
for B.E.– Four Year (8 Semester) Full Time Degree Programme

**B.E. – Third Year**

**Semester - v**

S.No.	Course No.	Subject	Period			Examination Scheme				
			L	T	P	Sessional Exam			ESE	TOTAL
						TA	CT	TOT		
(THEORY)										
1	ECE501	Single and systems	3	1	-	30	20	50	100	150
2	ECE502	Linear Integrated ckt	3	1	-	30	20	50	100	150
3	ECE503	Telecommunication Engineering	3	1	-	30	20	50	100	150
4	ECE504	Analog Communication	3	1	-	30	20	50	100	150
5	ECE505	Microwave Engineering-1	3	1	-	30	20	50	100	150
6	ECE506.1	Biomedical Instrumentation	3	1	-	30	20	50	100	150
	ECE506.2	Advanced data Structures								
	ECE506.3	Computer Oriented Numerical & Statistical Methods								
(PRACTICALS/SESSIONALS)										
7	ECE507	Electronics Engineering design lab	-	-	3	75	-	75	50	125
8	ECE508	Microwave Engineering lab	-	-	2	50	-	50	50	100
9	ECE509	Communication lab-1	-	-	3	75	-	75	50	125
10	ECE510	Signal Processing lab-1	-	-	2	50	-	50	50	100
		Total Hours	18	6	10					

TA – Teacher’s Assessment  
CT – Class Test  
ESE – End Semester Examination

Total Contact Hours – 34  
Total Marks – 1350

**TEACHING & EXAMINATION SCHEME**  
for B.E.– Four Year (8 Semester) Full Time Degree Programme

**B.E. – Third Year**

**Semester – VI**

S.No.	Course No.	Subject	Period			Examination Scheme				
			L	T	P	Sessional Exam			ESE	TOTAL
						TA	CT	TOT		
(THEORY)										
1	ECE601	Microwave Engineering-II	3	1	-	30	20	50	100	150
2	ECE602	Microprocessor and Microcontroller	3	1	-	30	20	50	100	150
3	ECE603	Industrial Electronics	3	1	-	30	20	50	100	150
4	ECE604	Digital Communication	3	1	-	30	20	50	100	150
5	ECE605	Control Systems	3	1	-	30	20	50	100	150
6	ECE606.1	Neural Networks Parallel	3	1	-	30	20	50	100	150
	ECE606.2	Computation & Architecture								
	ECE606.3	Optimization Techniques								
(PRACTICALS/SESSIONALS)										
7	ECE607	Communication Lab-II	-	-	2	50	-	50	50	100
8	ECE608	Microprocessor Lab	-	-	2	50	-	50	50	100
9	ECE609	Unix Shell Programming Lab	-	-	2	45	-	45	30	75
10	ECE610	Industrial Electronics Lab	-	-	2	50	-	50	50	100
11	ECE611	Entrepreneurship Development	-	-	2	45	-	45	30	75
12	ECE612	Discipline & Extracurricular Activities	-	-	-	-	-	100	-	100
		Total Hours	18	6	10					

TA – Teacher’s Assessment

CT – Class Test

ESE – End Semester Examination

Total Contact Hours – 34

Total Marks – 1450

**TEACHING & EXAMINATION SCHEME**

**for B.E.– Four Year (8 Semester) Full Time Degree Programme**

**B.E. – Fourth Year**

**Semester – VII**

S.No.	Course No.	Subject	Period			Examination Scheme				
			L	T	P	Sessional Exam			ESE	TOTAL
						TA	CT	TOT		
(THEORY)										
1	ECE701	Antenna & Wave Propagation	3	1	-	30	20	50	100	150
2	ECE702	Digital Signal Processing	3	1	-	30	20	50	100	150
3	ECE703	Wireless Communication	3	1	-	30	20	50	100	150
4	ECE704	IC Technology	3	1	-	30	20	50	100	150
5	ECE705	VLSI Design	3	1	-	30	20	50	100	150
6	ECE706.1	Advanced Microprocessors	3	1	-	30	20	50	100	150
	ECE706.2	Artificial Intelligence and Expert								
	ECE706.3	Systems Operating System								
(PRACTICALS/SESSIONALS)										
7	ECE707	Signal Processing Lab-II	-	-	3	50	-	50	50	100
8	ECE708	Wireless Communication Lab	-	-	3	50	-	50	50	100
9	ECE709	Antenna Lab	-	-	3	50	-	50	50	100
10	ECE710	Practical Training Seminar & Industrial Visit	-	-	2	30	-	30	20	50
11	ECE711	Project (Stage I)	-	-	2	50	-	50	50	100
		Total Hours	18	6	10					

TA – Teacher’s Assessment

CT – Class Test

ESE – End Semester Examination

Total Contact Hours – 34

Total Marks – 1350

**TEACHING & EXAMINATION SCHEME**

**for B.E.– Four Year (8 Semester) Full Time Degree Programme**

**B.E. – Fourth Year**

**Semester – VIII**

S.No.	Course No.	Subject	Period			Examination Scheme				
			L	T	P	Sessional Exam			ESE	TOTAL
						TA	CT	TOT		
(THEORY)										
1	ECE801	Computer Networks	3	1	-	30	20	50	100	150
2	ECE802	Radar & TV Engineering	3	1	-	30	20	50	100	150
3	ECE803	Optical Communicati	3	1	-	30	20	50	100	150
4	ECE804.1	Image Processing and Pattern	3	1	-	30	20	50	100	150
	ECE804.2	Recognition VHDL								
	ECE804.3	Microcontroller and Embedded Systems								
(PRACTICALS/SESSIONALS)										
5	ECE805	Computer Network Programming Lab	-	-	3	50	-	50	50	100
6	ECE806	Industrial Economics & Management.	-	-	2	45	-	45	30	75
7	ECE807	VLSI & Optical Fiber Lab	-	-	3	45	-	45	30	75
8	ECE808	Project( Stage-II)	-	-	4	200	-	200	150	350
9	ECE809	Seminar	-	-	4	100	-	100	50	150
10	ECE810	Discipline & Extracurricular Activities	-	-	-	-	-	100	-	100
		Total Hours	12	4	14					

TA – Teacher’s Assessment  
 CT – Class Test  
 ESE – End Semester Examination

Total Contact Hours – 32  
 Total Marks – 1450

**BE 101-ENGLISH**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT – I**

**Short Stories**

- . “The Gift of the Magi” by O. Henry
- . “The Fortune-Teller” by Karl Capek
- . “The Nightingale and the Rose” Oscar Wilde

**UNIT – II**

**Short Stories**

- . “Dr. Heidegger’s Experiment” by Nathaniel Hawthorne
- . “The Three Dancing Goats” by Anonymous
- . “The Accompanist” by Anita Desai

**UNIT – III**

**Poems**

- . “Mending Wall” by Robert Frost
- . “This is Going to Hurt Just a Little Bit” by Odgen Nash
- . “Death and Leveler” by James Shirley
- . “Last Lesson of the Afternoon” by D. H. Lawrence
- . “Night of the Scorpion” by Nissim Ezekiel

**UNIT – IV**

**Short Plays**

- . “The Dear Departed” by Stanley Houghton
- . “Refund” by Fritz Karinthy
- . “Monkey’s Paw” by W. W. Jacobs

**UNIT – V**

**Essays**

- . “Of Studies” by Francis Bacon
- . “Third Thoughts” by E. V. Lucas
- . “Toasted English” by R. K. Narayana

**BE 102-ENGINEERING MATHEMATICS-I**

**(L: 3: T: 1)**

**Max.Marks:100**

**UNIT – I**

**Differential Calculus**

- . Asymptotes (Cartesian Coordinates Only)
- . Curvature
- . Concavity, Convexity and Point of Inflexion (Cartesian Coordinates Only)
- . Curve Tracing (Cartesian and Standard Polar Curves – Cardioids, Lemniscates of Bernoulli, Limacon, Equiangular Spiral)

**UNIT – II**

**Differential Calculus**

- . Partial Differentiation, Euler's Theorem on Homogeneous Functions
- . Approximate Calculations
- . Maxima & Minima of Two and More Independent Variables
- . Lagrange's Method of Multipliers

**UNIT – III**

**Integral Calculus**

- . Applications in Finding the Length of Simple Curves
- . Surface and Volumes of Solids of Revolution
- . Double Integral, Areas & Volumes by Double Integration
- . Change of Order of Integration
- . Beta Function and Gamma Function (Simple Properties)

**UNIT - IV**

**Differential Equations**

- . Differential Equations of First Order and First Degree – Variable Separable, Homogeneous Forms, Reducible to Homogeneous Form, Linear Form, Exact Form, Reducible to Exact Form
- . Linear Differential Equations of Higher Order with Constant Coefficients Only

**UNIT - V**

**Differential Equations**

- . Second Order Ordinary Differential Equations with Variable Coefficients
- . Homogeneous and Exact Forms
- . Change of Dependent Variable
- . Change of Independent Variable, Normal Forms
- . Method of Variation of Parameter

**UNIT - I**

**Interference of Light:-**

- Interference as superposition of waves in space. Intensity variation. Bright and dark fringes. Fringe width. Conditions for observing interference of Light. Newton's Rings: Theory and experiment for determining wavelength of light and refractive index of liquid
- Michelson's Interferometer: Production of circular & straight line fringes, Determination of wavelength of light, Determination of wavelength separation of two nearby wavelengths

**Polarization of Light:-** types of polarization, Nicol prism, Double refraction, elliptically and circularly polarized light, Brewster's law, Malus law, Quarter wave and half wave plates.

**UNIT - II**

**Diffraction of Light:**

Fresnel diffraction:- narrow slit. Fraunhofer's diffraction:-Single Slit Diffraction: Quantitative description of single slit, Positions of maxima minima and width of central maximum, Intensity variation.

- Diffraction Grating: Construction and theory, Formation of spectrum by plane transmission grating, Missing and overlapping of spectra, Determination of wavelength of light using plane transmission grating
- Resolving Power: Geometrical & Spectral, Reyleigh criterion, Resolving power of diffraction grating,

**UNIT – III**

**Lasers:-** Spatial and temporal coherence, Coherence length, Coherent time and 'Q' factor for light Theory of Laser Action: Einstein's coefficients components of a laser, Threshold condition for laser action Theory, design and application of He-Ne and Semiconductor lasers

**Holography**

- Basic theory of holography, Basic requirement of a holographic laboratory
- Application of holography in microscopy and interferometry

**UNIT - IV**

**Quantum Mechanics:**

Origin of quantum nature of light: Black body radiation and photoelectric effect.

Unability of wave theory of light to explain photoelectric effect. Einstein Photoelectric Equation.

De-Broglie Matter waves. Uncertainty principle

- Compton effect and quantum nature of light
- Schrödinger's Wave Equation: Time dependent and time independent cases
- Physical interpretation of wave function and its properties, boundary conditions
- Particle in one and three dimensional boxes

**UNIT - V**

**Theory of relativity-**Inertial frame of reference , Non-inertial frame of reference, Michelson- Morley experiment, Einstein's special Theory of Relativity Lorentz Transformation, length contraction, time dilation, addition of velocities, variation of mass with velocity, Equivalence of mass and energy.

## UNIT - I

### Water

- Common Impurities, Hardness
- Determination of hardness by Clark's test and complexometric (EDTA) method, Degree of hardness

### Municipal Water Supply

- Requisites of drinking water, Purification of water, Sedimentation, Filtration, Sterilization, Break point chlorination

### Water for Steam Making

- Boiler troubles carry over, Corrosion, Sludge and scale formation and caustic embrittlement

### Methods of Boiler Water Treatment

- Preliminary treatments, Preheating, Lime-Soda process, Permutit (Zeolite) process, Deionizer or Demineralizer, Feed water conditioning, Internal treatment, Blow down
- Numerical problems based on water treatment (Lime-Soda process)

## UNIT - II

### Fuels

- Chemical Fuels: Origin and classification of fuels

### Solid Fuels

- Coal, Proximate and ultimate analysis of coal, Significance of the constituents
- Gross and net calorific value, Determination of calorific value by Bomb calorimeter
- Coke – Metallurgical, Coke-carbonization process
- Manufacture of coke-beehive Coke oven and byproduct coke ovens

### Liquid Fuels

- Advantages, Petroleum and refining of petroleum, Synthetic petrol, Refining and reforming of gasoline
- Knocking, Octane number, Knocking – Anti knocking agents, Cracking

### Gaseous Fuels

- Advantages, Manufacture, Composition and calorific value of coal gas and oil gas
- Determination of calorific value by Junker's calorimeter, Flue gas analysis by Orsat Apparatus

## UNIT - III

### Phase Rule

- Statement, Definition and meaning of the terms involved
- Application to one component system (Water and Sulphur systems)
- Study of two component system (Ag-Pb system)

### Polymers

- Plastics: Classifications and constituents of plastics and their uses, Preparation, properties and uses of polyethylene, Bakelite, Teryline and Nylon
- Rubber: natural rubber, Vulcanization, Synthetic rubber viz. Buna-S, Buna-N, Butyl and Neoprene rubbers

### Lubricants

- Classification, Types of lubrication, properties and uses
- Viscosity & Viscosity index, flash & fire point, Cloud and pour point, Emulsification

## UNIT - IV

### Corrosion

- Definition and its significance, Theories of corrosion, Galvanic cell and concentration cell, Pitting and Stress corrosion, Protection against corrosion, Protective metallic coating

**New Engineering Materials**

- . Brief idea of following: Superconductors, organic electronic materials, Fullerenes and Optical fibers

**UNIT - V****Cement**

- . Manufacturing of Portland cement, Vertical shaft kiln technology
- . Chemistry of setting and hardening

**Refractories**

- . Definition, properties, classification, properties of silica and fireclay refractories

**Glass**

- . Preparation, varieties and uses

**(L: 3: T: 1)**

**BE 104-COMPUTER SYSTEMS AND PROGRAMMING**

**Max.Marks:100**

**Min.Marks:40**

## **UNIT - I**

### **Introduction**

- . Types of computers and generations
- . Basic architecture of computers and its building blocks
- . Input-Output devices, Memories

## **UNIT - II**

### **Number Systems**

- . Binary, octal, decimal and hexadecimal representation of numbers
- . Integers and floating point numbers
- . Representation of characters, ASCII and EBCDIC codes
- . Binary Arithmetic: addition, subtraction, complements

## **UNIT - III**

### **Classification of Computer Languages**

- . Machine, assembly and high level languages
- . Brief idea of operating system
- . Assembler, compiler and interpreter

### **Programming in 'C'**

- . Need of programming languages, Defining problems
- . Flowcharts and algorithm development

## **UNIT - IV**

- . Data types, constants, variables, operators and expressions
- . Input and output statements, Conditional and control statements, Arrays

## **UNIT - V**

- . Structures and unions
- . Pointers
- . File handling

## **BE 105-ELECTRICAL AND ELECTRONICS ENGINEERING**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

## **UNIT - I**

### **DC Circuits**

- . Classification of circuit elements, V-I characteristics and current sources – ideal and practical, source conversion
- . Kirchoff's voltage and current laws, Loop analysis
- . Star-delta and Delta-star transformations, Superposition theorem & Thevenin's theorem

## **UNIT - II**

### **Single Phase AC Circuits**

- . Single phase EMF generation, Instantaneous, average and RMS values
- . Phase diagram, power and power factor for R, L, C, RL, RC and RLC circuits, complex representation of impedances
- . Solution of RLC series, parallel and series-parallel circuits.

### **Three Phase AC Circuits**

- . Three phase EMF generation, Star and delta connections, Line and phase quantities
- . 3-phase balance circuits – phasor diagram, solution and power measurement

## **UNIT - III**

### **Single Phase Transformer**

- . Faraday's law of electromagnetic induction
- . Construction and working of transformer
- . Ideal transformer: EMF equation, phasor diagram, voltage and current relationship (transformation ratio)

## **UNIT - IV**

### **p-n Junction Diodes**

- . Intrinsic and extrinsic semiconductors, open circuited p – n junction and space charge region
- . The biased p – n junction and voltage – ampere characteristics

### **Diode Circuits**

- . Single phase half wave and bridge rectifiers – peak inverse voltage
- . DC and RMS load currents and voltages, ripple factor, Introduction to filters

## **UNIT - V**

### **Transistor**

- . PNP and NPN transistors, transistor current components, Common emitter Configuration- input output characteristics
- . Transistor operating regions: active region, saturation region and cut off region
- . Transistor as an amplifier and a switch

## **BE 106-PHYSICS LAB**

**(L: 0: T: 0: P: 3)**

**Max.Marks:100**  
**Min.Marks:50**

### **OPTICS**

1. To determine the wave length of monochromatic light with the help of Fresnel's Biprism.
2. To determine the wave length of Sodium light by Newton's rings.
3. To determine the specific rotation of Glucose (Sugar) solution using a Polarimeter.
4. To determine the wave length of Sodium light by Michelson's Interferometer.
5. To determine the wavelength of prominent lines of mercury by plane diffraction grating with the help of a spectrometer.
6. To determine the dispersive power of material of prism for violet and yellow colors of mercury Light with the help of a spectrometer.
7. To determine the height of water tank with the help of a sextant.
8. To measure the numerical aperture of an optical fiber.
9. To determine the coherent length and coherent time of laser using He-Ne Laser.
10. To determine the profile of He-Ne Laser beam.

### **ELECTRONICS / ELECTRICAL**

11. To convert a galvanometer into an Ammeter of range 1.5 Amps and calibrate it.
12. To convert a galvanometer into an Voltmeter of range 1.5 Volts and calibrate it.
13. To study the variation of semiconductor resistance with temperature and hence determine the band gap of semiconductor in the form of reverse biased P-N junction diode.
14. To determine the specific resistance of the material of a wire by Carey-Foster's bridge.
15. To determine the ferromagnetic constants, retaintivity, permeability and susceptibility by tracing I-H curve using CRO.
16. To study the variation of thermo emf of Iron-Copper thermo couple with temperature.
17. To study the charge & discharge of a condenser and hence determine time constant.  
(Both current and voltage graphs are to be plotted)
18. To determine the high resistance by the method of leakage, using a Ballistic Galvanometer.
19. To determine dielectric constant of a liquid using moving coil Ballistic Galvanometer with standard parallel plate condenser.
20. Study G. M. counting system and hence study absorption coefficient of Lead using lead sheets.

### **BE 208-ENGINEERING CHEMISTRY LAB**

**(L: 0: T: 0: P: 3)**

**Max.Marks:100**

**Min.Marks:50**

## **S. No. List of Experiments**

### **(i) VOLUMETRIC ANALYSIS**

1. Determination of Hardness of Water by different methods.
2. Determination of available chlorine in water.
3. Determination of Copper Sulphate Iodometrically.
4. Determination of Ferrous Ammonium Sulphate.
5. Determination of Sodium Hydroxide and Sodium Carbonate in a alkali mixture.

### **(ii) GRAVIMETRIC ANALYSIS**

6. Determination of Barium as Barium Sulphate.
7. Determination of Silver as Silver Chloride.

### **(iii) PHYSICO CHEMICAL ANALYSIS**

8. Determination of Viscosity of lubricating oil by Redwood Viscometer.
9. Determination of Flash & Fire Point of lubricating oil by Pensky – Martin apparatus.
10. Determination of Cloud and Pour Point of lubricating oil.
11. Determination of Calorific Value of a solid fuel by Bomb Calorimeter.
12. Determination of proximate analysis of Coal.

### **(iv) PHYSICO CHEMICAL INSTRUMENTAL ANALYSIS / CHARACTERIZATION**

13. Spectrophotometer (UV – Vis) analysis / characterization.
14. Determination of pH by pH meter.
15. Determination of Conductivity of aqueous solutions of salts.
16. Determination of Sodium and Potassium by flame photometer.

**((L: 0: T: 0: P: 3)**

**BE 107-COMPUTER PROGRAMMING LAB**

**Max.Marks:100**

**Min.Marks:50**

**S. No. List of Experiments**

1. Simple input output program integer, real character and string. (Formatted & Unformatted)
2. Conditional statement programs (if, if-else-if, switch-case)
3. Looping Program. (for, while, do-while)
4. Program based on array (one, two and three dimensions)
5. Program using Structure and Union.
6. Program using Function (with and without recursion)
7. Simple programs using pointers.
8. File handling.

**(L: 0: T: 0: P: 3)**

**BE 108-PRACTICAL GEOMETRY**

**Max.Marks:100**

**Min.Marks:50**

### **S. No. List of Experiments**

1.
  - Lines, Lettering and Dimensioning
  - Scales: Representative factor, plain scales, diagonal scales, scale of chords
  - Conic Sections: Construction of ellipse, parabola and hyperbola by different methods. Normal and Tangents
  - Special Curves: Cycloid, Epicycloids, Hypo-cycloid, Involutives, Archimedean and logarithmic spirals
2.
  - Projections: Types of projection, Orthographic projection, First angle and third angle projection
  - Projection of points and lines, True inclinations and true length of straight lines, Traces of straight lines, Auxiliary planes
3.
  - Projection of planes and solids: Projection of planes, Projection of polyhedra, Pyramids, Cylinder and Cone
4.
  - Sections of Solids: Section of right solids by normal and inclined planes
  - Development of Surfaces: Parallel line and radial line method for right solids
5.
  - Isometric Projections: Isometric Scale, Isometric axes, Isometric projections of planes And simple solids , Introduction to development of surface .

**(L: 0: T: 0: P: 3)**

**BE 109-WORKSHOP PRACTICE**

**Max.Marks:100**

**Min.Marks:50**

## **S. No. List of Experiments**

### **1. Carpentry Shop**

- . Timber, definition, engineering applications, seasoning and preservation
- . Plywood and ply boards , simple joints

### **2. Foundry Shop**

- . Moulding Sands, constituents and characteristics
- . Pattern, definition, materials types, core prints
- . Role of gate, runner, riser, core and chaplets
- . Causes and remedies of some common casting defects like blow holes, cavities, Inclusions etc., module practice.

### **3. Welding Shop**

- . Definition of welding, brazing and soldering processes and their applications
- . Oxyacetylene gas welding process, equipment and techniques, types of flames and their applications
- . Manual metal arc welding technique and equipment, AC and DC welding
- . Electrodes: Constituents and functions of electrode coating, welding positions
- . Types of welded joints, common welding defects such as cracks, undercutting, slag inclusion and boring etc., simple welding exercises

### **4. Fitting Shop**

- . Files and other common tools materials and classification, fitting exercises.

### **5. Smithy Shop**

- . Forging, forging principle, materials
- . Operations like drawing, upsetting, bending and forge welding
- . Use of forged parts

## **List of jobs to be made in the workshop practice**

## **S. No. List of Experiments**

### **CARPENTRY SHOP**

1. T – Lap joint
2. Bridle joint

### **FOUNDRY SHOP**

3. Mould of any pattern
4. Casting of any simple pattern

### **WELDING SHOP**

5. Gas welding practice by students on mild steel flat
6. Lap joint by gas welding
7. MMA welding practice by students
8. Square butt joint by MMA welding
9. Lap joint by MMA welding
10. Demonstration of brazing

### **MACHINE SHOP PRACTICE**

11. Job on lathe with one step turning and chamfering operations
12. Job on shaper for finishing two sides of a job

13. Drilling two holes of size 5 and 12 mm diameter on job used / to be used for shaping
14. Grinding a corner of above job on bench grinder

**FITTING AND SMITHY SHOP**

15. Finishing of two sides of a square piece by filing
16. Tin smithy for making mechanical joint and soldering of joint
17. To cut a square notch using hacksaw and to drill three holes on PCD and tapping

**BE 110-ELECTRICAL AND ELECTRONICS LAB**

**(L: 0: T: 0: P: 2)**

**Max.Marks:100**

**Min.Marks:50**

**S. No. List of Experiments**

## **A. ELECTRICAL LAB**

1. Single line diagram of a power system and a distribution sub-station and basic functional study of main components used in power systems.
2. Make house wiring including earthing for 1-phase energy meter, MCB, ceiling fan, tube light, three pin socket and a lamp operated from two different positions. Basic functional study of components used in house wiring.
3. Study the construction and basic working of ceiling fan, single phase induction motor and three phase squirrel cage induction motor. Connect ceiling fan along with regulator and single phase induction motor through auto-transformer to run and vary speed.
- 4.(a) Basic functional study and connection of moving coil & moving iron ammeters and voltmeters, dynamometer, wattmeter and energy meter.  
(b) Run a 3-phase squirrel cage induction motor at no load and measure its voltage, current, power and power factor. Reverse the direction of rotation.
5. Study the construction, circuit, working and application of the following lamps:  
(i) Fluorescent lamp, (ii) Sodium vapour lamp, (iii) Mercury vapour lamp, (iv) Halogen lamp and (v) Neon lamp
- 6.(a) Study the construction and connection of single phase transformer and auto-transformer. Measure input and output voltage and find turn ratio.  
(b) Study the construction of a core type three phase transformer. Perform star and delta connection on a 3-phase transformer and find relation between line and phase voltage.

## **B. ELECTRONICS LAB**

7. Identification, testing and applications of resistors, inductors, capacitors, PN-diode, Zener diode, LED, LCD, BJT, FET, UJT, SCR, Photo diode and Photo transistor.
- 8.(a) Functional study of CRO, analog & digital multi-meters and function / signal generator.  
(b) Study the single phase half wave and bridge rectifier and effects of filters on waveform.
9. Study the BJT amplifier in common emitter configuration. Measure voltage gain, plot gain frequency response and calculate its bandwidth.
- 10.(a) Study the construction and basic working of SCR.  
(b) Study the single phase half wave and bridge controlled rectifier and observe the effect of firing angle on waveform.

## **BE 201-COMMUNICATION TECHNIQUES**

**(L: 3: T: 1)**

**Max.Marks:100**  
**Min.Marks:40**

**UNIT - I**

**Grammar** : Words and Sentences, Verbs / Tenses, Questions / Questions Tags, Modal Verbs, The Passive

**UNIT - II**

**Grammar** : The Infinitive and The ING form, Nouns and Articles, Determiners, Reported Speech, Adjectives and Adverbs

**UNIT - III**

**Grammar** : Prepositions, verbs with Prepositions and Adverbs Pronouns, Relative Clauses, Conditionals, Linking Words

**UNIT - IV**

**Compositions** : Essay and Report Writing, Review Writing

**UNIT - V**

**Compositions** : Applications, Letter and Précis Writing, Technical Proposal Writing

**BE 202-ENGINEERING MATHEMATICS – II**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT - I**

**Coordinate Geometry of Three Dimensions** - Equation of a sphere, Intersection of a sphere and a plane, tangent plane, normal lines, Right circular cone, Right circular cylinder

**UNIT - II**

**Matrices** - Rank of a matrix, inverse of a matrix by elementary transformations

. Solution of simultaneous linear equations, Eigen values and Eigen vectors, Cayley – Hamilton theorem (without proof), Diagonalization of matrix

**UNIT - III**

**Vector Calculus** - Scalar and vector field, differentiation & integration of vector functions

. Gradient, Divergence, Curl and Differential Operator, Line, Surface and volume Integrals

. Green's Theorem in a Plane, Gauss' and Stoke's Theorem (without proof) and their Applications

**UNIT - IV**

**Dynamics** - Angular Motion, Radial and Transverse Velocities and Accelerations

. Tangential and Normal Accelerations, Rectilinear Motion in Resisting Medium

**UNIT - V**

**Differential Equations** - Series Solutions of Second Order Linear Differential Equations with Variable, Coefficients (Complementary Functions only), Partial Differential Equations of First Order, Lagrange's Form, Standard Forms, Charpit's Method

**BE 204-ENGINEERING MECHANICS**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT - I**

. System of forces, Fundamental laws of mechanics, Composition of forces, Free body diagram, Lami's theorem, Moments and couple, Varignon's theorem, condition of equilibrium

. Types of support and loading, reaction, Analysis of simple trusses by methods of joints

and method of sections

#### **UNIT - II**

. Laws of Coulomb friction, Ladder, Wedges, Belt friction and rolling, Principle of virtual work and its applications

#### **UNIT - III**

. Location of centroid and center of gravity, area moment of inertia, mass moment of inertia,  
. Law of machines, Variation of mechanical advantages, efficiency, reversibility of  
Machine, Pulleys, wheel and axle, wheel and differential axle, Transmission of power through belt and rope

#### **UNIT - IV**

##### **Kinematics of Particle**

. Rectilinear motion, plane curvilinear motion, Projectile motion, Constrained motion of connected particles

##### **Dynamics of Particle and Rigid Body**

. Newton's law of motion, D'Alembert's principle

#### **UNIT - V**

**Work and Energy** : Work, energy (Potential, Kinetic and Spring), Work – Energy relation

. Law of conservation of energy

**Impulse and Momentum** : Impulse, momentum, Impulse – Momentum relation, Impact

**Vibration** - Un-damped free vibrations

## **BE 205-MECHANICAL ENGINEERING**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

#### **UNIT - I**

##### **Basic Concepts**

. Thermodynamic systems, properties, work and heat

**Working Fluids**

Air and steam, calculation of properties of air as ideal gas for various thermodynamic processes Use of steam tables and Molier charts for steam properties

**First and Second Laws of Thermodynamics**

Non-flow and flow energy equations, second law statements, Carnot cycle Application of first and second law to ideal gas system subjects to various thermodynamics processes

**UNIT - II****Internal Combustion Engines**

Otto and Diesel cycle, thermal efficiency calculations , Classification, two and four stroke engines, construction and working of petrol and diesel , Engines. Introduction to various systems of IC engines

**Gas Turbine Plants**

Ideal Bryton cycle, thermal efficiency calculations., Construction and working of reciprocating and rotary air compressors, Applications of gas turbine plants

**UNIT - III****Steam Power Plant**

Simple Rankine cycle, thermal efficiency calculations, classification of steam generators  
Construction and working of low and high pressure boilers, Introduction to various components of thermal power plants

**Refrigeration and Air-conditioning**

Psychrometing, use of psychrometric charts, Elementary concepts of refrigeration and air-conditioning, Vapour compression cycle, working principle and schematic diagrams of refrigerators, air coolers, air conditioners and ice plants

**UNIT - IV****Manufacturing Processes**

Classification, principle of working, specification, applications of various machine tools, lathe, drilling, shaper and milling machines, Basic descriptions and applications of hot and cold working processes, forging, bending, shearing, drawing and forming operations

**UNIT - V**

Foundry Tools, equipments and moulding materials., Gas welding, arc welding, soldering and brazing

**Power Transmission**

Classification and application of mechanical drives like belts ropes, chains and gear, drives (excluding epicyclic trains) and their velocity ratios, Ratio of tension in belts and ropes

**BE 206-ENVIRONMENTAL STUDIES & DISASTER MANAGEMENT**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT - I**

Do's and Don'ts for prevention of life and property due to earthquake, tsunami, cyclone fire, flood and landslides, Legislative responsibility and community base disaster management

## **UNIT - II**

Introduction, General introduction to environment, biotic and abiotic environment  
. Environmental pollution, Adverse effect of pollution n environment, control strategies  
. Various acts and regulations for environmental protection

## **UNIT - III**

### **Water Pollution**

. Surface and underground sources of water, Water quality standards, impurities in water and their removal, River water pollution, eutrophication of lakes  
. Domestic waste water management,

### **Air Pollution**

. Sources of air pollution, adverse effects on human health, Green house effect, global warming, acid rain, ozone depletion

### **Ecology**

. Basics of species, biodiversity, population dynamics, Energy flow, ecosystems, environmental impact assessment, Renewable sources of energy, Sustainable development

## **UNIT - IV**

### **Introduction & Basic Concept of Disasters**

. Types of disasters and their brief introduction: Natural & Man made disasters , Earthquakes, tsunami, cyclone, flood, drought, landslide, Nuclear, Chemical, Fire and environmental hazards

## **UNIT - V**

### **Disaster Management Cycle & its Components**

. Mitigation and prevention, preparedness, Response (rescue & relief), rehabilitation and recovery  
. Disaster vulnerability & risk and its reduction, Maps showing earthquake, cyclone, flood and landslide hazards in India

## **BE 207-LANGUAGE LAB**

**(L: 0: T: 0: P: 3)**

**Max.Marks:100**

**Min.Marks:50**

The content and coverage of the Language Lab. lessons will cover the following:

1. Phonetic symbols and transcription
2. Listening Skills and comprehension
3. Conversation practice, perfecting English sounds, pronunciation, stress and intonation etc.
4. Vocabulary building, synonyms and antonyms, one word for many, words commonly misspelt and mispronounced
5. Practice of Seminar presentation, Group discussion and Interview skills.

**BE 209-ENVIRONMENTAL ENGINEERING LAB**

**(L: 0: T: 0: P: 2)**

**Max.Marks:100**

**Min.Marks:50**

**S. No. List of Experiments**

1. Measurement of pH of water
2. Measurement of hardness of water

3. Measurement of residual chlorine in water
4. Measurement of conductivity of water
5. Measurement of chlorides in water
6. Measurement of nitrate in water
7. Measurement of fluoride in water
8. Measurement of dissolved oxygen in water
9. Measurement of total solids in sewage
10. Measurement of dissolved solids in sewage
11. Measurement of settleable solids in sewage

### **BE 210-MACHINE DRAWING**

**(L: 0: T: 0: P: 3)**

**Max.Marks:100**  
**Min.Marks:50**

#### **S. No. List of Experiments**

1.
  - . Introduction to machine drawing
  - . Dimensioning, locations and placing,

- Orthographic projections: First & third angle methods
- 2. Sheet 1: Orthographic Projections (3 Problems)
- 3. Sheet 2: Sectional Views (3 Problems)
- 4. Sheet 3: Riveted joints, lap joints, butt joints, chain riveting, zig-zag riveting
- 5. Sheet 4: Screw fasteners, different threads, Nuts & bolts locking devices, set screws, foundation
- 6. Sheet 5: Bearing, Plumber block
- 7. Lectures on free hand sketches
- 8. List of free hand sketches
  - Different type of lines
  - Conventional representation of materials
  - Screw fasteners
  - Bearing: Ball, roller, needle, foot step bearing
  - Coupling: Protected type, flange, and pin type flexible coupling
  - Welded joints
  - Belts and pulleys
  - Pipes and pipe joints
  - Valves

**B.E III SEMESTER**

**ECE 301 MATHEMATICS-III**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1** :Laplace transform with its simple properties, applications to the solution of ordinary and partial differential equations having constant co-efficients with special reference to the wave and diffusion equations.

**UNIT 2** :Expansion of simple functions in fourier series. Halfrange series, Change of intervals, Harmonic analysis.  
**Z TRANSFORM** - Introduction, Properties, Inverse ZTransform .

**UNIT3** :Complex form of Fourier Transform and its inverse, Fourier sine and transform and their inversion. Applications of Fourier Transform to solution of partial differential equations having constant co-efficient with special reference to heat equation and wave equation.

**UNIT 4** :Analytic functions, Cauchy-Riemann equations, Elementary conformal mapping with simple applications, Line integral in complex domain, Cauchy;s theorem. Cauchy's integral formula.

**UNIT 5** :Taylor's series Laurent's series poles, Residues, Evaluation of simple definite real integrals using the theorem of residues. Simple contour integration.

Text/References:

1. M.Ray, J.C.Chaturvedi & H.C.Sharma-Differential Equations.
2. Chandrika prasad-Mathematics for Engineers.
3. Chandrika prasad-Advanced Mathematics for engineers.
4. B.S.Grewal-Higher engineering mathematics
5. Gokhroo et al; Higher Engg.Maths III (3EE2) Unique Books, Ajmer

### **ECE 302 - ELECTRONIC DEVICES & CIRCUITS**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1** :Mobility and conductivity, charge densities in a semiconductor, Fermi Dirac distribution, carrier concentrations and fermi levels in semiconductor, Generation and recombination of charges, diffusion and continuity equation, Mass action Law, Hall effect.

**UNIT 2** : Junction diodes,Diode as a ckt. element, load line concept, clipping and clamping circuits, Voltage multipliers. Construction, characteristics and working principles of UJT

**UNIT 3** : Transistor characteristics, Current components, Current gains: alpha and beta. Operating point. Hybrid model, h-parameter equivalent circuits. CE, CB and CC configuration. DC and AC analysis of CE,CC and CB amplifiers. Ebers-Moll model. Biasing & stabilization techniques. Thermal runaway, Thermal stability.

**UNIT 4** : JFET, MOSFET, Equivalent circuits and biasing of JFET's & MOSFET's. Low frequency CS and CD JFET amplifiers. FET as a voltage variable resistor.

**UNIT 5** :Analysis of low frequency small signal amplifiers using BJT & FET, DC and RC coupled amplifiers. Frequency response, midband gain, gains at low and high frequency. Analysis of DC and differential amplifiers, Miller's Theorem. Cascading Transistor amplifiers, Darlington pair. Emitter follower, source follower.

Text/References:

1. J.Millman & C.C.Halkias-Integrated Electronics:analog & Digital circuits system, TMH
2. Jacob Millman and Arvin Grabel-Microelectronics, McGraw Hill
3. Robert L.Boyle sted & Louis Nashelshky-Devices and Circuit Theory, PHI

### **ECE 303- CIRCUIT ANALYSIS & SYNTHESIS**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : NETWORK THEOREMS AND ELEMENTS** :Thevenin's, Norton's, Reciprocity, Superposition, Compensation, Miller's, Tellegen's and maximum power transfer theorems. Networks with dependent sources. Inductively coupled circuits – mutual inductance, coefficient of coupling and mutual inductance between portions of same circuits and between parallel branches. Transformer equivalent, inductively and conductively coupled circuits.

**UNIT 2 :TRANSIENTS ANALYSIS :** Impulse, step, ramp and sinusoidal response Analysis of first order and second order circuits. Time domain & transform domain (frequency, Laplace) analysis. Initial and final value theorems. Complex periodic waves and their analysis by Fourier analysis. Different kind of symmetry. Power in a circuit.

**UNIT 3 : NETWORK FUNCTIONS :** Terminals and terminal pairs, driving point impedance transfer functions, poles and zeros. Procedure of finding network functions for general two terminal pair networks. Stability & causality.

**UNIT 4 : TWO PORT NETWORKS :** Two port parameters and their interrelations – z-parameters, yparameters, h-parameters, ABCD parameters. Equivalence of two ports, transformer equivalent, interconnection of two port networks. Image parameters. Attenuation & phase shift in symmetrical T and  $\pi$  networks.

**UNIT 5 : NETWORK SYNTHESIS :** Hurwitz polynomial, positive real function, RL & RC networks synthesis, Foster First & Second form, Cauer forms.

Text/References :

1. Hayt & Kemmerly:Engineering circuit Analysis, TMH
2. A. Chakarvorty :Circuit Theory.
3. J Edminster & M.Nahvi:Theory & Problems of electric circuits, Schaum's series.
4. B.R.Gupta & Vandana singhal-Fundamentals of electrical Networks, Wheeler's Pub.
5. K.A.Gangadhar-Circuit theory.
6. Van Valkenburg-Network Analysis.
7. G.K. Mithal-Network Analysis.
8. Network Analysis and Synthesis: Louis weinberg

#### **ECE 304- ELECTRONIC MEASUREMENTS & INSTRUMENTAITON**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : THEORY OF ERRORS:** Accuracy & precision, Repeatability, Limits of errors, Systematic & random errors Modeling of errors, Probable error & standard deviation, Gaussian error analysis, Combination of errors.

**UNIT 2 : ELECTRONIC INSTRUMENTS FOR MEASURING BASIC PARAMETERS :** Electronic Voltmeter, Electronic Multimeters, Digital Voltmeter, Component Measuring Instruments, Q meter, Vector Impedance meter, RF Power & Voltage Measurements. Measurement of frequency. Introduction to shielding & grounding.

**UNIT 3 : OSCILLOSCOPES :** CRT Construction, Basic CRO circuits, CRO Probes, Oscilloscope Techniques of Measurement of frequency, Phase Angle and Time Delay, Multibeam, multi trace, storage& sampling Oscilloscopes. Curve tracers.

**UNIT 4 : SIGNAL GENERATION:** - Sine wave generators, Frequency synthesized signal generators, Sweep frequency generators. Signal Analysis - Measurement Technique, Wave Analyzers, Frequency - selective wave analyser, Heterodyne wave analyser, Harmonic distortion analyser, Spectrum analyser.

**UNIT 5 : TRANSDUCERS** - Classification, Selection Criteria, Characteristics, Construction, Working Principles, Application of following Transducers- RTD, Thermocouples, Thermistors, LVDT, RVDT, Strain Gauges, Bourdon Tubes, Bellows. Diaphragms, Seismic Accelerometers, Tachogenerators, Load Cell, Piezoelectric Transducers, Ultrasonic Flow Meters.

Text/References:

1. A.K.Sawhney:Electrical and electronic measurements and measuring instruments,Dhanpat Rai & Sons.
2. E.W.Golding:electrical Measurements.

### **ECE 305 ELECTRONIC MATERIALS & PROCESSES**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : DIELECTRIC MATERIALS :** Polarisation phenomenon, spontaneous polarisation, dielectric constant and loss, piezo and ferro electricity.

**UNIT 2 : MAGNETIC MATERIALS:** Dia, para, ferro-ferrimagnetism; soft and hard magnetic materials and their applications.

**UNIT 3 : SEMI CONDUCTOR MATERIALS :** Crystal growth, zone refining, Degenerate and nondegenerate semiconductors, Direct and indirect band gap semiconductors. Electronic properties of silicon, Germanium, Compound Semiconductor, Gallium Arsenide, gallium phosphide & Silicon carbide.

**UNIT 4: CONDUCTIVE & SUPERCONDUCTIVE MATERIALS :** Electrical properties of conductive and resistive materials. Important characteristics and electronic applications of specific conductor & resistance materials. Superconductor phenomenon, Type I and Type II superconductors and their applications.

**UNIT 5: PASSIVE COMPONENTS & PCB FABRICATION:** Brief study of fabrication methods of fixed and variable type of resistors; capacitors, Inductors, solenoid and toroid, air core, iron core and Ferro core conductors. Printed Circuit Boards – Types, Manufacturing of copper clad laminates, PCB Manufacturing process, Manufacturing of single and double sided PCBs. Surface mount devices – advantages & limitations.

Text/References:

1. C.S Indulkar & S. Thriuvengadam-An introduction to Electrical Engineering Materials,S.Chand.
2. S.P.Seth & P.V.Gupta-A course in Electrical Engineering Materials,Dhanpat Rai & Sons.
3. B.D.Indu:Electrical Engineering Materials,Jain Brothers.
4. A.J.Dekkar-Electrical Engineering Materials.
5. R.M.Rose et al-Structure and properties of Materials, Wiley Eastern Ltd.

### **ECE 306 DATA STRUCTURES & ALGORITHMS**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : PERFORMANCE MEASUREMENT :** Space complexity and Time complexity, big oh, omega and theta notations and their significance. Linear Lists - Array and linked representation, Singly & Doubly linked lists. Concept of circular linked lists.

**UNIT 2 : ARRAY & MATRICES** - Row and Column Major mapping & representation, irregular 2D array, Matrix operations, Special matrices: diagonal, tri-diagonal, triangular, symmetric. Sparse matrices representation and its transpose.

**UNIT 3 : STACKS** - Representation in array & linked lists, basic operation, Applications of stacks in parenthesis matching, towers of Hanoi etc. Queues - Representation in array & linked lists, applications, circular queues.

**UNIT 4 : TREES** - Binary Tree, representation in array & linked lists, basic operation on binary trees, binary tree traversal (preorder, post order, in order). Search Trees - Binary search tree, indexed-binary search tree, basic operation, AVL tree, B-tree.

**UNIT 5 : GRAPHS** - Representation of un weighted graphs, BFS, DFS, Minimum cost spanning trees, Single source shortest path. Sorting - Bubble sort, insertion sort, merge sort, selection sort, quick sort, heap sort.

***References:-***

1. S. Lioschutz: Data Structures, Mc Graw Hill International Edition.
2. A.V. Aho., J.E. Hopcroft, and J.D. Ullman, Data Structures and Algorithms, Pearson Education Asia.
3. A. Michael Berman: Data Structures via C++, Oxford University Press.
4. Sara Baase and Allen Van Gelder: Computer Algorithms, Pearson Education Asia.
5. Jean-Paul Tremblay and Paul G. Sorenson, An Introduction to Data structures with applications, TMH Publishing Co.Ltd.

**ECE 307 ELECTRONICS WORKSHOP**

**(L: 0: T: 0: P=2)**

**Max.Marks:100**

**Min.Marks:50**

1. Identification, Study & Testing of various electronic components :
- (a) Resistances-Variou types, Colour coding
  - (b) Capacitors-Variou types, Coding,
  - (c) Inductors
  - (d) Diodes
  - (e) Transistors
  - (f) SCRs
  - (g) ICs
  - (h) Photo diode
  - (i) Photo transistor
  - (j) LED
  - (k) LDR
  - (l) Potentiometers

2. Study of symbols for various Electrical & Electronic Components, Devices, Circuit functions etc.
3. To study and perform experiment on CRO demonstration kit.
4. Soldering & desoldering practice.
5. (a) To Design & fabricate a PCB for a Regulated power supply.  
(b) Assemble the Regulated power supply using PCB and test it.
6. To study and plot the characteristics of following Opto-Electronic devices –  
(a) LED (b) LDR (C) Photovoltaic cell (d) Opto-coupler  
(e) Photo diode (f) Photo transistor (g) Solar cell
7. To study the specifications and working of a Transistor radio kit and perform measurements on it.
8. To study the specifications and working of a Tape Recorder kit.
9. To prepare design layout of PCBs using software tools.
10. To fabricate PCB and testing of electronics circuit on PCB.
11. To design and test regulated power supply using Ics
12. To study the specifications and working of a VCD Player.
13. To study the specifications and working of color TV.

### **ECE 308 COMPUTER PROGRAMMING LAB-I**

**(L: 0: T: 0: P=2)**

**Max.Marks:75**

**Min.Marks:38**

1. Simple array and sorting algorithm implementations.
2. Addition, multiplication and transpose of sparse matrices represented in array form.
3. Polynomial addition, multiplication (8<sup>th</sup> degree polynomials), using array & linked lists.
4. Implementation of stack and queue using array & linked lists.
5. Implementation of circular queue using array.
6. Infix to postfix/prefix conversion.
7. Binary search tree creation and traversing.
8. Generation of spanning trees for a given graph using BFS & DFS algorithms.
9. AVL tree implementation (creation, insertion, deletion).
10. Symbol table organization (Hash Table).

### **ECE 309 ELECTRONICS LAB I**

**(L: 0: T: 0: P=2)**

**Max.Marks:100**

**Min.Marks:50**

1. Study the following devices:  
(a) Analog & digital multimeters  
(b) Function/ Signal generators

- (c) Regulated d. c. power supplies (constant voltage and constant current operations)
- (d) Study of analog CRO, measurement of time period, amplitude, frequency & phase angle using Lissajous figures.
- 2 Plot V-I characteristic of P-N junction diode & calculate cut-in voltage, reverse Saturation current and static & dynamic resistances.
  - 3 Plot V-I characteristic of zener diode and study of zener diode as voltage regulator. Observe the effect of load changes and determine load limits of the voltage regulator.
  - 4 Plot frequency response curve for single stage amplifier and to determine gain bandwidth product.
  - 5 Plot drain current - drain voltage and drain current – gate bias characteristics of field effect transistor and measure of  $I_{dss}$  &  $V_p$
  - 6 Application of Diode as clipper & clamper
  - 7 Plot gain- frequency characteristic of two stage RC coupled amplifier & calculate its bandwidth and compare it with theoretical value.
  - 8 Plot gain- frequency characteristic of emitter follower & find out its input and output resistances.
  - 9 Plot input and output characteristics of BJT in CB, CC and CE configurations. Find their hparameters.
  - 10 Study half wave rectifier and effect of filters on wave. Also calculate theoretical & practical ripple factor.
  - 11 Study bridge rectifier and measure the effect of filter network on D.C. voltage output & ripple factor.

### **ECE 310 ELECTRONIC MEASUREMENT & INSTRUMENTATION LAB**

**(L: 0: T: 0: P=2)**

**Max.Marks:75**  
**Min.Marks:38**

1. Measure earth resistance using fall of potential method.
2. Plot V-I characteristics & measure open circuit voltage & short circuit current of a solar panel.
3. Measure unknown inductance capacitance resistance using following bridges  
(a) Anderson Bridge (b) Maxwell Bridge
4. To measure unknown frequency & capacitance using Wein's bridge.
5. Measurement of the distance with the help of ultrasonic transmitter & receiver.
6. Measurement of displacement with the help of LVDT.
7. Draw the characteristics of the following temperature transducers:  
(a) RTD (Pt-100) (b) Thermistors (c) Thermocouple
8. Draw the characteristics between temperature & voltage of a K type thermocouple.
9. Measure the speed of a Table Fan using stroboscope.
10. Measurement of strain/ force with the help of strain gauge load cell.
11. Study the working of Q-meter and measure Q of coils.
12. To study the working of Spectrum analyzer and determine the bandwidth of different signals.

### **ECE 311 HUMANITIES AND SOCIAL SCIENCE**

**(L: 0: T: 0: P=2)**

**Max.Marks:50**  
**Min.Marks:25**

**UNIT 1 : INDIA-** Silent features of Indian Constitution, fundamental rights, duties, directive principles of state. History of Indian national movement, Socioeconomic growth after independence.

**UNIT 2 : SOCIETY –** Social Groups- Concepts and types, socialization- concept and theory, social control; concept, social problem in contemporary India, status and role.

**UNIT 3 : THE FUNDAMENTALS OF ECONOMICS** – Meaning, definition and importance of economics, Logic of choice, Central Economic Problems, Positive and Normative approaches, economic systems socialism and capitalism.

**UNIT 4 : MICROECONOMICS** –Law of demand and supply, Utility approach, Indifference curves, Elasticity of demand & supply and applications, Consumer surplus, Law of returns to factors and returns to scale.

**UNIT 5: MACRO ECONOMICS** –Concept relating to national product-National income and its measurement, Simple Keynesian theory, Simple multiplier, Money and banking,- Meaning, Concept of international trade, Determination of exchange rate, Balance of payments. Characteristics of Indian Economy.

**BE300\*SPECIAL MATHEMATICS**

(For Diploma passed candidates-Common for all branches)

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**Unit1**

**DifferentialCalculus:**

Introduction to successive differentiation, maxima and minima Partial Differentiation, Asymptotes, Curvature, envelopes, evolutes, concavity /convexity, singular points, curve tracing.

#### **Unit 2**

**Integral Calculus:** methods of integration, Definite Integral, Rectification and quadrature, Volumes and surfaces of solids of revolution. Mean values of functions, differentiation under sign of integration, Beta and Gamma functions

#### **Unit3**

**Differential Equations:** Differential equations of first order and first degree, Equation of the first order but not of the first degree, linear differential equation with constant coefficients, Homogeneous Linear differential equations, second order differential equation with variable coefficients

#### **Unit4**

**Matrix algebra:** Elementary transformations with application to inverse, Rank and Solution of simultaneous linear equations. Eigen values and Eigen vector, Cayley-Hamilton Theorem and its applications .

#### **Unit 5**

##### **Mechanics:**

Statics: Equilibrium of coplanar forces acting at a point, Resultant and Equilibrium of coplanar forces acting on rigid body, friction, Common catenary.

Dynamics: Composition and resolution of velocities and acceleration .Relative velocity. Rectilinear Motion under constant acceleration. Vertical motion under gravity. Simple harmonic motion.

### **B.E IV SEMESTER**

#### **ECE 401 MATHEMATICS-IV**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 :** Finite differences – Forward, Backward and Central differences. Newton’s forward and backward differences, interpolation formulae. Stirling’s formula, Lagrange’s interpolation formula.

**UNIT 2 :** Trapezoidal rule, Simpson’s one third and three-eighth rules. Numerical solution of ordinary differential equations of first order - Picard’s method, Euler’s and modified Euler’s methods, Milne’s method and Runge-Kutta fourth order method.,**Differentiation**

**UNIT 3 :** Bessel’s functions of first and second kind, simple recurrence relations, orthogonal property of Bessel’s , Transformation, Generating functions, Legendre’s function of first kind. Simple recurrence relations, Orthogonal property, Generating function.

**UNIT 4 :** Elementary theory of probability, Baye’s theorem with simple applications, Expected value, theoretical probability distributions-Binomial, Poisson and Normal distributions. Lines of regression, co-relation and rank correlation.

**UNIT 5 :** Functional, strong and weak variations simple variation problems, the Euler’s equation.

Text/References :

1. Chandrika Prasad-Advanced mathematics for engineering.
2. B.S.Grewal-Higher engineering mathematics.
3. Gokhroo and Mehta-Advanced Engg. Maths IV (4EE6.1) Unique Books,Ajmer

**ECE 402– ANALOG ELECTRONICS**

**(L: 3: T: 1)**

**Max.Marks:100**  
**Min.Marks:40**

**UNIT 1 : FEEDBACK AMPLIFIERS :** Classification, Feedback concept, Transfer gain with feedback, General characteristics of negative feedback amplifiers. Analysis of voltage-series, voltage-shunt, current-series and current-shunt feedback amplifier. Stability criterion.

**UNIT 2 : OSCILLATORS :** Classification. Criterion for oscillation. Tuned collector, Hartley, Colpitts, RC Phase shift, Wien bridge and crystal oscillators, Astable, monostable and bistable multivibrators. Schmitt trigger. Blocking oscillators.

**UNIT 3 : HIGH FREQUENCY AMPLIFIERS :** Hybrid Pi model, conductances and capacitances of hybrid-Pi model, high frequency analysis of CE amplifier, gain-bandwidth product. Emitter follower at high frequencies.

**UNIT 4 : TUNED AMPLIFIER -** Band Pass Amplifier, Parallel resonant Circuits, Band Width of Parallel resonant circuit. Analysis of Single Tuned Amplifier, Primary & Secondary Tuned Amplifier with BJT & FET. Double Tuned Transformer Coupled Amplifier. Stagger Tuned Amplifier. Pulse Response of such Amplifier. Shunt Peaked Circuits for Increased Bandwidth.

**UNIT 5 : POWER AMPLIFIERS :** Power amplifier circuits, Class A output stage, class B output stage and class AB output stages, class C amplifiers, pushpull amplifiers with and without transformers. Complementary symmetry & quasi complementary symmetry amplifiers.

Text/References:

1. J.Millman & C.C.Halkias: Integrated electronics: analog and Digital circuits systems (TMH)
2. Jacob Millman and Arvin Grabel: Micro electronics.(McGraw Hill).
3. Robert L. Boyle sted and Louis Nashleshky: Electronic devices and circuit theory (PHI)

**ECE 403-DIGITAL ELECTRONICS**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : NUMBER SYSTEMS, BASIC LOGIC GATES & BOOLEAN ALGEBRA:** Binary Arithmetic & Radix representation of different numbers. Sign & magnitude representation, complement notation, various codes & arithmetic in different codes & their inter conversion. Features of logic algebra, postulates of Boolean algebra. Theorems of Boolean algebra. Boolean function. Derived logic gates: Exclusive-OR, NAND, NOR gates, their block diagrams and truth tables. Logic diagrams from Boolean expressions and vica-versa. Converting logic diagrams to universal logic. Positive, negative and mixed logic. Logic gate conversion.

**UNIT 2 : DIGITAL LOGIC GATE CHARACTERISTICS:** TTL logic gate characteristics. Theory & operation of TTL NAND gate circuitry. Open collector TTL. Three state output logic. TTL subfamilies. MOS & CMOS logic families. Realization of logic gates in RTL, DTL, ECL, C-MOS & MOSFET. Interfacing logic families to one another.

**UNIT 3 : MINIMIZATION TECHNIQUES:** Minterm, Maxterm, Karnaugh Map, K map upto 4 variables. Simplification of logic functions with K-map, conversion of truth tables in POS and SOP form. Incomplete specified functions. Variable mapping. Quinn-Mc Klusky minimization techniques.

**UNIT 4 : COMBINATIONAL SYSTEMS:** Combinational logic circuit design, half and full adder, subtractor. Binary serial and parallel adders. BCD adder. Binary multiplier. Decoder: Binary to Gray decoder, BCD to decimal, BCD to 7-segment decoder. Multiplexer, demultiplexer, encoder. Octal to binary, BCD to excess-3 encoder. Diode switching matrix. Design of logic circuits by multiplexers, encoders, decoders and demultiplexers.

**UNIT 5 : SEQUENTIAL SYSTEMS:** Latches, flip-flops, R-S, D, J-K, Master Slave flip flops. Conversions of flip-flops. Counters : Asynchronous (ripple), synchronous and synchronous decade counter, Modulus counter, skipping state counter, counter design. Ring counter. Counter applications. Registers: buffer register, shift register.

Text/References:

1. Malvino and Leach-Digital principles and Applications.
2. M.Morris Mano-Digital Logic and computer Design.
3. S.Salivahnan, S.Anvazhagar-Digital circuits and design

**ECE 404 ELECTROMAGNETIC FIELD THEORY**

**(L: 3: T: 1)**

**Max.Marks:100**  
**Min.Marks:40**

**UNIT 1 : INTRODUCTION :** Vector Relation in rectangular, cylindrical, spherical and general curvilinear coordinate system. Concept and physical interpretation of gradient, Divergence and curl, Green's & Stoke's theorems.

**UNIT 2 : ELECTROSTATICS :** Electric field intensity & flux density. Electric field due to various charge configurations. The potential functions and displacement vector. Gauss's law. Poisson's and Laplace's equation and their solution. Uniqueness theorem. Continuity equation. Capacitance and electrostatics energy. Field determination by method of images. Boundary conditions. Field mapping and concept of field cells.

**UNIT 3 : MAGNETOSTATICS :** Magnetic field intensity, flux density & magnetization, Faraday's Law, Bio-Savart's law, Ampere's law, Magnetic scalar and vector potential, self & mutual inductance, Energy stored in magnetic field, Boundary conditions, Analogy between electric and magnetic field, Field mapping and concept of field cells.

**UNIT 4 : TIME VARYING FIELDS :** Displacement currents and equation of continuity. Maxwell's equations, Uniform plane wave in free space, dielectrics and conductors, skin effect sinusoidal time variations, reflection & refraction of Uniform Plane Wave, standing wave ratio. Pointing vector and power considerations.

**UNIT 5: RADIATION, EMI AND EMC :** Retarded Potentials and concepts of radiation, Radiation from a small current element. Radiation resistance: Introduction to Electromagnetic Interference and Electromagnetic compatibility, EMI coupling modes, Methods of eliminating interference, shielding, grounding, conducted EMI, EMI testing: emission testing, susceptibility testing.

#### **RECOMMENDED BOOKS :**

1. David K Cheng-Field and Vave Electromagnetic 2nd Ed. Wesley Publishing company.
2. Griffith-Introduction to Electrodynamics. 2nd Ed., Prentice Hall of India.
3. J D Kraus, Electromagnetic. 5th, Mc Graw Hill Book company.
4. P Lorrain, D R Corson-Electromagnetic field and waves. Willey Eastern Ltd.
5. V.V. Sarwate-Electromagnetic field and waves,willey estern Ltd.
6. T.he Feynman Lectures on physics, Vol-II Narosa Publishing House.
7. J.K. Kraus-Applied Electromagnetic, 5th Ed.
8. Engineering Electromagnetics: HAYT AND BUCK

#### **ECE 405 RANDOM VARIABLES & STOCHASTIC PROCESSES**

**(L: 3: T: 1)**

**Max.Marks:100**  
**Min.Marks:40**

**UNIT 1 : PROBABILITY** :Definitions, sample, space & events, joint & conditional probability, independent events.

**UNIT 2 : RANDOM VARIABLES** : Introduction, distribution & density functions, discrete & continuous random variables, special distributions : binominal, poisson, uniform, exponential, normal, rayleigh, conditional distribution & density functions.

**UNIT 3 : MULTIPLE RANDOM VARIABLES** : Vector random variable, joint distribution functions, joint probability density function, conditional distribution & density functions. Statistical independence, distribution & density function of sum of random variable, one function of two random variable, two function of two random variable., linear transformation

**UNIT 4 : OPERATION ON SINGLE & MULTIPLE RANDOM VARIABLES** : Mean & variance, moments, chebyshev's inequality, Central limit theorem, characteristic functions & moment generating function, covariance & correlation coefficient of multiple random variable.

**UNIT 5: STOCHASTIC PROCESSES** : Introduction, random process concept, stationary & independence, ergodicity, correlation, functions. Gaussian Random Process, Transmission of Random process through linear systems. Power spectral Density, Cross Spectral density,

**ECE 406 OBJECT ORIENTED PROGRAMMING**

**(L: 3: T: 1)**

**Max.Marks:100**  
**Min.Marks:40**

**UNIT 1 : OOP FUNDAMENTALS:** Concept of class and object, attributes, public, private and protected members, derived classes, single & multiple inheritance,

**UNIT 2 : PROGRAMMING IN C++:** Enhancements in C++ over C, Data types, operators and functions. Inline functions, constructors and destructors. Friend function, function and operator overloading. Working with class and derived classes. Single, multiple and multilevel inheritances and their combinations, virtual functions, pointers to objects. Input output flags and formatting operations. Working with text files.

**UNIT 3 : JAVA:** Variation from C++ to JAVA. Introduction to Java byte code, virtual machine, application & applets of Java, integer, floating point, characters, Boolean, literals, and array declarations.

**UNIT 4 : OPERATORS AND CONTROL STATEMENTS:** Arithmetic operators, bit wise operators, relational operators, Boolean logic operators, the assignment operators, ?: operators, operator precedence. Switch and loop statements.

**UNIT 5: PACKAGE AND INTERFACES:** Packages, access protection, importing & defining packages. Defining and implementing interfaces.

***References:-***

1. A.R.Venugopal, Rajkumar, T. Ravishanker “Mastering C++”, TMH, 1997.
2. S. B. Lippman & J. Lajoie, “C++ Primer”, 3rd Edition, Addison Wesley, 2000.
3. Schildt Herbert, “C++: The Complete Reference”, 4th Ed., Tata McGraw Hill, 1999.
4. Tony Gaddis, Watters, Muganda, “Object-Oriented Programming in C++”, 3rd Ed.,
5. Deitel and Deitel, Java, How to Program, Pearson Education Asia.
6. E. Balaguruswamy, Programming with Java, Tata McGraw Hill.

**ECE 407 COMPUTER PROGRAMMING LAB-II**

**(L: 0: T: 0: P=2)**

**Max.Marks:100**

**Min.Marks:50**

**Programs in C++**

1. Write a program to perform the complex arithmetic.
2. Write a program to perform the rational number arithmetic.
3. Write a program to perform the matrix operations. (Transpose, addition, subtraction, multiplication, Test if a matrix is symmetric/ lower triangular/ upper triangular)
4. Implement Morse code to text conversion and vice-versa.
5. To calculate Greatest Common Divisor of given numbers.
6. To implement tower of Hanoi problem.

**Program in Java**

7. To implement spell checker using dictionary.
8. To implement a color selector from a given set of colors.
9. To implement a shape selector from a given set of shapes.
10. By mapping keys to pens of different colors, implement turtle graphics.
11. To implement a calculator with its functionality.
12. To implement a graph and display BFS/DFS order of nodes.

**ECE 408 ELECTRONICS LAB II****(L: 0: T: 0: P=3)****Max.Marks:125****Min.Marks:63**

1. Plot gain-frequency characteristics of BJT amplifier with and without negative feedback in the emitter circuit and determine bandwidths, gain bandwidth products and gains at 1kHz with and without negative feedback.
2. Study of series and shunt voltage regulators and measurement of line and load regulation and ripple factor.
3. Plot and study the characteristics of small signal amplifier using FET.
4. Study of push pull amplifier. Measure variation of output power & distortion with load.
5. Study Wein bridge oscillator and observe the effect of variation in R & C on oscillator frequency
6. Study transistor phase shift oscillator and observe the effect of variation in R & C on oscillator frequency and compare with theoretical value.
7. Study the following oscillators and observe the effect of variation of C on oscillator frequency: (a) Hartley (b) Colpitts
8. Design Fabrication and Testing of k-derived filters (LP/HP).
9. Study of a Digital Storage CRO and store a transient on it.
10. To plot the characteristics of UJT and UJT as relaxation.
11. To plot the characteristics of MOSFET and CMOS.

**ECE 409 DIGITAL ELECTORNICS LAB****(L: 0: T: 0: P=2)****Max.Marks:100****Min.Marks:50**

1. To study and perform the following experiments.
  - (a) Operation of digital multiplexer and demultiplexer.
  - (b) Binary to decimal encoder.
  - (c) Characteristics of CMOS integrated circuits.
2. To study and perform experiment- Compound logic functions and various combinational circuits based on AND/NAND and OR/NOR Logic blocks.
3. To study and perform experiment -Digital to analog and analog to digital converters.
4. To study and perform experiment- Various types of counters and shift registers.
5. To study and perform experiment - Interfacing of CMOS to TTL and TTL to CMOS ICs.
6. To study and perform experiment- BCD to binary conversion on digital IC trainer.
7. To study and perform experiment - (a) Astable (b) Monostable (c) Bistable Multivibrators and the frequency variation with different parameters, observe voltage waveforms at different points of transistor.
8. To study and perform experiment -Voltage comparator circuit using IC-710.
9. To study and perform experiment- Schmitt transistor binary circuit.
10. Design 2 bit binary up/down binary counter on bread board.

### **ECE 410 Object Oriented Programming Lab**

**(L: 0: T: 0: P=3)**

**Max.Marks:125**

**Min.Marks:63**

1. Simple input output program integer, real character and string. (Formatted & Unformatted)
2. Conditional statement programs (if, if-else-if, switch-case)
3. Looping Program. (for, while, do-while)
4. Program based on array (one, two and three dimensions)
5. Program using Structure and Union.
6. Program using Function (with and without recursion)
7. Inheritance, polymorphism, overloading etc.
8. File handling.

**BE V SEMESTER**

## ECE501 SIGNALS AND SYSTEMS

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : INTRODUCTION :** Continuous time and discrete time systems, Properties of systems. Linear time invariant systems - continuous time and discrete time. Properties of LTI systems and their block diagrams. Convolution, Discrete time systems described by difference equations.

**UNIT 2 : FOURIER SERIES REPRESENTATION OF SIGNALS :** Fourier series representation of continuous periodic signal & its properties, Fourier series representation of Discrete periodic signal & its properties, Continuous time filters & Discrete time filters described by Diff. equation.

**UNIT 3 : FOURIER TRANSFORM:** The continuous time Fourier transform for periodic and aperiodic signals, Properties of CTFT. Discrete time Fourier transform for periodic and aperiodic signals. Properties of DTFT. The convolution and modulation property.

**UNIT 4 : Z-TRANSFORM & LAPLACE TRANSFORM :** Introduction. The region of convergence for the Z-transform. The Inverse Z-transform. Two dimensional Z-transform. Properties of Z transform. Laplace transform, Properties of Laplace Transform, Application of Laplace transform to system analysis.

**UNIT 5 : SAMPLING :** Mathematical theory of sampling. Sampling theorem. Ideal & Real sampling. Interpolation technique for the reconstruction of a signal from its samples. Aliasing. Sampling in freq. domain. Sampling of discrete time signals.

### **Recommended Books:**

1. Ziemer-signals and Systems, Pearson Education.
2. A.V. Oppenheim, A.S. Willsky and I.J. Young-"Signals & Systems", Prentice Hall of India Ltd.
3. Tabub & Schilling-"Principles of Communication System", Tata Mc-graw Hill.
4. Prokins & Manolakis-Digital Signal Processing: Principles algorithms \*Applications, Prentice Hall Pvt. Ltd.

## ECE502 LINEAR INTEGRATED CIRCUITS

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : OPERATIONAL AMPLIFIERS** : Basic differential amplifier analysis, Single ended and double ended configurations ,Op-amp configurations with feedback, Op-amp parameters, Inverting and Non-Inverting configuration, Comparators, Adder .

**UNIT 2 : OPERATIONAL AMPLIFIER APPLICATIONS:**

Integrator, Differentiator, Voltage to frequency & Frequency to voltage converters.

Oscillators: Phase shift, Wien bridge, Quadrature, square wave, triangular wave, sawtooth oscillators. Voltage controlled oscillators.

**UNIT 3 : ACTIVE FILTERS:** Low pass, high pass, band pass and band reject filters, All pass filter, Switched capacitor filter, Butterworth filter design, Chebyshev Filter design.

**UNIT 4 : PHASE-LOCKED LOOPS** : Operating Principles of PLL, Linear Model of PLL, Lock range, Capture range, Applications of PLL as FM detector, FSK demodulator, AM detector, frequency translator, phase shifter, tracking filter, signal synchronizer and frequency synthesizer, Building blocks of PLL, LM 565 PLL.

**UNIT 5 : LINEAR IC's** : Four quadrant multiplier & its applications, Basic blocks of linear IC voltage regulators, Three terminal voltage regulators, Positive and negative voltage regulators. The 555 timer as astable and monostable multivibrators. Zero crossing detector, Schmitt trigger.

**Recommended Books:**

1. R.A. Gayakwad-Op-amplifiers & Linear ICs, Prentice Hall of India.
2. Taubay-Operational Amplifiers.
3. K.R. Botkar-Integrated Circuits. Pearson Education.

## **ECE503 TELECOMMUNICATION ENGINEERING**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : TRANSMISSION LINE:** Types of transmission lines, general transmission line equation, line constant, equivalent circuits, infinite line, and reflection on a line, SWR of line with different type of terminations. Distortion less and dissipation less lines, Coaxial cables, Transmission lines at audio and radio frequencies, Losses in transmission line,. Characteristics of quarter wave, half wave and lines of other lengths,

**UNIT 2 :TRANSMISSION LINE APPLICATIONS:** Smith chart and its application. Transmission line applications, Impedance matching Network. Single & double Stub matching. Measurement of parameters of transmission line, measurement of attenuation, insertion loss, reflection coefficient and standing wave ratio.

**UNIT 3 : ATTENUATORS & FILTERS:** Elements of telephone transmission networks, symmetrical and Asymmetrical two port networks. Different Attenuators, p-section & T-section attenuators, stub matching, Transmission equalizers Filters, constant K-section, Ladder type, p-section, T-section filter, m-derived filter sections, Lattices filter section.

**UNIT 4 : TELEPHONE TRANSMISSION:** Telephone set, Touch tone dial types, two wire/ four wire transmission, Echo suppressors & cancellors, cross talk. Multi-channel systems: Frequency division & time division multiplexing.

**UNIT 5: AUTOMATIC TELEPHONY & TELEGRAPHY:** Trunking concepts, Grade of service, Traffic definitions, Introduction to switching networks, classification of switching systems. Principle of Electronic Exchange, EPABX and SPC Digital telephone Exchange,Numberig Plan, Fascimile services.

### **Recommended Books:**

1. W. Fraser-Telecommunications (BPB Publication)
2. I. Vishvanathan- Telecommunication switching systems & Networks. Prentice Hall of India.
3. Cole- Introduction to Telecommunication. Pearson Educatino
4. Floyd-Telecommunication Switching Traffic and Networks, Pearson Education

## ECE504 ANALOG COMMUNICATION

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : NOISE EFFECTS IN COMMUNICATION SYSTEMS:** Resistor noise, Networks with reactive elements, Noise temperature, Noise bandwidth, effective input noise temperature, Noise figure. Noise figure & equivalent noise temperature in cascaded circuits.

**UNIT 2 : AMPLITUDE MODULATION :** Frequency translation, Recovery of base band signal, Spectrum & power relations in AM systems. Methods of generation & demodulation of AM-DSB, AM-DSB/SC and AM-SSB signals. Modulation & detector circuits for AM systems. AM transmitters & receivers.

**UNIT 3 : FREQUENCY MODULATION :** Phase & freq. modulation & their relationship, Spectrum & band width of a sinusoidally modulated FM signal, phasor diagram, Narrow band & wide band FM. Generation & demodulation of FM signals. FM transmitters & receivers.. Comparison of AM, FM & PM. Pre emphasis & deemphasis. Threshold in FM, PLL demodulator.

**UNIT 4: NOISE IN AM AND FM:** Calculation of signal-to-noise ratio in SSB-SC, DSB-SC, DSB with carrier, Noise calculation of square law demodulator & envelope detector. Calculation of S/N ratio in FM demodulators, Super heterodyne receivers.

**UNIT 5 : PULSE ANALOG MODULATION :** Practical aspects of sampling: Natural and flat top sampling. PAM, PWM, PPM modulation and demodulation methods, PAM-TDM.

### Recommended Books:

1. H.Taub & D.L. Schilling-"Principles of Communication Systems", Tata Mc-Graw Hill.
2. G.Kennedy-"Electronic Communication Systems:", John Wiely & Sons.
3. Simon Haykin-"communication Systems". John Wiely & Sons.
4. B.P. Lathi-"Communication Systems:", John Wiley.
5. Modern Digital Analog communication Systems.
6. Louch-Digital & analog Communication, Pearson Education.
7. Tomasi-Electronic Communication. Pearson Education.

## **ECE505 MICROWAVE ENGINEERING-I**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : WAVE GUIDES :** Introduction of Microwaves and their applications. Rectangular Waveguides , Solution of Wave equation in TE and TM modes. Power transmission and Power losses. Excitation of modes in Rectangular waveguides, circular waveguides : Basic idea of TE and TM modes, field patterns, TEM mode of propagation.

**UNIT 2 : WAVEGUIDE COMPONENTS :** Scattering matrix representation of networks. Rectangular cavity and circular cavity resonators. Waveguide Tees, Magic Tees. Hybrid rings. Waveguide corners, Bends and twists. Directional couplers, Circulators and isolators.

**UNIT 3 : KLYSTRONS :** Limitation of conventional vacuum tubes, Construction and operation of two cavity & multicavity klystrons. Velocity modulation and electron bunching (analytical treatment), Applegate diagram and applications of two cavity klystrons. Construction, working and operation of Reflex klystron. Applications and practical considerations. Velocity modulation, power output and frequency characteristics of a Reflex klystron. Electron admittance.

**UNIT 4 : TRAVELLING WAVE TUBES (TWT):** Construction, operation and practical consideration of helix type TWT. Introduction to CW power, pulsed dual mode TWT. Coupled cavity TWT. Applications of TWT.

**UNIT 5 : MAGNETRON :** Types of Magnetron. Construction, operation, analysis and practical consideration of cavity or travelling wave magnetron. Introduction to coaxial, frequency angle and voltage tunable magnetrons. Backward cross field oscillator, Forward wave cross field amplifier.

### **Recommended Books:**

1. S.Y. Laio-'Microwave devices and Circuits', Prentice-Hall of India.
2. H.J. Reich-'Microwave Principles', East-West Press.
3. R.E. Collin-'Foundations for microwave Engineering', Mc-Graw Hill.
4. Sisodia V.L. Gupta-'Microwave Engineering', New Age.

## ECE506.1 BIOMEDICAL INSTRUMENTATION

(L: 3: T: 1)

Max.Marks:100

Min.Marks:40

**UNIT 1 : HUMAN BODY SUBSYSTEMS** : Brief description of neural, muscular, cardiovascular and respiratory systems; their electrical, mechanical and chemical activities.

**TRANSDUCERS AND ELECTRODES** : Principles and classification of transducers for Bio-medical applications, Electrode theory, different types of electrodes, Selection criteria for transducers and electrodes.

**UNIT 2: BIOPOTENTIALS:** Electrical activity of excitable cells, ENG, EMG, ECG, ERG, EEG. Neuron potential.

**CARDIOVASCULAR SYSTEM MEASUREMENTS** : Measurement of blood pressure, blood flow, cardiac output, cardiac rate, heart sounds, Electrocardiograph, phonocardiograph, Plethysmograph, Echocardiograph.

**UNIT 3 : INSTRUMENTATION FOR CLINICAL LABORATORY** : Measurement of pH value of blood, ESR

measurement, hemoglobin measurement, O<sub>2</sub> and CO<sub>2</sub> concentration in blood, GSR measurement.

Instrumentation for clinical laboratory: Spectrophotometry, chromatography, Hematology, Measurement of pH value, concentration in blood.

**MEDICAL IMAGING** : Diagnostic X-rays, CAT, MRI, thermography, Ultrasonography, medical use of isotopes, endoscopy.

**UNIT 4: PATIENT CARE, MONITORING AND SAFETY MEASURES** : Elements of Intensive care monitoring basic hospital systems and components, physiological effect of electric current shock hazards from electrical equipment, safety measures, Standards & practices.

**COMPUTER APPLICATIONS AND BIOTELEMETRY** : Real time computer applications, data acquisition and processing, remote data recording and management.

**UNIT 5: THERAPEUTIC AND PROSTHETIC DEVICES** : Introduction to cardiac pacemakers, defibrillators, ventilators, muscle stimulators, diathermy, heart lung machine, Hemodialysis, Applications of Laser.

### Recommended Books:

1. Webster, J.G.-Medical Instrumentation, Application and Design, John Wiley and sons.
2. Jacobson, B.Webster, J.G.-Medical and clinical Engineering, Prentice Hall of India.
3. Cromwell-Blomedical Instrumentation and Measurement, Prentice Hall of India.
4. R.S. Khandpur-Handbook of Biomedical Instrumentation, Tata Mc-Graw Hill.
5. Carr-Introduction to Biomedical Equipment Technology, Pearson Education.

## **ECE506.2 ADVANCED DATA STRUCTURES**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : ADVANCED TREES** - Definitions and operations on weight balanced trees (Huffman trees), 2-3 trees and Red-Black trees. Augmenting Red-Black trees to dynamic order statistics and interval tree applications. Operations on disjoint sets and its Union-Find problem. Implementing sets, dictionaries, priority queues and concatenable queues using 2-3 trees.

**UNIT 2 : MERGEABLE HEAPS** - Mergeable Heap operations, binomial trees, implementing binomial heaps and its operations. 2-3-4- trees and 2-3-4 heaps. Structure and potential function of Fibonacci heap. Implementing Fibonacci Heap .

**UNIT 3 : GRAPH THEORY DEFINITIONS** - Definitions of Isomorphism, Components, Circuits, Fundamental Circuits, Cut-sets, Cut-Vertices, Planer and dual graphs, Spanning trees, Kuratovski's two graphs.

**UNIT 4 : GRAPH THEORETIC ALGORITHMS** - Algorithms for connectedness, finding all spanning trees in a weighted graph and planarity testing. Breadth first and depth first search, topological sort, strongly connected components and, articulation point.

**UNIT 5 : APPLICATION OF GRAPHS** - Single source shortest path and all pair shortest path algorithms. Min-Cut Max-Flow theorem of network flows, Ford-Fulkerson Max Flow algorithms.

### **Recommended Books:**

1. Narsingh Deo- Graph Theory with Applications to Engineering and Computer Science, Prentice Hall of India.
2. Cormen- Introduction to Algorithms, Prentice Hall of India.
3. Aho A.V., Hopcroft J.E. and Ullman J.D.-The Design and Analysis of Computer Algorithms, Addison-Wesley.
4. Horwitz and Sahni-fundamentals of Data Structures, Galgotia Book source.
5. Wilson-Introduction to Graph Theory, Pearson Education.

## **ECE506.3 COMPUTER ORIENTED NUMERICAL & STATISTICAL METHODS**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : MATRIX COMPUTATION:** Algebra of matrix, Inverse of a matrix, Rank of a matrix, Matrix inversion by Gauss elimination, Computer programs for matrix inversion.

**UNIT 2 : SOLUTION OF LINEAR EQUATIONS:** Cramer's rule, Gauss elimination, Gauss Jordan elimination and Gauss Seidal iterative method and their implementation in C.

**UNIT 3 : SOLUTION OF NON-LINEAR EQUATIONS:** Interval bisection method, Secant method, Regula-Falsi method, Curve fitting, Method of least squares and their implementation in C.

**UNIT 4 : SOLUTION OF DIFFERENTIAL EQUATIONS:** Euler's method, Modified Euler's method, Runge Kutta method of fourth order, Solution of partial differential equation with special reference to heat equation, Laplace equation and wave equation Milne's and their implementation in C.

**UNIT 5 : STATISTICAL METHODS:** Curve fitting methods – method of least squares, fitting a straight line, parabola. Correlation and Linear regression.

### **Recommended Books:**

1. V.Rajaraman-Computer Oriented Numerical Methods, Prentice Hall of India.
2. B.S. Grewal-Higher Engineering Mathematics
3. J.L. Bansal-Numerical Analysis
4. Balasubramanyam-Numerical Methods.
5. E.V. Krishnamurthy-Numerical Methods.
6. Gaur and Kaul-Higher Engineering Mathematics.

## **ECE507 ELECTRONIC ENGINEERING DESIGN LAB**

**(L: 0: T: 0: P: 3)**

**Max.Marks:125**

**Min.Marks:63**

**To design the following circuits, assemble these on bread board and test them.  
Simulation of these circuits with the help of appropriate software.**

1. Op-Amp characteristics and get data for input bias current, measure the output-offset voltage and reduce it to zero and calculate slew rate.
2. Op-Amp in inverting and non-inverting modes.
3. Op-Amp as scalar, summer and voltage follower.
4. Op-Amp as differentiator and integrator.
5. Design LPF and HPF using Op-Amp 741
6. Design Band Pass and Band reject Active filters using Op-Amp 741.
7. Design Oscillators using Op-Amp (i) RC phase shift (ii) Hartley (iii) Colpitts
8. Design (i) Astable (ii) Monostable multivibrators using IC-555 timer
9. Design Triangular & square wave generator using 555 timer.
10. Design Amplifier (for given gain) using Bipolar Junction Transistor.

## **EC508 MICROWAVE ENGINEERING LAB**

**(L: 0: T: 0: P: 2)**

**Max.Marks:100**

**Min.Marks:50**

1. Study of various microwave components and instruments like frequency meter, attenuator, detector & VSWR meter.
2. Draw V-I characteristics of microwave source like Gunn diode/ Reflex Klystron.
3. Measurement of frequency and wavelength in a rectangular waveguide.
4. Measurement of VSWR (small as well as large values) & reflection coefficient.
5. Measure an unknown impedance with smith chart.
6. Draw the following characteristics of Gunn Diode
  - (i) Output power and frequency as a function of voltage
  - (ii) Square wave modulation by PIN diode.
7. Drawing polar pattern of Horn antenna.
8. To observe the action of directional coupler and its use in separating incident & reflected wave.
9. Study of Magic Tee, Circulator, isolator
10. Study of spectrum analyzer & its use in observing the response of
  - (i) High frequency amplifier
  - (ii) Low pass, high pass, band pass, band reject filters.

## ECE509 COMMUNICATION LAB-I

**(L: 0: T: 0: P :3)**

**Max.Marks:125**

**Min.Marks:63**

1. Harmonic analysis of a square wave of a modulated wave form.
2. Observe the Amplitude modulated wave form & measure modulation index. Demodulation of AM signal.
3. Generation & Demodulation of DSB – SC signal.
4. Modulate a sinusoidal signal with high frequency carrier to obtain FM signal. Demodulation of the FM signal.
5. To observe the following in a transmission line demonstrator kit :
  - (a) The propagation of pulse in non reflecting transmission line.
  - (b) The effect of losses in transmission line.
  - (c) Transmission with standing waves on a Transmission line.
  - (d) The resonance characteristics of a half-wave length long X-mission line.
6. (a) To observe the operation of sampling and sample & hold circuits.  
(b) To study the effect of sampling time (sampling pulse width).  
(c) To study the effects of changing the sampling frequency & observing aliasing phenomena.
7. To study & observe the operation of a super heterodyne receiver.
8. To study & observe the amplitude response of automatic gain controller (AGC ).
- 9, 10. PAM, PWM & PPM: Modulation and demodulation.

## EC510 – SIGNAL PROCESSING LAB-I

**(L: 0: T: 0: P: 2)**

**Max.Marks:100**

**Min.Marks:50**

### **Simulation in MATLAB Environment:**

1. Generation of continuous and discrete elementary signals (periodic and non-periodic) using mathematical expression.
2. Generation of Continuous and Discrete Unit Step Signal.
3. Generation of Exponential and Ramp signals in Continuous & Discrete domain.
4. Continuous and discrete time Convolution (using basic definition).
5. Adding and subtracting two given signals. (Continuous as well as Discrete signals)
6. To generate uniform random numbers between (0, 1).
7. To generate a random binary wave.
8. To generate random sequences with arbitrary distributions, means and variances for following :
  - (a) Rayleigh distribution
  - (b) Normal distributions:  $N(0,1)$ .
  - (c) Gaussian distributions:  $N(m, \sigma_x^2)$
9. To plot the probability density functions. Find mean and variance for the above distributions

**B.E VI SEMESTER  
ECE601-MICROWAVE ENGINEERING-II**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : MICROWAVE MEASUREMENTS :** Detection of microwaves , Microwave power measurement, Impedance measurement, Measurement of scattering parameters, Frequency measurement, VSWR measurements.

**UNIT 2 :** Introduction to microstrip lines, Parallel striplines, Coplanar striplines, Shielded striplines, Slot lines, Integrated Fin line, Non-radiative guide, Transitions, Bends and Discontinuities.

**UNIT 3 : MICROWAVE NETWORK ANALYSIS:** Impedance and Admittance matrices, Scattering matrix, Reciprocal networks and Loss less networks parameters, ABCD Matrix, Equivalent circuits for Two port Network, Conversions between two port network Signal flow graphs, Discontinuities in waveguides and microstrip.

**UNIT 4 : MICROWAVE SEMICONDUCTOR DEVICES :** Construction, Operation and Practical applications of PIN diode, varactor and Tunnel diode, Gunn diode, IMPATT, TRAPTT diodes, BJT, JFET, MESFET, CCD, MASER and LASER.

**UNIT 5 : MONOLITHIC MICOWAVE INTEGRATED CIRCUITS :** Introduction, Materials, MMIC Growth, MOSFET fabrication, Thin film formation, Hybrid integrated circuit fabrication, Advantages & Difficulties of MICs.

**Recommended Books:**

1. S.Y.Liao-'Microwave Devices and ckts', Prentice Hall of India.
2. K.C. Gupta-'Microwaves', New Age International.
3. R.E. Collin-'Foundations for Mocrowave Engg', Mc-Graw Hill.
4. T.C. Edwards-'Foundation for Micostrip circuit Design', John Wiley & Sons.
5. B.Bhat & S.K. Koul-'Stripline like Transmision Lines for Microwave Integrated Circuits, Wiley Eastern Limited.

## **ECE602 MICROPROCESSOR AND MICROCONTROLLER**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : INTRODUCTION** : CPU, address bus, data bus and control bus. Input/ Output devices, buffers, encoders, latches and memories.

**UNIT 2 : 8085 MICROPROCESSOR ARCHITECTURE** : Internal data operations and registers, pins and signals, peripheral devices and memory organization, interrupts. CISC and RISC architecture overview.

**UNIT 3 : 8085 MICROPROCESSOR INSTRUCTIONS** : Classification, format and timing. Instruction set. Programming and debugging, 8 bit and 16 bit instructions.

**UNIT 4 : 8085 MICROPROCESSOR INTERFACING** : 8259, 8257, 8255, 8253, 8155 chips and their applications. A/D conversion, memory, keyboard and display interface (8279).

**UNIT 5: INTRODUCTION TO 8051 MICROCONTROLLER** : General features & architecture of 8051. Memory, timers and interrupts. Pin details. Interfacing and applications.

### **Recommended Books:**

1. R. Gaonkar- Microprocessor Architecture, Programming and Applications, Wiley Eastern Ltd.
2. NTEL- Microcontroller Handbook.
3. Ayle- 8051 Microcontrollers, Penram Press.
4. the 8051 Microcontrollers & Embeded System, Pearson Education.
5. PIC Microcontrollers, Pearson Education.

## ECE603 INDUSTRIAL ELECTRONICS

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1: SEMICONDUCTOR POWER DEVICES** - Basic characteristics & working of Power Diodes, Diac, SCR, Triac, Power Transistor, MOSFETs, IGBT, and GTO.

**UNIT 2: RECTIFIERS & INVERTERS** - Working principles of single and three phase bridge rectifiers, Voltage and current source inverters.

**UNIT 3: POWER SUPPLIES:** Principle of operation of choppers. Step up, Step down and reversible choppers. High frequency electronic ballast, Switch Mode Power Supply: Fly back converter, forward/buck converter, Boost converter and buck-boost converter. Uninterruptible Power Supply.

**UNIT 4: MOTOR CONTROL:** Introduction to speed control of DC motors using phase controlled converters and choppers, Basic idea of speed control of three phase induction motors using voltage and frequency control methods.

**UNIT 5:** Stepper Motors: Variable reluctance, Permanent magnet and hybrid stepper motors. Induction and dielectric heating control.

### **Recommended Books:**

1. Biswanath Paul, Industrial Electronics and Control, Prentice Hall of India.
2. S.N. Biswas, Industrial Electronics, Dhanpat Rai & Co.
3. Zbar, Industrial Electronics: A text Lab Manual, Tata Mc-Graw Hill.
4. Morris, Industrial Electronics, Tata Mc-Graw Hill.

## ECE604 DIGITAL COMMUNICATION

(L: 3: T: 1)

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : PCM & DELTA MODULATION SYSTEMS** : Uniform and Non-uniform quantization. PCM and delta modulation, Signal to quantization noise ratio in PCM and delta modulation. DPCM, ADM, T1 Carrier System, Matched filter detection. Error probability in PCM system.

**UNIT 2 : BASE BAND TRANSMISSION:** Line coding(RZ,NRZ): Polar,Bipolar,Manchester,AMI. Inter symbol interference, Pulse shaping, Nyquist criterion, Raised cosine spectrum.

**UNIT 3 : DIGITAL MODULATION TECHNIQUES** : Geometric interpretation of signals,Orthogonalization. ASK, BPSK, BFSK, QPSK, MSK modulation techniques and Coherent detection of these techniques. Calculation of error probabilities.

**UNIT 4 : INFORMATION THEORY** : Amount of Information, Average Information, Entropy, Information rate, Increase in Average information per bit by coding, Shannon's Theorem and Shannon's bound, Capacity of a Gaussian Channel, BW-S/N trade off,

**UNIT 5: CODING** : Coding and decoding of Information, Hamming code, Single Parity-Bit Code, Linear Block code, cyclic code & convolutional code.

### **Recommended Books:**

1. H.Taub & D.L. schilling-"Principles of communication System", Tata Mc-Graw Hill.
2. Simon Haykin-"Communication Systems", John Wiley & Sons.
3. B.P. Lathi-"Communication Systems", Tata Mc-Graw Hill.
4. Proakis-"Digital Communication" Tata Mc-Graw Hill.
5. Sklar-"Digital Communication" Pearson Education.

## ECE605 CONTROL SYSTEMS

(L: 3: T: 1)

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : CONTROL SYSTEMS ANALYSIS AND COMPONENTS:** Examples and application of open loop and close loop systems. Brief idea of multivariable control system, Brief idea of Z-transform and digital control systems. Differential equations. Determination of transfer function by block diagram reduction technique & signal flow graph method.

**UNIT 2 : TIME RESPONSE ANALYSIS OF FIRST ORDER & SECOND ORDER SYSTEMS:**  
Transient response analysis. Steady state error & error constants. Dynamic error and dynamic error coefficient, Performance Indices.

**UNIT 3 : FREQUENCY DOMAIN METHODS:** Bode plot, Design specification in frequency domain and their co-relation with time domain.

**UNIT 4: STABILITY OF THE SYSTEM:** Absolute stability and relative stability. Routh's stability criterion, Hurwitz criterion. Root locus method of analysis. Polar plots, Nyquist stability criterion. M and N loci, Nicholas charts.

**UNIT 5 : STATE VARIABLE ANALYSIS:** Concepts of state, state variable and state model. State models for linear continuous time systems. Brief idea of state variable analysis in discrete time domain. Transfer functions, Solution of state equation. Concepts of controllability & observability.

### **Recommended Books:**

1. I J Nagrath and M Gopal: Control Systems Engineering, New Age Publication.
2. K Atsuhiko Ogata: Modern Control Engineering, Prentice Hall of India.
3. M. gopal: Control Systems, Tata Mc-Graw Hill.
4. B.C.Kuo: Automatic Control Systems, Prentice Hall of India.
5. Bekn: Digital control mpten
6. R.T. stef: Design of F.B. control myoter.

## ECE606.1 NEURAL NETWORKS

(L: 3: T: 1)

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1: INTRODUCTION:** Introduction to Neural Networks, Biological basis for NN, Human brain, Models of a Neuron, Directed Graphs, Feedback, Network architectures, Knowledge representation, Artificial intelligence & Neural Networks.

**UNIT 2: LEARNING PROCESSES:** Introduction, Error–Correction learning, Memory –based learning, Hebbian learning, Competitive learning, Boltzmann learning, Learning with a Teacher & without a teacher, learning tasks, Memory, Adaptation.

**UNIT 3: SINGLE LAYER PERCEPTRONS:** Introduction, Least-mean-square algorithm, Learning Curves, Learning rate Annealing Techniques, Perceptron, Perceptron Convergence Theorem.

**UNIT 4: MULTI LAYER PERCEPTRONS :** Introduction, Back-Propagation Algorithm, XOR Problem, Output representation and Decision rule, Feature Detection, Back-Propagation and Differentiation, Hessian Matrix, Generalization.

**UNIT 5: RADIAL-BASIS FUNCTION NETWORKS & SELF-ORGANISING MAPS:** Introduction to Radial basis function networks, Cover's Theorem on the Separability of Patterns, Interpolation Problem, Generalized Radial-Basis function networks, XOR Problem. Self-Organizing map, Summary of SOM Algorithm, Properties of the feature map.

### **Recommended Books:**

freeman/Skapura-Networks, Pearson Education.

## **ECE606.2 PARALLEL COMPUTATION & ARCHITECTURE**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : INTRODUCTION** - Synchronous and asynchronous paradigms of parallel computing.

**UNIT 2 : HARDWARE TAXONOMY** – Flynn’s classification, Handler’s classification, Software taxonomy, Kung’s taxonomy, SPMD.

**UNIT 3 : ABSTRACT PARALLEL COMPUTATIONAL MODELS** – Combinational circuits, Sorting networks, PRAM models, interconnection RAMs.

**UNIT 4 : PARALLEL PROGRAMMING LANGUAGES:**

Performances Matrices – Laws governing performance measurements, metrics-speed up, efficiency utilization, communication, overheads, single/multiple programme performances, benchmarks.

**UNIT 5 : PROCESSOR ARRAYS:**

Basic Algorithms – Fast Fourier Transform, Linear System Solution, Sorting etc.

**Recommended Books:**

1. Quinn- M.Parallel Computing Theory and Practice, Mc\_graw Hill.
2. Hwang K. Briggs, F.A.-Computer Architecture & Parallel Processing, Mc-Graw Hill.
3. Kumar, V., Grama, A.Gupta A. and Karypis, G-An Introduction to Parallel Computing, Addison Wesley.
4. Hwang, K.-Advanced Computer Arcitecture-Parallelism, Scalability and Programmability, Mc\_Graw Hill.

## **ECE606.3 OPTIMIZATION TECHNIQUES**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1: INTRODUCTION** -Historical development, engineering application of optimization, Formulation of design problems as a mathematical programming problem, Classification of optimization problems.

**UNIT 2: LINEAR PROGRAMMING** - Simplex methods, Revised simplex method, Duality in linear programming, post optimality analysis.

**UNIT 3:** Applications of Linear programming, Transportation and assignment problems.

**UNIT 4: NON-LINEAR PROGRAMMING** - Unconstrained optimization techniques, Direct search methods, Descent methods, Constrained optimization, Direct and Indirect methods.

**UNIT 5:** Dynamic Programming: Introduction, multi-decision processes, computational procedure

## **ECE607 COMMUNICATION LAB-II**

**(L: 0: T: 0: P: 3)**

**Max.Marks:100**

**Min.Marks:50**

1. (a) To observe sampling of analog signal. Identify & solve the aliasing problem.  
(b) To observe the Transmission of two signals over a single channel using sampling methods.
2. TDM-PAM: Modulation & demodulation.
3. Operation of a PCM encoder & decoder.
4. TDM-PCM: Modulation & demodulation.
5. Observe the performance of a Delta modulation system & to derive from it a delta sigma modulation system.
6. To generate and study the various data formatting schemes (Unipolar, Bi-polar, Manchester,AMI etc.).
7. Generate ASK signals, with and without carrier suppression. Demodulation of these two types of modulated signal.
8. Generate the FSK wave forms & demodulate the FSK signals based on the properties of  
(a) Tuned circuits (b) PLL
9. Generate the PSK signals and demodulate it.

### **Simulation using any virtual Instrumentation Software:**

10. To carry out convolution in both continuous time and discrete time systems.
11. Companding and multiplexing of PCM signals.
12. Perform various keying Techniques: PSK, ASK, FSK & MSK.

## EC608 MICROPROCESSOR LAB

**(L: 0: T: 0: P: 3)**

**Max.Marks:100**

**Min.Marks:50**

1. Study the hardware, functions, memory structure and operation of 8085 microprocessor kit.
2. Program to perform integer division: (i) 8-bit by 8-bit (ii) 16-bit by 8-bit.
3. Transfer of a block of data in memory to another place in memory in the direct and reverse order.
4. Searching a number in an array and finding its parity.
5. Sorting of array in: (i) Ascending (ii) Descending order
6. Programme to perform following conversion: (i) BCD to ASCII (ii) BCD to Hexadecimal
7. Programme to multiply two 8-bit numbers.
8. Programme to generate and sum 15 fibanocci numbers.
9. Programme for rolling display of message "INDIAN".
10. To insert a number at correct place in a sorted array.
11. Serial and Parallel data transfer on output port 8155 & 8255 & designing of disco light, running light, and sequential lights on off by above hardware.
12. Generation of different waveform on 8253/ 8254 programmable timer.

## ECE609 UNIX SHELL PROGRAMMING LAB

**(L: 0: T: 0: P: 2)**

**Max.Marks:75**

**Min.Marks:38**

1. Use of Basic Unix Shell Commands: ls,mkdir,rmdir,cd,cat,banner,touch,file,wc,sort,cut,grep,dd,dfspace,du,ulimit.
2. Commands related to Inode,I/O redirection and piping, process control commands, mails.
3. Shell Programming: Shell script exercises based on following
  - (i) Interactive shell scripts
  - (ii) Positional parameters
  - (iii) Arithmetic
  - (iv) if-then-fi, if-then-else-fi, nested if-else
  - (v) Logical operators
  - (vi) else + if equals elif, case structure
  - (vii) while, until, for loops, use of break
  - (viii) Metacharacters
  - (ix) System administration: disk management and daily administration
4. Write a shell script to create a file in \$USER /class/batch directory. Follow the instructions
  - (i) Input a page profile to yourself, copy it into other existing file;
  - (ii) Start printing file at certain line
  - (iii) Print all the difference between two file, copy the two files at \$USER/CSC/2007 directory.
  - (iv) Print lines matching certain word pattern.
5. Write shell script for-
  - (i) Showing the count of users logged in,
  - (ii) Printing Column list of files in your home directory
  - (iii) Listing your job with below normal priority
  - (iv) Continue running your job after logging out.
6. Write a shell script to change data format .Show the time taken in execution of this script.
7. Write a shell script to print files names in a directory showing date of creation & serial number of the file.
8. Write a shell script to count lines, words and characters in its input(do not use wc).
9. Write a shell script to print end of a Glossary file in reverse order using Array. (Use awk tail)
10. Write a shell script to check whether Ram logged in, Continue checking further after every 30 seconds till success.

## **EC610 INDUSTRIAL ELECTRONICS LAB**

**(L: 0: T: 0: P: 2)**

**Max.Marks:100**

**Min.Marks:50**

1. Study the characteristics of SCR.
  - 1.1 Observe the terminal configuration.
  - 1.2 Measure the breakdown voltage.
  - 1.3 Measure latching and holding current.
  - 1.4 V-I characteristics.
- 2 Perform experiment on triggering circuits for SCR.
  - 2.1 R-triggering circuit.
  - 2.2 R-C triggering circuit.
  - 2.3 UJT triggering circuit.
- 3 Study and obtain the characteristics of Diac.
- 4 Study and obtain the waveforms for single-phase half-wave controlled converter.
- 5 Study and obtain the waveforms for single-phase half controlled symmetrical and asymmetrical bridge converters.
- 6 Study and obtain the waveforms for single-phase fully controlled bridge converter.
- 7 Study and obtain the waveforms for voltage-commutated chopper.
- 8 Study and obtain the waveforms for current-commutated chopper.
- 9 Perform experiment on single phase PWM inverter.
- 10 Perform experiment on buck, boost and buck-boost regulators.
- 11 Perform experiment on Motor control – open loop & closed loop.

## **ECE 611 ENTREPRENEURSHIP DEVELOPMENT**

**(L: 0; T: 0; P=2)**

**Max.Marks:75**

**Min.Marks:38**

- 1 Definition of entrepreneur, qualities of a successful entrepreneur, Charms of being an entrepreneur, achievement- motivation, leadership and entrepreneurial competencies.
- 2 Decision-making, procedures and formalities for starting own business, financial support system.
- 3 Identification and selection of business opportunities and market survey, business plan. Implementation and customer satisfaction.
- 4 Business crises, problem-solving attitude, communication skill. Government policies for entrepreneurs.
- 5 Knowledge based enterprises, Scope of entrepreneur in present context, area of future entrepreneurship.
- 6 Marketing & Sales Promotion, Techno-Economic Feasibility Assessment by Preparation of Preliminary & Detailed project report.

## **ECE701- ANTENNA & WAVE PROPAGATION**

**(L: 3: T: 1)**

**Max.Marks:100**  
**Min.Marks:40**

**UNIT 1 : ANTENNA FUNDAMENTALS** - Antenna parameters, Radiation from a current element in free space. Quarter & half wave antenna. Reciprocity theorem. Resonant and non-resonant antenna. Effective length and aperture, gain, beamwidth, directivity, radiation resistance, efficiency, polarization, impedance and directional characteristics of antenna, antenna temperature.

**UNIT 2 : ANTENNAS** - V and Rhombic antennas, Folded dipole, Yagi-Uda antenna, Frequency independent antennas, Log-periodic antennas, UHF and Microwave antennas- Antenna with parabolic reflectors, Horn and Lens antennas, Helical antennas, Square and Circular loop antennas, Fundamentals of Slot and Microstrip antennas.

**UNIT 3 : ANTENNA ARRAYS** - Two element array, N-element linear arrays, Broadside, End fire, collinear and combination arrays, Multiplication of patterns, Binomial arrays. Effect of ground on antennas, Antenna loading

**Antenna Measurements** - Antenna impedance, radiation pattern, gain, directivity, polarization and phase measurements

**UNIT 4 : RADIO WAVE PROPAGATION** - Mechanism of radio wave propagation, Reflection, Refraction interference and diffraction of radio waves. Theory of ground wave, space wave and sky wave propagation. Plane earth reflection, Reflection factors for horizontal and vertical polarizations. Duct propagation and tropospheric scattering.

**UNIT 5 :** Various Ionospheric layers. Characteristics of ionosphere and its effects on wave propagation. Critical frequency, Virtual height, skipzone & maximum usable frequency. Multiple hop transmission. Oblique & vertical incidence transmission. Effect of earth's magnetic field, solar activity and meteorological conditions on wave propagation.

### **Recommended Books:**

1. J.D. Kraus, 'Antennas', Mc-Graw Hill.
2. C.A. Balanis, 'Antenna Theory', Harper & Row.
3. K.D. Prasad, 'Antenna and Wave Propagation', SATYA Prakashan, New Delhi.
4. E.C. Jordan and K.g. Balmain, 'Electromagnetic waves and Radiating Systems', Prentice hall of India.
5. R.e. Collin, 'Antennas & Radio Wave Propagation', Mc-Graw Hill.

## ECE702 DIGITAL SIGNAL PROCESSING

(L: 3: T: 1)

Max.Marks:100

Min.Marks:40

**UNIT 1 : SAMPLING** - Discrete time processing of Continuous-time signals, continuous-time processing of discrete-time signals, changing the sampling rate using discrete-time processing.

**UNIT 2 : TRANSFORM ANALYSIS OF LTI SYSTEMS** - Introduction, The frequency response of LTI systems, System functions for systems characterized by LCCD (Linear Constant Coefficient Difference) equations, All-pass system, Minimum-Phase systems, Linear systems with linear phase.

**UNIT 3 : STRUCTURES FOR DISCRETE-TIME SYSTEMS-** Block diagram and signal flow graph representation of LCCD (LCCD – Linear Constant Coefficient Difference) equations, Basic structures for IIR and FIR systems, Transposed forms.

**UNIT 4 : FILTER DESIGN TECHNIQUES** - Introduction, Analog filter Design: Butterworth & Chebyshev. IIR filter design by impulse invariance & Bilinear transformation. Design of FIR filters by Windowing: Rectangular, Hanning, Hamming & Kaiser.

**UNIT 5 :** The Discrete Fourier transform (DFT), Properties of the DFT, Linear Convolution using DFT. Efficient computation of the DFT: Decimation-in-Time and Decimation-in frequency FFT Algorithms. Processing of speech signals: Vocoders, linear predictive coders.

### Recommended Books:

1. Schafer, Buck-Discrete Time signal Processing, Pearson Education Asia.
2. Prokis & Monolakis-Digital Signal Processing: Principles, Algorithms & Application, Prentice hall of India.
3. S.K. Mitra-Digital Signal Processing. Tata Mc-Graw Hill.
4. Rabiner & Gold-Theory & Applications of Digital Signal Processing, Prentice Hall of India.
5. Lathi-Signal Processing & Linear System, Oxford Univ Pren

## **ECE703 WIRELESS COMMUNICATION**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : PROPAGATION PHENOMENA** - Fundamentals of fading, Multipath channels, Spread Spectrum signals: Direct-sequence spread spectrum signals, p-n sequences, Frequency-hopped spread spectrum signals, Code-division multiplexing.

**UNIT 2 : LINE OF SIGHT MICOWAVE COMMUNICATION** - Link Engineering, Frequency planning, Free space loss, Fresnel zone clearance bending of radio beam, Effective earth radius, Building blocks of Transmitter & Receiver.

**UNIT 3 : MULTIPLE ACCESS TECHNIQUES** - FDMA, TDMA and CDMA with reference to mobile radio and satellite systems. TDMA based networks. CDMA based networks,

**UNIT 4 : CELLULAR WIRELESS NETWORKS-** , GSM: Introduction, overview of the GSM systems, GSM codec, channel coding and interleaving, radio like control. Cordless systems and WLL, Mobile IP, Wireless access protocol. Wireless LAN's: Technology, IEEE 802.11 standards and Blue tooth. Broadband Wireless 802.16

**UNIT 5 : SATELLITE COMMUNICATION** - Elements of satellite communication: Frequency bands, Transmission and multiplexing. Modulation, Multiple access. Satellite orbit and description- orbital period and velocity, effects of orbital inclination, Azimuth and elevation, Coverage angle and slant range, Geostationary orbit, Satellite description. Earth Station antenna, high-power amplifier, low-noise amplifier, up converter, down converter, monitoring and control, reliability. Satellite Link: basic link analysis,

### **Recommended Books:**

1. Reppaport-Wireless Communication, Pearson Education.
2. William Stallings- Wireless communication & Networks, LPE, Pearson Education, Asia.
3. Tri. T. Ha.- Digital Satellite Communications, Mc-Graw Hill International.
4. Dr.Kamilo Feher-Digital Wireless Communication, Prentice Hall of India.
5. William C.Y. Le-Mobile Cellular Telecommunications, Mc-Graw Hill Interational Edition.
6. Richharia M-Satellite Communication System, Mac Millan.

## ECE704 IC TECHNOLOGY

(L: 3: T: 1)

Max.Marks:100

Min.Marks:40

**UNIT 1 : INTRODUCTION TO TECHNOLOGIES-** Semiconductor Substrate-Crystal defects, Electronic Grade Silicon, Czochralski Growth, Float Zone Growth, Characterization & evaluation of Crystals; Wafer Preparation- Silicon Shaping, Etching and Polishing, Chemical cleaning.

**UNIT 2 : DIFFUSION & ION IMPLANTATION-** Ficks diffusion Equation in One Dimension, Atomic model, Analytic Solution of Ficks Law, correction to simple theory , Diffusion in SiO<sub>2</sub> . Ion Implantation and Ion Implantation Systems Oxidation. Growth mechanism and Deal-Grove Model of oxidation, Linear and Parabolic Rate co-efficient, Structure of SiO<sub>2</sub> , Oxidation techniques and system, Oxide properties.

**UNIT 3 : CHEMICAL VAPOUR DEPOSITION AND LAYER GROWTH-** CVD for deposition of dielectric and polysilicon – a simple CVD system, Chemical equilibrium and the law of mass action, Introduction to atmospheric CVD of dielectric, low pressure CVD of dielectric and semiconductor. Epitaxy-Vapour Phase Epitaxy, Defects in Epitaxial growth, Metal Organic Chemical Vapor Deposition, Molecular beam epitaxy.

**UNIT 4 : PATTERN TRANSFER-** Introduction to photo/optical lithography, Contact/ proximity printers, Projection printers, Mask generation, photoresists. Wet etching, Plasma etching, Reaction ion etching.

**UNIT 5 : VLSI PROCESS INTEGRATION-** Junction and Oxide Isolation, LOCOS methods, Trench Isolation, SOI; Metallization, Planarization. Fundamental consideration for IC Processing, NMOS IC Technology, CMOS IC Technology, Bipolar IC Technology.

### Recommended Books:

1. S.M. Sze-VLSI Technology, Tata Mc-Graw Hill.
2. D. Nagchoudhary-principles of Microelectronic Technology, Wheeler Publishing.
3. Stephen A Campbell-The Science and Engineering of Microelectronic Fabrication, Oxford University Press.
4. Hong Xiao-Introduction to Semiconductor Manufacturing, Prentice Hall India.
5. Kang- CMOS circuit design, Tata Mc-Graw Hill.
6. Razoni-Design of CMOS Analog Integrated Circuit.

## ECE705 VLSI DESIGN

(L: 3: T: 1)

Max.Marks:100

Min.Marks:40

**UNIT 1 : INTRODUCTION TO MOS TECHNOLOGY-** Basic MOS transistors , Enhancement Mode transistor action, Depletion Mode transistor action, NMOS and CMOS fabrication.

**UNIT 2 : BASIC ELECTRICAL PROPERTIES OF MOS CIRCUITS-**  $I_{ds}$  versus  $V_{ds}$  relationship, Aspects of threshold voltage, Transistor Transconductance  $g_m$ . The nMOS inverter, Pull up to Pull-down ratio for a NMOS Inverter and CMOS Inverter ( $B_{n,p}/B_{p,n}$ ), MOS transistor circuit Model, Noise Margin.

**UNIT 3 : CMOS LOGIC CIRCUITS-** The inverter, Combinational Logic, NAND Gate NOR gate, Compound Gates, 2 input CMOS Multiplexer, Memory latches and registers, Transmission Gate, Gate delays, CMOS-Gate Transistor sizing, Power dissipation.

**UNIT 4 :** Basic physical design of simple Gates and Layout issues. Layout issues for inverter, Layout for NAND and NOR Gates, Complex Logic gates Layout, Layout optimization for performance.

**UNIT 5 :** Introduction to VHDL, Prolog & other design tools. VHDL Code for simple Logic gates, flip-flops, shift registers.

### Recommended Books:

1. Stephen Brown and Zvonlo Veranesic-Fundamentals of Digital Logic with VHDL Design, Tata Mc-Graw Hill.
2. Neil H.E. Weste, Kamran Eshraghian-Principles of CMOS VLSI Design.
3. Douglas A. Pucknell, Kamran Eshraghian-Basic VLSI Design.
4. Michael John, Sebastian Smith-Application specific Integrated Circuit.
5. Behzad Razavi-Design of Analog CMOS Integrated Circuits, Mc-Graw Hill.

## **ECE706.1 ADVANCED MICROPROCESSORS**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : 8086 ARCHITECTURE-** Hardware specifications, Pins and signals, Internal data operations and Registers, Minimum and maximum mode, System Bus Timing, Linking and execution of Programs, Assembler Directives and operators.

**UNIT 2: SOFTWARE & INSTRUCTION SET-** Assembly language programming: addressing mode and instructions of 8086, MACRO programming, 8086 interrupts.

**UNIT 3: ANALOG INTERFACING:** A/D and D/A converter interfacing, keyboard and display interfacing, RS 232 & IEEE 488 communication standards .

**UNIT 4 : DIGITAL INTERFACING:** Programmable parallel ports , Interfacing microprocessor to keyboard and alphanumeric displays, Memory interfacing and Decoding , DMA controller.

**UNIT 5 : MULTIPROCESSOR CONFIGURATIONS -** Multiuser / Multitasking operating system concepts, 8086 based Multiprocessor systems. Introduction and basic features of 286, 386, 486 & Pentium processors.

### **Recommended Books:**

1. Douglas V.Hall- Microprocessors & Interfacing: Programming and Hardware, Tata Mc-Graw Hill.
2. Yu-Cheng Liu, Glenn A.Gibson- Microprocessor systems: The 8086/8088", Prentice Hall of India.
3. A.K. ray, K.H. Bhurchand- Advanced Microprocessor and Peripherals, Tata Mc-Graw Hill.
4. Barry B. Brey- The Intel Microprocessors: Architecture, Programming & Interfacing, Pearson Education Asia.
5. Antonalces J.L- The pentium Microprocessors, Pearson.

## **ECE706.2 ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : INTRODUCTION TO AI KNOWLEDGE-** Importance of AI, Knowledge Base System Knowledge organization & manipulation, Conceptual Introduction to LISP and other AI programming Languages.

**UNIT 2 : KNOWLEDGE REPRESENTATION-** Syntax Semantics, Inference Rules, Non-deductive Inference methods, and representations using rules, forward chaining and backward chaining. Fuzzy Logic & Natural languages computations. Probabilistic Reasoning. Object Oriented Representations.

**UNIT 3 : KNOWLEDGE ORGANIZATION & MANIPULATION-** Search & control strategies, matching techniques, knowledge organization & management, Genetic Algorithms based search techniques.

**UNIT 4 : KNOWLEDGE SYSTEMS ARCHITECTURE-** Rule based, non-production, uncertainty knowledge system building tools.

**UNIT 5 : KNOWLEDGE ACQUISITION-** General concepts, learning by induction.

## **ECE706.3 OPERATING SYSTEMS**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : INTRODUCTION** – History, Operating system services, types, responsibilities, generations, LINUX, WINDOWS.

**UNIT 2 : PROCESS MANAGEMENT** - Operations on process, Process state, Scheduling, Criteria, scheduling algorithms, Evaluation, Synchronization, Semaphores, Monitors.

**UNIT 3 : MEMORY MANAGEMENT**- Swapping, Continuous memory allocation, Paging, Pure paging, Demand paging, Page-replacement algorithms, thrashing, Example-Pentium, Disk Scheduling.

**UNIT 4 : INFORMATION MANAGEMENT**- File and directory concept, Access methods, Protection, Free space management, Efficiency and performance, Access matrix, Capability-based systems, Program-threats, User authentication, Firewall.

**UNIT 5 : DEAD LOCKS**- System model, Dead lock characterization, Deadlock prevention, Avoidance, Detection, Recovery, Classic problems of synchronization.

## **ECE707 SIGNAL PROCESSING LAB-II**

**(L: 0: T: 0: P: 3)**

**Max.Marks:100**

**Min.Marks:50**

### **Modeling and simulation using MAT LAB**

1. Realising a given block diagram having multiplier, adder/subtractor and system (Discrete/Continuous) with given Impulse response. Calculating output for given input.
2. To simulate the transmitter and receiver for BPSK
3. To design and simulate FIR digital filter (LP/HP).
4. To design and simulate IIR digital filter (LP/HP).

### **DSP Lab using TMS320C6XXX DSP Kits**

5. To study the architecture of TMS320C6XXX DSP kits using Bloom with DSP.
6. To generate wave form (SINE, COSINE, SQUARE & TRIANGULAR).
7. Verification of Sampling Theorem.
8. Verification of linear/circular convolution.
9. To design FIR and IIR digital filter ( LP/HP).

## **ECE708 WIRELESS COMMUNICATION LAB**

**(L: 0: T: 0: P: 3)**

**Max.Marks:100**

**Min.Marks:50**

1. Measurement of antenna characteristics :  
Radiation Pattern on polar plots, Beam width and Gain of main lobe for the following types of antennas.
  - (a) Half wave and quarter wave dipole
  - (b) Folded dipole
  - (c) Yagi UDA multiple element folded dipole
  - (d) Hertz Antenna
  - (e) End fire array and broad side array
  - (f) Helix antenna
  - (g) Paraboloid reflector antenna
  - (h) Loop antenna
  - (i) Ground plane antenna
  - (j) Log periodic antenna
  - (k) Rhombus antenna
  - (l) Slot antenna
  
2. Demonstration of modeling of wire antenna using appropriate design software.
3. Simulation of antenna arrays using appropriate software.
4. Design and testing of microstrip rectangular patch antenna using appropriate software.
5. Investigate the transmission characteristics of the link and measure the gain of the microstrip patch antennas. Draw the antenna radiation diagram.
6. Radar Trainer: Working of Doppler radar, velocity of moving object, time and frequency measurement and other applications.
7. To perform Modulation, Demodulation and BER measurement using CDMA – DSSS Trainer.
8. To establish analog/digital communication link and transmit & receive three signals (audio, video, tone) simultaneously using Satellite Communication Trainer.
9. To study GPS Receiver, establishing link between GPS satellite & GPS trainer and measure of latitude & longitude

## ECE709 ANTENNA LAB

**L: 0: T: 0: P: 3)**

**Max.Marks:100  
Min.Marks:50**

1. To study the characteristic of the following: (a) End-fed vertical antennas.
  - (b) Altering the effective length of an antenna.
  - (c) Practical top loaded antennas.
  - (d) Directional antenna with driven elements.
  - (e) Parasitic arrays.
  - (f) Folded antenna elements
2. Study the important characteristics of antenna and experimental measure the Radiation resistance, Radiation Pattern on polar plots and calculate the Beam width and gain of main lobe and band width for the following types of antenna. (a) Half wave dipole
  - (b) Folded dipole
  - (c) Yagi UDA multiple element folded dipole
  - (d) Hertz Antenna
  - (e) End fire and broad side antenna
  - (f) Phase array antenna
  - (g) combined collinear array
  - (h) Loop antenna
  - (i) Ground plane antenna
  - (j) Log periodic antenna
  - (k) Rhombus antenna
  - (l) Slot antenna
3. Demonstration of modeling of wire antenna using appropriate design software.
4. Simulation of antenna arrays using appropriate software.
5. Design and testing of microstrip rectangular patch antenna using appropriate software.
6. (a) to construct a basic transmitter, receiver and line of sight microwave radio link using microstrip components.
  - (b) To investigate the transmission characteristics of the link and to measure the gain of the microstrip patch antennas using in the above setup. Draw the antenna radiation diagram.

## B.E VIII SEMESTER

### ECE801 COMPUTER NETWORKS

(L: 3: T: 1)

Max.Marks:100

Min.Marks:40

**UNIT 1: QUEUING THEORY-** Pure birth, Pure death & Birth-death processes, Mathematical models for M/M/1, M/M/8, M/M/m, M/M/1/K and M/M/m/m queues. Little's formula. M/G/1 Queuing model basics.

**UNIT 2: DATA LINK LAYER -** Packet & Circuit switching, OSI & TCP/IP Reference Models, Framing, Simplex protocol, Simplex stop & wait protocol, Sliding window protocol, Go back N protocol, selective repeat, HDLC, Data link layer in internet.

**UNIT 3: MEDIUM LAYER-** Static & dynamic channel allocation, Multiple Access Protocols: ALOHA, slotted ALOHA, CSMA, Token Bus, Token Ring, FDDI, IEEE standards 802.2, 802.3 Hubs, Bridges, Routers & Gateways.

**UNIT 4: NETWORK LAYER-** Network layer Design issues.

Adaptive & Non-adaptive routing algorithms, Congestion control algorithms for TCP/IP networks, Internetworking, Network layer in the Internet: IPv4 & IPv6 Protocols, OSPF and BGP. TCP Protocol architecture.

**UNIT 5: ATM NETWORKS-** Connection Oriented Networks: X.25, Frame Relay & ATM. ISDN system architecture. Broadband ISDN. ATM Protocol architecture, Recognition Algorithm in ATM Networks, Congestion control Algorithms.

#### Recommended Books:

1. Tanenbaum - Computer Networks, Pearson Education of Asia.
2. Gallager - Data Networks, Prentice Hall of India.
3. Stallings - Data & computer Communication, Pearson Education Asia.
4. Trivedi- Probability and Statistics with reliability, Queuing and Computer Science Applications, Sc. Application, Prentice hall of India
5. Forouzan- Data Communication and Networking, Tata Mc-Graw Hill.

## ECE802-RADAR & TV ENGINEERING

(L: 3: T: 1)

Max.Marks:100

Min.Marks:40

**UNIT 1 : RADAR** - Radar Block diagram, frequencies and applications. Radar range equation. Continuous wave (CW) & FM radar; Moving target indicator (MTI) : Delay line cancellers, blind velocity Pulse Doppler Radar. Tracking radar sequential lobbing, Conical scan and monopulse radar, Types of display, Radar receivers, Noise figure.

**UNIT 2 : NAVIGATIONAL AIDS** - Principle of operation of Radar direction finder & range system. LORAN system, DME, TACAN, Aircraft landing systems.

**UNIT 3 : TV ENGINEERING-** Theory of scanning standards, Principles of Monochrome and colour T.V. system (PAL, SECAM, NTSC). Composite video signal analysis.  
T.V Cameras : Image orthicon, plumbicon, vidicon. CCD camera tubes.  
Types of Monochrome and colour picture tubes, set-up adjustments. LCD and Plasma displays

**UNIT 4 :** Picture, colour and sound carriers. Vestigial side band transmission. Encoding picture information. Chrominance modulation. Compatibility of colour and monochrome T.V. systems. Block diagram of T.V. transmitters. TV transmission & reception antennas.

**UNIT 5 :TV RECEIVER:** Functional block diagram of T.V. receiver, R.F. Tuner, I.F. amplifier, Video detector, video amplifier, AGC, Synchronisation, Sync. Processing and AFC. Deflection oscillators, vertical & horizontal deflection and sound system circuits. EHT generation. Common faults and their diagnosis. Basic idea of HDTV, DBS-TV and 3D-TV.

### Recommended Books:

1. M.I.Skolnik - 'Introduction to Radar System', Mc-Graw Hill.
2. N.S. Nagaraja - 'Elements of Electronic navigation', Tata Mc-Graw hill.
3. R.R. Gulati - Monochromic and Colour Television, Wiley Eastem.
4. Dhake - television Engineering. Tata Mc-Graw Hill.

## ECE803-OPTICAL COMMUNICATION

(L: 3: T: 1)

Max.Marks:100

Min.Marks:40

**UNIT 1 : OPTICAL FIBERS** - Basic optical laws and definitions, Principles of light propagation in fibers, Ray theory, Optical fiber modes and configurations, Step index and graded index fibers, Monomode and multimode fibers, Fiber materials, fiber fabrication, Fiber optic cables. Attenuation, signal distortion in optical fibers, Dispersion-intra modal & inter modal, Dispersion shifted and flattened fiber.

**UNIT 2 : OPTICAL SOURCES** - LED's- Structure, Materials, Characteristics, Modulation, Power & efficiency, Laser Diodes - Basic concept, Hetro Structure, properties and modulation.

**UNIT 3 : OPTICAL DETECTORS** - PIN and Avalanche photo diodes, photo detector noise, detector response time, Avalanche multiplication noise. Photo diode materials. Fundamental of Optical Receiver Operation.

**UNIT 4 : OPTICAL FIBER COMMUNICATION SYSTEMS** - Source to fiber coupling, fiber to fiber joints, fiber splicing, fiber connectors. Principal components. Link design calculation, Applications, Wavelength division multiplexing.

**UNIT 5 : OPTICAL FIBER MEASUREMENTS** : Measurements of Fiber attenuation, Dispersion, refractive index profile, Numerical aperture & diameter.

### Recommended Books:

1. Gerd Keiser-Optical Fiber Communications, Tata Mc-Graw IHill.
2. J.N. Senior-Optical Fiber Communications, Prentice Hall of India.
3. J.Gowar-Optical Communications system, Prentice hall of India.
4. J.Wilson & Hawkes-Opto Electronics-An Introduction, Prentice Hall of India.
5. Joseph C. Palais-Fiber Optic Communications, LPE, Pearson Education Asia.

## **ECE804. 1 IMAGE PROCESSING AND PATTERN RECOGNITION**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1: INTRODUCTION:** Imaging in ultraviolet and visible band. Fundamental steps in image processing. Components in image processing. Image perception in eye, light and electromagnetic spectrum, Image sensing and acquisition using sensor array.

**UNIT 2: DIGITAL IMAGE FUNDAMENTALS:** Image sampling and quantization, Representing digital images, Spatial and gray-level resolution, Aliasing and Moiré patterns, Zooming and Shrinking digital images.

**UNIT 3: IMAGE RESTORATION:** Image restoration model, Noise Models, Spatial and frequency properties of noise, noise probability density functions, Noise - only spatial filter, Mean filter Statistic filter and adaptive filter, Frequency domain filters - Band reject filter, Band pass filter and Notch filter.

**UNIT 4: IMAGE COMPRESSION:** Compression Fundamentals - Coding Redundancy, Interpixel redundancy, Psycho visual redundancy and Fidelity criteria. Image Compression models, Source encoder and decoder, Channel encoder and decoder, Lossy compression and compression standards. color space formats, scaling methodologies (like horizontal, vertical up/down scaling). Display format (VGA, NTSC, PAL).

**UNIT 5: EXPERT SYSTEM AND PATTERN RECOGNITION:** Use of computers in problem solving, information representation, searching, theorem proving, and pattern matching with substitution. Methods for knowledge representation, searching, spatial, temporal and common sense reasoning, and logic and probabilistic inferencing. Applications in expert systems and robotics

### **Recommended Books:**

1. Rafael C. Gonzalez-Digital Image Processing, Pearson Education Asia.
2. Kenneth R. Castleman-Digital Image Processing, Pearson Education Asia.
3. Nick Effard-Digital Image Processing, Pearson Education Asia.
4. Jain A.K.-Digital Image Processing, Prentice hall of India.
5. Sonka, Hlavac & Boyle-Image Processing. analysis and machine Vision, Thomas Learning.

## **ECE804.2 VHDL**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : INTRODUCTION** – Fundamental & history of various hardware description language, Design flow of ASICs and standard logic circuits using software.

**UNIT 2 : COMBINATIONAL CIRCUIT BUILDING BLOCKS-** Multiplexer, Decoders, encoders, Code Converters, VHDL Code for Combinational Circuits.

**UNIT 3 : SEQUENTIAL CIRCUITS:** VHDL code for Flip-Flops, shift registers , Counters.

**UNIT 4 : SYNCHRONOUS/ ASYNCHRONOUS SEQUENTIAL CIRCUITS:** Mealy & Moore type FSMs, VHDL Code for Mealy & Moore Machines, VHDL Codes for Serial Adder, Vending Machine.

**UNIT 5 : DIGITAL SYSTEM DESIGN-** Building Block circuits, Memory organization, SRAM, Design examples of divider, Multiplier, Shifting & Sorting Operations, Clock Synchronization, CPU organization and design concepts.

### **Recommended Books:**

1. Stephen Brown and Zvonki Vranesic-Fundamentals of Digital Logic circuit VHDL Design, Tata Mc-Graw Hill.
2. Z.Navabi-Analysis and Modeling of Digital Systems, Tata Mc-Graw Hill.
3. D.L.Perry-VHDL 3rd cd., Tata Mc-Graw Hill.
4. Morris Mano-Digital Logic & Computer Design, Prentice Hall of India.

## **ECE804.3 MICROCONTROLLER AND EMBEDDED SYSTEMS**

**(L: 3: T: 1)**

**Max.Marks:100**

**Min.Marks:40**

**UNIT 1 : THE 8051 MICROCONTROLLER:** Introduction, The 8051 microcontroller hardware, I/O pins, Port, External memory, Counters and Timers, Serial data. Interrupts.

**UNIT 2 : 8051 ASSEMBLY LANGUAGE PROGRAMMING:** Addressing modes, External data moves, push and pop opcodes, Logical operations, Byte level and bit level logical operations. Arithmetic operations, Jump and call instructions, Interrupts & returns.

**UNIT 3: REAL TIME CONTROL:** Interrupts, Multiple sources of interrupts, Non maskable sources of interrupts, Interrupt structure in 8051, Timers, Free running counter & Real Time control .

**UNIT 4: SYSTEM DESIGN :** Serial I/O interface, Parallel I/O ports interface, Digital and Analog interfacing methods, LED array, keyboard, Printer, Flash memory interfacing.

**UNIT 5: INTRODUCTION TO EMBEDDED SYSTEM :** Application of Microcontrollers in interfacing, Robotics, MCU based measuring instruments. Real Time Operating System for System Design, Multitasking System, Task Definition in a Multitasking System, Round Robin Scheduling, Full Pre-emptive Scheduling, Basic study and Features of Commercial RTOS : WINCE and Embedded Linux.

### **Recommended Books:**

1. K.N. Ayala-The 8051 Microcontroller. Penram International.
2. M.A. Mazidi and J.G. Mazidi-The 8051 Microcontroller and Embedded Systems, Pearson Education Asia.
3. David simon-An Embedded software Primer. Pearson Education Asia.
4. J.W. Valvano Brooks/Cole-Embedded Microcomputer Systems Thomson LearningTM

## CE805 COMPUTER NETWORK PROGRAMMING LAB

(L: 0: T: 0: P: 3)

Max.Marks:100

Min.Marks:50

1. **PRELIMINARIES:** Study and use of common TCP/IP protocols and term viz. telnet rlogin ftp, ping, finger, Socket, Port etc.
2. **DATA STRUCTURES USED IN NETWORK PROGRAMMING:** Representation of unidirectional, Directional weighted and unweighted graphs.
3. **ALGORITHMS IN NETWORKS:** computation of shortest path for one source-one destination and one source –all destination.
4. **SIMULATION OF NETWORK PROTOCOLS:**
  - (i) Simulation of M/M/1 and M/M/1/N queues.
  - (ii) Simulation of pure and slotted ALOHA.
  - (iii) Simulation of link state routing algorithm.
5. **Case study : on LAN Training kit**
  - (i) Observe the behavior & measure the throughput of reliable data transfer protocols under various Bit error rates for following DLL layer protocols-
    - a. Stop & Wait
    - b. Sliding Window : Go-Back-N and Selective Repeat
  - (ii) Observe the behavior & measure the throughput under various network load conditions for following MAC layer Protocols
    - a. Aloha
    - b. CSMA, CSMA/CD & CSMA/CA
    - c. Token Bus & Token Ring
6. **DEVELOPMENT OF CLIENT SERVER APPLICATION:**
  - (i) Develop 'telnet' client and server which uses port other than 23.
  - (ii) Write a finger application which prints all available information for five users currently logged on and are using the network for longest duration. Print the information in ascending order of time.

## **EEC806 INDUSTRIAL ECONOMICS & MANAGEMENT**

**(L: 0: T: 0: P: 2)**

**Max.Marks:75**

**Min.Marks:38**

**UNIT 1 :** Organizational forms, Profit maximization and other objectives of industrial firms, Theory of profitability, Economies of scale.

Financing of Industries- Need and sources of finance, Role of special financial institutions, Investment criteria-NPV, IRR.

**UNIT 2 :** Approaches to industrial location analysis, Productivity analysis, Input-Output analysis, Concentration of economic power.

New Industrial Policy – Critical analysis, Role of technology and entrepreneurship in industrial development.

**UNIT 3:** Management – Principles of management, functions-planning, Organization staffing, Directing, Controlling, Coordination, Decision making.

**UNIT 4 :** Production Management – Total quality management, JIT, Quality circle, Quality-ISO9000, ISO14000, KANBAN, Bench marking, Effective communication.

**UNIT 5:** Labour Legislations.

## **ECE807 VLSI & Optical fiber LAB**

**(L: 0: T: 0: P: 3)**

**Max.Marks:75**

**Min.Marks:38**

**PART-I** Schematic design and make Device Level Layout of following circuits.

1. BJT/FET Amplifier in various configuration..
2. Counters, Shift Registers & Sequence Decoders.
3. Various circuits with Op-Amp.

**PART-II** Design of following ckt using appropriate software like VHDL/ FPGA.

4. 3-input NAND gate.
5. Half adder.
6. D-Latch.
7. Serial in-serial out shift register.

**PART-III** To perform following experiments based on Fiber Optic Trainer.

8. To set up Fiber Optic Analog link.
9. To set up fiber Optic Digital link.
10. Measurement of Propagation loss and numerical aperture.
11. Characterization of laser diode and light emitting diode.