ANURAG ENGINEERING COLLEGE,KODAD

(An Autonomous Institution)

Ananthagiri(V&M) ,Suryapet(Dt) -508 206..

****Academic Regulations - for B. Tech (Regular)

(Effective for the students admitted into I year from the Academic Year **2014-2015** onwards)

1. Award of B.Tech. Degree

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

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

ii. **Register for 200 credits and secure 200 credits**

2. Students, who fail to fulfil all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech course.

3. Courses of study

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

Branch Code	**Branch**
I.	Civil Engineering
II.	Electrical and Electronics Engineering.
III.	Mechanical Engineering.
IV.	Electronics and Communication Engineering
V.	Computer Science and Engineering.

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

4. Credits

	For I Year – I/II semester		II, III, IV years per Semester	
	Periods / Week	Credits	Periods / Week	Credits
Theory	03	03	03	03
	02	02	04	04
Practical	03	02	03	02

Drawing	03T/03D	03	03 06	02 04
Mini Project	--	--	--	02
Comprehensive Viva Voce	--	--	--	02
Seminar	--	--	6	02
Project	--	--	15	10

5. Distribution and Weightage of Marks

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

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

iii. For theory subjects, during the semester there shall be 2 midterm examinations. Each mid term examination consists of Part-A (Short Answer) for 5 marks and Part-B (subjective paper) for 15 marks with duration of 90 Minutes and one assignment carrying 5 marks.

Subjective paper shall contain 3 questions with internal choice, each question carries 5 marks. First mid term examination shall be conducted for 2.5 units of syllabus and second mid term examination shall be conducted for 2.5 units. First Assignment should be submitted before the conduct of the first mid, and the second Assignment should be submitted before the conduct of the second mid.

The total marks secured by the student in each mid term examination for 25 marks is considered and the average of the two mid term examinations shall be taken as the final marks secured by each candidate**.** If he/she is absent for any test / assignment, he/she is awarded zero marks for that test / assignment.

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

shall be conducted with one external examiner and one internal examiner. The external examiner shall be appointed from the panel of examiners as recommended by Chairman, Board of Studies in respective Branches.

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

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

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

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

ix. Out of a total of 200 marks for the project work, 50 marks shall be for Internal Evaluation and 150 marks for the End Semester Examination. The End Semester Examination (viva-voce) shall be conducted by the committee. The committee consists of an external examiner, head of the department, the

supervisor of project and a senior faculty member of the department. The topics for industry oriented mini project, seminar and project work shall be different from each other. The evaluation of project work shall be conducted at the end of the IV year. The internal evaluation shall be on the basis of two seminars given by each student on the topic of his project**.**

6. Attendance Requirements:

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

ii. Condonation of shortage of attendance in aggregate up to 10% (on genuine medical grounds) in each semester may be granted by the College Academic Council on the basis of recommendation by the principal.

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

iv. Students falling short of attendance as specified above will be detained.

v. A student will not be promoted to the next semester unless he satisfies the attendance requirement of the present semester. They may seek re-admission for that semester when offered next.

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

vii. A stipulated fee decided by the Academic Council shall be payable towards condonation of shortage of attendance.

7. Minimum Academic Requirements:

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

i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical design or drawing subject or project if he secures not less than 35% of marks

in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together.

ii. A student shall be promoted from II to III year only if he fulfils the academic requirement of

Rule (I): 30 credits (out of 75 credits) secured from all the exams (both regular and supplementary) conducted up to end of II year, excluding the performance in II – B.Tech – II – Semester examination.

(OR)

Rule (II): 40 credits (out of 100 credits) secured from all the exams (both regular and supplementary) conducted up to end of II year, including the performance in II – B.Tech – II – Semester examination.

iii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of

Rule (I): Total **50 c**redits (out of 125 credits) secured from all the exams (both regular and supplementary) conducted up to end of III year, excluding the performance in III – B.Tech – II – Semester examination.

(OR)

Rule (II): 60 credits (out of 150 credits) secured from all the exams (both regular and supplementary) conducted up to end of III year, including the performance in III – B.Tech – II – Semester examination.

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

v. Students who fail to earn 200 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

8. Course pattern:

i. The entire course of study is of four academic years. All years shall be on semester pattern.

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

iii. When a student is detained due to lack of credits / shortage of attendance he may be re-admitted when the semester is offered after fulfilment of academic regulations.

9. Award of Class:

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

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

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

10. Minimum Instruction Days:

For each semester there shall be 90 clear instruction days.

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

12. General:

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

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

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

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

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

(Effective for the students getting admitted into II year from the Academic Year 2015-2016 and onwards)

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

Register for **150** credits and secure **150** credits.

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

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

4. Promotion Rule:

A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of

Rule (I) : 30 Credits (out of 75 credits) secured from all the exams (both regular and supplementary) conducted upto end of 3rd year, excluding the performance in III-B.Tech-II-Sem Exam.

OR

Rule (II) : 40 Credits (out of 100 credits) secured from all the exams (both regular and supplementary) conducted upto end of 3rd year, including the performance in III-B.Tech-II-Sem Exam.

5. Award of Class:

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

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

Pass Class	Below 50% but not less than 40%	

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

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

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

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

		be cancelled.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all END examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all END examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already

	organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all END examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester. The candidate is also debarred and forfeits the seat.

9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the PRINCIPAL/DIRECTOR for further action to award suitable punishment.	

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE STRUCTURE (R14) & SYLLABUS

I B.Tech (ECE) I Semester

S.No.	Course Code	Course	Lectures	T / P / D	Credits	Internal Marks	External Marks	Total Marks
1	A51001	English-I	2	0	2	25	75	100
2	A51002	Mathematics - I	3	1	3	25	75	100
3	A51003	Engineering Physics-I	3	0	3	25	75	100
4	A51005	Computer Programming – I	3	1	3	25	75	100
5	A51008	Electrical Circuits	3	1	3	25	75	100
6	A51009	Engineering Graphics	3	3	3	25	75	100
7	A51213	English Language Communication Skills Lab-I	0	3	2	25	50	100
8	A51214	Computer Programming – I Lab	0	3	2	25	50	100
9	A51215	Engineering Physic Lab	0	3	2	25	50	100
10	A51216	Engineering Workshop	0	3	2	25	50	100
Total			17	18	25	250	650	1000

T – Tutorial P – Practical D – Drawing

I B.Tech (ECE) II Semester

S.No.	Course Code	Course	Lectures	T / P / D	Credits	Internal Marks	External Marks	Total Marks
1	A52001	English-II	2	0	2	25	75	100
2	A52002	Mathematics - II	3	1	3	25	75	100
3	A52003	Engineering Physics-II	3	0	3	25	75	100
4	A52008	Mathematics - III	3	1	3	25	75	100
5	A52009	Engineering Chemistry	3	1	3	25	75	100
6	A52010	Electronic Devices and Circuits	3	1	3	25	75	100
7	A52213	English Language Communication Skills Lab-I	0	3	2	25	50	75
8	A52214	Electronic Devices and Circuits Lab	0	3	2	25	50	75
9	A52215	Engineering Chemistry Lab	0	3	2	25	50	75
10	A52216	IT Work shop	0	3	2	25	50	75
Total			17	16	25	250	650	900

T – Tutorial P – Practical D – Drawing

II B.Tech (ECE) I Semester

S.No.	Course Code	Course	Lectures	T / P / D	Credits	Internal Marks	External Marks	Total Marks
1	A53007	Mathematics –IV	4		3	25	75	100
2	A53016	Switching Theory and Logic Design	4		4	25	75	100
3	A53003	Environmental Studies	4		3	25	75	100
4	A53017	Electronic Circuit Analysis	4		4	25	75	100
5	A53018	Probability Theory & Stochastic Process	4		3	25	75	100
6	A53019	Computer Programming-II	4		4	25	75	100
7	A53207	Electronic Circuits Analysis Lab	-	3	2	25	50	75
8	A53208	Computer Programming-II Lab	-	3	2	25	50	75
Total			24	18	25	200	550	750

T – Tutorial P – Practical D – Drawing

II B.Tech (ECE) II Semester

S.No.	Course Code	Course	Lectures	T / P / D	Credits	Internal Marks	External Marks	Total Marks
1	A54017	Structured Digital System Design	4		4	25	75	100
2	A54018	Principles of Electrical Engineering	4		4	25	75	100
3	A54019	Pulse and Digital Circuits	4		4	25	75	100
4	A54020	Electromagnetic Theory and Transmission Lines	4		3	25	75	100
5	A54021	Signals and Systems	4		4	25	75	100
6	A54207	Pulse Digital Circuits Lab		3	2	25	50	75
7	A54208	Basic Simulation Lab		3	2	25	50	75
8	A54209	Principles of Electrical Engineering Lab		3	2	25	50	75
		Gender Sensitization		3		25	50	75
Total			17	18	25	225	575	800

T – Tutorial P – Practical D – Drawing

III B.Tech (ECE) I Semester

S.No.	Course Code	Course	Lectures	T / P / D	Credits	Internal Marks	External Marks	Total Marks
1	A55018	Antenna & Wave Propagation	4	1	4	25	75	100
2	A55019	Analog Communications	4	-	4	25	75	100
3	A55007	IC Applications	4	-	4	25	75	100
4	A55020	Electronic Measurements & Instrumentation	3	1	3	25	75	100
5	A55021	Computer Organization	3	1	3	25	75	100
6	A55022	Control Systems Engineering	3	-	3	25	75	100
7	A55207	IC Applications Lab	-	3	2	25	50	75
8	A55208	Analog Communications Lab	-	3	2	25	50	75
Total			21	9	25	200	550	750

T – Tutorial P – Practical D – Drawing

III B.Tech (ECE) II Semester

S.No.	Course Code	Course	Lectures	T / P / D	Credits	Internal Marks	External Marks	Total Marks
1	A56025	Microprocessors & Microcontrollers	4	-	4	25	75	100
2	A56026	Managerial Economics And Financial Analysis	4	1	4	25	75	100
3	A56027	Digital Signal Processing	4	1	4	25	75	100
4	A56028	Digital Communications	4	-	4	25	75	100
5		Open Elective	3	1	3	25	75	100
6	A56029	1. Object Oriented Programming through JAVA						
	A56023	2.Nanotechnology						
	A56030	3. Industrial Electronics						
7	A56207	Microprocessors & Microcontrollers Lab	-	3	2	25	50	75
8	A56208	Digital Signal Processing Lab	-	3	2	25	50	75
9	A56209	Advanced English Language Communication Skills Lab	-	3	2	25	50	75
	Total		19	12	25	200	525	800

T – Tutorial P – Practical D – Drawing

IV B.Tech (ECE) I Semester

S.No.	Course Code	Course	Lectures	T / P / D	Credits	Internal Marks	External Marks	Total Marks
1	A57029	Microwave Engineering	3	1	3	25	75	100
2	A57030	Management Science	3	1	3	25	75	100
3	A57014	VLSI Design	3	1	3	25	75	100
4	A57031	Computer Networks	3	1	3	25	75	100
5		Elective-I	3	-	3	25	75	100
	A57032	1. DSP Processors & Architectures						
	A57033	2.Optical Communications						
	A57034	3.Digital Image Processing						
6		Elective –II	3	-	3	25	75	100
	A57018	1. Neural networks & Fuzzy logic						
	A57035	2.Satellite Communications						
	A57036	3.Telecommunication switching Systems						
7	A57210	Microwave Engineering and Digital Communication Lab		3	2	25	50	75
8	A57211	e-CAD & VLSI Lab		3	2	25	50	75
9	A57212	Industry oriented mini project			2		50	50
	TOTAL		18	10	24	200	600	800

IV B.Tech (ECE) II Semester

S.No.	Course Code	Course	Lectures	T / P / D	Credits	Internal Marks	External Marks	Total Marks
1	A58210	Seminar		6	2	50		50
2	A58211	Major Project		15	13	50	150	200
3		Elective –III	3	-	3	25	75	100
	A58022	1.Cellular & Mobile						
	A58023	2.Biomedical signal processing						
	A58024	3.Embedded systems						
4		Elective-IV	3	-	3	25	75	100
	A58025	1.Radar Systems						
	A58026	2.RF System Design						
	A58027	3.Cyber Security						
5		Elective-V	3	-	3	25	75	100
	A58028	1. Wireless Communications & Networks						
	A58029	2.Mixed IC Design						
	A58030	3.DBMS						
6	A58212	Comprehensive Viva		2	2	-	100	100
	TOTAL		9	23	26	175	475	650

T – Tutorial P – Practical D – Drawing

ANURAG ENGINEERING COLLEGE,KODAD

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

MATHEMATICS-I

(Calculus and Matrices)

Course Objectives:

1. Able to know the Mean value theorems and determine the maxima and minima for function of several variables.
2. Concepts of matrix algebra, methods of solving system of linear equations.
3. Determine eigen values and eigen vectors of a matrix, cayeley hamilton theorem and inverse by cayley Hamilton theorem
4. Develop a strategy for finding a solution of given arbitrary differential equation, using different methods.
5. Understand the sol of higher order differential equations, application of ODE in Bending of beams, electrical circuits and simple harmonic motion.

UNIT-I: Functions of Single Variable and Functions of several variables

Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – Generalized Mean Value theorem (all theorems without proof) – Geometrical interpretation of Mean value theorems. Functions of several variables – Partial Differentiation and total differentiation - Functional dependence-Jacobian Determinent- Maxima and Minima of functions of two variables with constraints and without constraints.

UNIT-II: Matrices and Linear System of Equations

Matrices and Linear systems of equations: Real matrices – Symmetric, skew - symmetric, orthogonal, Linear Transformation – Orthogonal Transformation. Complex matrices: Hermitian, Skew – Hermitian and Unitary. Elementary row transformations-Rank-Echelon form, Normal form – Solution of Linear Systems – Direct Methods (Gauss Elimination, Gauss Jordan).

UNIT-III: Eigen Values and Eigen Vectors

Eigen values, Eigen vectors – properties, Cayley-Hamilton Theorem (without Proof) - Inverse and powers of a matrix by Cayley-Hamilton theorem – Diagonolization of matrix.

UNIT-IV: Differential Equations of first order and their Applications

Differential equations of first order and first degree: exact, linear and Bernoulli, Applications to Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

UNIT-V: Higher Order Linear Differential Equations and their Applications Linear differential equations of second and higher order with constant coefficients, RHS term of the type f(X) $= e^{ax}, \sin ax, \cos ax \; and \; x^k, e^{ax}V(x), x^kV(x)$. Method of variation of parameters. Applications - Bending of beams, Electrical circuits, simple harmonic motion.

Course Outcomes:

1. Understand Rolle's and the Mean value theorems and to verify the Mean value theorems
2. Apply partial derivatives to study maxima and minima of functions of two variables
3. Define rank and elementary transformations of a matrix.
4. Discuss Non homogeneous and homogeneous system of equations.
5. Compute eigen values and corresponding eigen vectors of a square matrix.
6. Specify standard methods for solving differential equations and their applications in geometrical and physical problems.
7. Identify different types of higher order differential equations and their applications in engineering problem solving.

TEXT BOOKS:

1. Grewal B.S (2007), Higher Engineering Mathematics, 40th Edition, New Delhi, Khanna Publishers.
2. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Engineering Mathematics Vol - I, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
3. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Mathematical Methods, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
4. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley.

REFERENCE BOOKS:

1. Jain R. K., and Iyengar S. R. K (2008), Advanced Engineering Mathematics, 3rd Edition, New Delhi, Narosa Publication House.
2. Shahanaz Bathul (2007), Engineering Mathematics-I, 3rd Edition, Hyderabad, Right Publishers.
3. Ramana B.V (2010), Engineering Mathematics, New Delhi, Tata McGraw Hill Publishing Co. Limited
4. Mathematical Methods: S.R.K. Iyengar and R.K. Jain, Narosa Publishing House. Mathematical Methods of Science and Engineering (Aided with Matlab) Kanti B.Datta (2012), Seventh Edition, CENGAGE Learning.

ANURAG ENGINEERING COLLEGE,KODAD
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I Year B.Tech. ECE – I Sem	L	T/P/D	C
	2	-/-/-	2

ENGLISH-I

1. INTRODUCTION:

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

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc. The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. *However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.*

2. OBJECTIVES:

a. To improve the language proficiency of the students in English with emphasis on LSRW skills.

b. To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.

c. To develop the study skills and communication skills in formal and informal situations.

LEARNING OUTCOMES:

1. Usage of English Language, written and spoken.

2. Enrichment of comprehension and fluency

3. Gaining confidence in using language in verbal situations.

SYLLABUS:

Listening Skills:

Objectives

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation

2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

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

• Listening for general content

• Listening to fill up information

• Intensive listening

• Listening for specific information

Speaking Skills:

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.

2. To enable students to express themselves fluently and appropriately in social and professional contexts.

• Oral practice

• Describing objects/situations/people

• Role play – Individual/Group activities (Using exercises from the five units of the prescribed text: ***Skills Annexe - Functional English for Success)***

• Just A Minute(JAM) Sessions.

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.

2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.

• Skimming the text

• Understanding the gist of an argument

• Identifying the topic sentence

• Inferring lexical and contextual meaning

• Understanding discourse features

• Scanning

• Recognizing coherence/sequencing of sentences

NOTE: *The students will be trained in reading skills using the prescribed text for detailed study.*

They will be examined in reading and answering questions using 'unseen' passages which may be taken fromauthentic texts, such as magazines/newspaper articles.

Writing Skills :

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill

2. To equip them with the components of different forms of writing, beginning with the lower order ones.

• Writing sentences

• Use of appropriate vocabulary

• Paragraph writing

• Coherence and cohesiveness

• Narration / description

• Note Making

• Formal and informal letter writing

• Describing graphs using expressions of comparison

TEXTBOOKS PRESCRIBED:

For Detailed study:

First Textbook: ***"Skills Annexe -Functional English for Success***", Published by Orient Black Swan, Hyderabad

For Non-detailed study:

Second text book ***"Epitome of Wisdom",*** Published by Maruthi Publications, Guntur

UNIT –I

Chapter 1: **'Wit and Humour'** from 'Skills Annexe' -Functional English for Success, Published by Orient Black Swan, Hyderabad

2 hrs

L-Listening For Sounds, Stress and Intonation 1

S-Greeting and Taking Leave, Introducing Oneself and Others (Formal and Informal Situations) 1

R- Reading for Subject/ Theme 1

W- Writing Paragraphs 1

UNIT –II

Chapter 2:**'Mokshagundam Visvesvaraya'** from "Epitome of Wisdom", Published by Maruthi Publications, Hyderabad.

3 hrs

G-Types of Nouns and Pronouns 1

V- Homonyms, homophones synonyms, antonyms 2

UNIT-III

Chapter 3: **"Cyber Age"** from "Skills Annexe -Functional English for Success" Published by Orient Black Swan, Hyderabad.

2 hrs

L – Listening for themes and facts 1

S – Apologizing, interrupting, requesting and making polite conversation 1

R- For theme and gist 1

W- Describing People, Places, Objects, Events 1

UNIT-IV

Chapter 4:**'Three Days To See'** from "Epitome of Wisdom", Published by Maruthi

Publications, Hyderabad 2 hrs

G- Verb forms
2

V- noun, verb, adjective and adverb
2

UNIT-V

Chapter 5**'Risk Management'** from "Skills Annexe -Functional English for Success" Published by Orient Black Swan, Hyderabad
2 hrs

L – for main points and sub-points for note taking
1

S – giving instructions and directions; Speaking of hypothetical situations
1

R – reading for details
1

W – note-making, information transfer, punctuation
1

REFERENCES :

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi.2010.

2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.

3. English Grammar Practice, Raj N Bakshi, Orient Longman.

4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.

5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao**,** P Sreehari, Published by Pearson

6. Handbook of English Grammar& Usage, Mark Lester and Larry Beason, Tata Mc Graw – Hill.

7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.

8. Technical Communication, Meenakshi Raman, Oxford University Press

9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education

10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.

11. Murphy's English Grammar with CD, Murphy, Cambridge University Press.

12. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt Ltd.,

13. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.

14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education

15. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw –Hill.

16. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO

17. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education

18. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,

19. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers

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ENGINEERING PHYSICS – I

Course objectives:

1. Emphasize the study of interference, diffraction and create an ability to design and conduct experiments like diffraction grating.
2. To impart the knowledge of mathematics and science to determine the crystal structures of various systems.
3. Having knowledge of classical and quantum statistics of distribution, the study of behavior of particles in large number is possible.
4. Impart the importance of magnetic materials and super conductors and their applications.
5. To enable the students to know about the influence of electric field on dielectric materials and thereby solve the problems relating the topic.

UNIT- I

Interference And Diffraction: 10

Superposition principle, resultant amplitude, coherence, methods to obtain coherent sources, interference, Young's double slit experiment (Qualitative), interference in thin films by reflection, Newton's rings Experiment, Distinction between Fraunhofer and Fresnel diffraction, Diffraction at single slit, Diffraction grating (Qualitative), Introduction to polarization, Brewster's law and Double refraction.

UNIT - II

Crystal Structures: 05

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

Directions, Planes And X-Rd: 05

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

UNIT - III

Elements Of Statistical Mechanics: 08

Introduction, Phase space, Definition of Ensembles, Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics – Photon gas –Planck's law of black body radiation – Deduction of Wien's law and Rayleigh-Jeans law from Plank's law.

UNIT – IV

Magnetic Properties : 08

Introduction – Basic definitions - Origin of magnetic moment, Bohr magneton – Classification of magnetic materials (Dia, Para and Ferro)- Domain theory of

ferromagnetism, Hysteresis curve – Soft and Hard magnetic materials – properties of Anti ferro and Ferri magnetic materials .
Superconductivity: Introduction, Meissner effect – Critical fields, Type I and Type II superconductors-Applications of super conductors.

UNIT - V

Dielectric Properties: 09

Electric dipole, Dipole moment, Dielectric constant – Parallel plate Capacitor, Electronic, Ionic and Orientation Polarization – Calculation of Polarizibilities – Internal fields – Claussius – Mossotti equation – Basic concepts of Piezo, Pyro and Ferro electricity.

Course Outcomes:

1. Finally the students may be familiar with the topics of crystals, dielectrics, optics etc… which will be useful in various branches of technology.
2. There will be a chance for them use the subject as a mathematical tool to solve their real life problems.

TEXT BOOKS:

1. Engineering Physics by P K palanisamy :Scietech publication
2. Solid State Physics by M Armugam; Anuradha Publications

REFERENCE BOOKS:

1. Introduction to Solid State Physics by Charles Kittel : John Wiley & Sons
2. Engineering Physics by R.K.Gaur and S.L.Gupta; Dhanpat Rai and Sons
3. Engineering Physics by V Rajendran; McGraw hill education private ltd.
4. A Text book of Engineering Physics by M N Avadhanulu, P G Kshirsagar; S Chand
5. Engineering Physics by K Malik, A K Singh; Tata Mc Graw hill book publishers
6. Engineering Physics by M.R.Srinivasan, New Age Publishers

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ELECTRICAL CIRCUITS

Course Objective:

This course introduces the basic concept of circuit analysis which is the fundamental for all subjects of the Electrical engineering discipline. The emphasis of this course if laid on the basic analysis of circuit which includes single phase circuits, magnetic circuits and theorems.

UNIT-I: Introduction to Electrical Circuits:

Circuit concept, R-L-C parameters, voltage and current sources, dependent and independent sources, source transformations, relationship for passive elements for different input signals (square, ramp, saw- tooth, triangular).

KCL, KVL, network reduction technique, series, parallel, series-parallel, Star-Delta, Delta-Star transformations. Nodal analysis, Mesh analysis - super node and super mesh for DC excitations.

UNIT-II: Magnetic circuits:

Magnetic circuits, Faraday's laws of electro magnetic induction - concept of self and mutual inductance. Dot convention, coefficient of coupling, composite magnetic circuits, analysis of series and parallel magnetic circuits.

UNIT-III: Single Phase AC Circuits:

R.M.S, average values and form factor for different periodic wave forms – steady state analysis of R,L,C (in different combination) with sinusoidal excitation - concept of reactance, impedance, susceptance and admittance. Phase and phase difference, concept of power factor, real and reactive power, J – notation , complex and polar forms of representation, complex power.

UNIT-IV: Locus diagram and Resonance:

Locus diagram: Series R-L, R-C, R-L-C and parallel combination with variation of various parameters. **Resonance**: Series, parallel circuits, concept of bandwidth and Q-factor.

UNIT –V: Network Theorems(with A.C and D.C Excitations): Super position, Norton's, Reciprocity, Thevenin's, Maximum power transfer, Milliman's, and compensation theorems. Problems on all above theorems.

Course Outcomes:

1. To develop a basic concepts of electrical components, energy sources, their various types of connections and solutions of D.C circuits.
2. To develop a basic concepts of magnetic circuits, Faraday's Laws and analysis of series and parallel magnetic circuits.
3. To develop a basic concept of different periodic wave forms, complex power, J-notation.
4. To develop a basic concepts of various types of connections of R-L, R-C,R-L-C and their solutions, concept of resonance of A.C circuits.
5. To develop a solutions of various complex circuit connections by using different theorems of D.C & A.C excitations.

TEXT BOOKS:

1. Engineering circuits analysis by William Hayt and Jack E. Kemmerly, McGraw Hill company, 6^{th} edition.
2. Network Analysis by A. sudhakar and Shyammohan S Palli, Tata McGraw-Hill.
3. Electrical circuits by A. Chakrabarthy, Dhanpat Rai & Sons.

REFERENCE BOOKS:

1. Network Analysis by M.E Van Valkenberg.
2. Linear circuits analysis(time domain, phasor and laplace transform approaches) Second edition by Raymond A. Decarlo and Penmin-Lin, Oxford University Press. Second edition, 2004.
3. Electrical circuits theory by K. Rajeswaran, Pearson Education, 2004.
4. Basic circuits analysis by D.R.Cunningham & J.A. Stuller, Jaico publications.

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COMPUTER PROGRAMMING - I

Course Objectives:

1. To explain representation of numbers, alphabets and other characters in computer system
2. To understand the basic concepts in C Programming Language
3. To explain software development tools like algorithm, pseudo codes and programming structure.
4. To explain selection and repetition statements in 'C' Language
5. To explain arrays to solve problems
6. To explain strings and string operations
7. To learn how to write modular programming in 'C' Language.

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, operating system functions, language processor concepts.

Overview of C Language : Program structure and simple programs using scanf and printf functions.

Data representations- Binary, octal, hexa number systems, ASCII and EBCDIC, data types, Identifiers, Variables, Constants, declarations.

UNIT - II

Operators, Expressions, Precedence and Associativity, evaluation of expressions, sample programs using expressions, Type conversions, unformatted I/O.

Algorithms- control structure – grouping, selectors, repetitions.

Step wise refinement, flowchart.

UNIT – III

Statements- Selection Statements – if and switch statements, algorithm and program example using selectors.

Repetition statements (loops)-while, for, do-while statements, algorithm development using repetition and programs using repetition, break, continue, goto, exit, Simple C Program examples.

UNIT - IV

Arrays – Introduction, declaration, reading and printing arrays , programs using arrays, two – dimensional arrays, Multidimensional arrays, C program examples.

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

UNIT – V

Functions- procedural abstraction, function declarations, function calls and parameter passing, Standard functions, Storage classes- recursion- recursive functions, example C programs.

Course Outcomes:

Upon completion of this course the students will have an:

1. Ability to design algorithmic solutions to problem
2. Ability to convert algorithms to C-Programs
3. Ability to write, compile and debug programs in C Language
4. Ability to write Programs using selection and repetition statements
5. Ability to write programs using Arrays and Strings
6. Ability to design structured programming.

TEXT BOOKS:

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

2. Programming in C. P. Dey and M Ghosh , Oxford University Press.

REFERENCE BOOKS:

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.

2. C for All, S. Thamarai Selvi, R.Murugesan, Anuradha Publications.

3. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition, Pearson education.

4. Programming in C, Ajay Mittal, Pearson.

5. Programming with C, B.Gottfried, 3rd edition, Schaum's outlines, TMH.

6. Problem solving with C, M.T.Somasekhara, PHI

7. Programming with C, R.S.Bickar, Universities Press.

8. Computer Programming & Data Structures, E.Balagurusamy, 4th edition, TMH.

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ENGINEERING GRAPHICS

Course Objectives:

1. To visualize and communicate geometrical elements like Polygons,Curves,Conic Sections, Cycloids and Involutes
2. To understand the fundamentals of geometry like Orthographic Projections and its applications in design and manufacturing of various engineering components.
3. To understand the fundamentals of geometry like Principles involved in Planes and Solids and its applications in design and manufacturing of various engineering components.
4. To understand the fundamentals of geometry like Isometric Projections and its applications in design and manufacturing of various engineering components.
5. To understand the fundamentals of geometry like Conversion of Orthographic Views to Isometric Views and its applications in design and manufacturing of various engineering components.

UNIT – I

Introduction to Engineering Drawing: Drawing Instruments and their uses, types of lines, use of pencils, Lettering, Rules of dimensioning.
Construction of polygons: Inscription and superscription of polygons given the diameter of circle.
Curves used in Engineering Practice and their Constructions:
Conic Sections: Ellipse, Parabola, Hyperbola including the Rectangular Hyperbola - General method only.
Cycloidal curves - Cycloid, Epicycloid and Hypocycloid
Involutes

UNIT – II

Drawing of Projections or Views (Orthographic Projection in First Angle Projection Only): Principles of Orthographic Projections – Conventions – First and Third Angle Projections, Projection of Points, Projection of Lines - inclined to both planes, True lengths. (Mid points & Traces are eliminated).

UNIT – III

Projections of Planes: Projections of regular Planes – Inclined to both planes.
Projections of Solids: Projections of Regular Solids – Regular Polyhedra, solids of revolution, Axis inclined to both planes – Change of position.

UNIT –IV

Isometric Projections/views: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines.

UNIT –V

Conversion of Orthographic Views to Isometric Views of simple objects.
Transformation of Projections: Conversion of isometric views to orthographic views of simple objects.

Course Outcomes:

1. To Know the importance of Engineering Graphics and to represent the various Polygons,Curves,Conic Sections, Cycloids and Involutes used in Engineering Graphics.
2. To Draw and understand the Principles involved in Orthographic Projections and to represent the Principles involved in Points, Lines and Traces.
3. To Draw and understand the construction Principles involved in Planes and Solids.
4. To Draw and understand the construction Principles involved in Isometric Projections.
5. To Draw and understand about Conversion of Orthographic Views to Isometric Views and also represent it's Transformation of Projections.

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhatt / Charotar publishers
2. Engineering Drawing, K.L.Narayana and Kannaiah / Scietech publishers.

REFERENCES:

1. Engineering Drawing, K.Venugopal/G.Sreekanjana, New Age International Publishers.

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ENGLISH LANGUAGE COMMUNICATION SKILLS LAB-I

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

Objectives

To facilitate computer-aided multi-media instruction enabling individualized and independent language learning

1. To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm
2. To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
3. To improve the fluency in spoken English and neutralize mother tongue influence
4. To train students to use language appropriately for interviews, group discussion and public speaking

Learning Outcomes:

1. Better Understanding of nuances of language through audio- visual experience and group activities

2. Neutralization of accent for intelligibility

3. Speaking with clarity and confidence thereby enhancing employability skills of the Students

Syllabus: English Language Communication Skills Lab shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

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

Exercise-I

CALL Lab: Introduction to Phonetics
Speech Sounds
Vowels and Consonants

Exercise-II

ICS Lab: Ice-Breaking activity and JAM session

Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

Exercise-III

CALL Lab: Structure of Syllables

Past Tense Marker and Plural Marker

Weak Forms and Strong Forms

Consonant Clusters.

Exercise-IV

ICS Lab: Situational Dialogues -Role-Play- Self-introduction and introducing others- Greetings- Apologies- Requests.

Exercise-V

ICS Lab: Social and Professional Etiquette and Telephone Etiquette-Tenses-Non-Verbal Communications.

Minimum Requirement of infra structural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):

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

i) P – IV Processor

a) Speed – 2.8 GHZ

b) RAM – 512 MB Minimum

c) Hard Disk – 80 GB

ii) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab :

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

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

1. Suresh Kumar, E. & Sreehari, P. 2009. A Handbook for English Language Laboratories.New Delhi: Foundation

2. **Strengthen Your Steps -** Dr. M. Hari Prasad and others, Maruthi Publications

3. Speaking English Effectively 2nd Edition by Krishna Mohan and N. P. Singh, 2011.Macmillan Publishers India Ltd. Delhi.

4. Kumar, V & Dhamija, P.V. How to Prepare for Group Discussion and Interviews. Tata McGraw Hill

5. Hancock, M. 2009. English Pronunciation in Use. Intermediate. Cambridge: CUP

6. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison.2013. Orient Blackswan. Hyderabad.

7. Hewings, M. 2009. English Pronunciation in Use. Advanced. Cambridge: CUP

8. Marks, J. 2009. English Pronunciation in Use. Elementary. Cambridge: CUP

9. Nambiar, K.C. 2011. Speaking Accurately. A Course in International Communication.New Delhi : Foundation

10. Soundararaj, Francis. 2012. Basics of Communication in English. New Delhi: Macmillan

11. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.

12. **English Pronouncing Dictionary** Daniel Jones Current Edition with CD.

13. **A textbook of English Phonetics for Indian Students** by T. Balasubramanian

(Macmillan)

14. **Lab Manual:** A Manual entitled "**English Language Communication Skills (ELCS)**

Lab Manual- cum- Work Book", published by Cengage Learning India Pvt. Ltd, New Delhi. 2013

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COMPUTER PROGRAMMING – I LAB

Course Objectives:

1. To make the student learn Linux commands
2. To make the student learn a programming language
3. To teach the student to write programs in C to solve the problems
4. To make the student to write the programs using control statements
5. To make the student to use arrays for solving the problems
6. To make the student to write modular programming

Week 1:

1. Familiarity with Linux Commands – Login, Wild Chars, ls, cp, mv, mkdir, wc, chdir.
2. Creation of text files using vi editor.

Week 2:

Using vi editor – perform operations of pattern search, insertion, deletion and substitution operations

Week 3:

Write simple programs using scanf and printf functions and familiarity with format strings.

Week 4 & 5:

Write programs to illustrate the Assignment Operators

Week 6:

Write programs to illustrate the Logical Operators

Week 7:

Write programs to illustrate the Relational Operators

Week 8:

Write programs using If Statement

Week 9:

Write programs using while, do-while loops

Week 10:

Write programs using for loop

Week 11:

Write programs to illustrate one dimensional arrays

Week 12:

Write programs to illustrate two dimensional arrays

Week 13:

Write programs to illustrate String concepts.

Week 14:

Write programs using functions

Week 15:

Review

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ENGINEERING PHYSICS LAB

1. Diffraction Grating with sodium vapor lamp
2. Single Slit with laser source
3. Newton's Rings
4. Energy gap of a semiconductor material
5. Torsional Pendulum Expt. to determine the rigidity modulus of material of a wire
6. Seebeck Effect
7. Decay of charge - R C circuit and time constant
8. L C R Series circuits
9. Dispersive Power of the material of a Prism using Spectrometer
10. Stewart & Gee's experiment
11. LED Characteristics
12. Numerical Aperture of an Optical Fibre & Bending losses of an Optical Fibre
13. Diffraction Grating with laser source

References:

1. Fundamentals of physics – D Halliday, R Resnick& John wiley.
2. Optics – A Ghatak Tata Mcgrawhill.
3. Practical Physics – G.L Squires.

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

ENGINEERING WORKSHOP

Course Objectives:

To impart the knowledge regarding the various techniques, skills and tools necessary for engineering workshop practice.

1. To provide the students with hands on experience on different trades of engineering workshop like carpentry, tin-smithy, fitting, welding and house wiring.
2. To learn about the machines in view of constructions details, different operations to be performed on the machines and different tools.
3. To enhance the practical approach towards machine tools.
4. To introduce the concepts of power tools in constructions , wood working, electrical engineering and mechanical engineering in manufacturing applications

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-smithy and development of jobs carried out and soldering.
4. House-wiring
5. Welding

2. TRADES FOR DEMONSTRATION&EXPOSURE:

1. Plumbing
2. Machine shop
3. Power tools in construction, wood working, electrical engineering and mechanical engineering.

Course Outcomes:

1. To make a lap joint.
2. To make a dovetail- joint.
3. To make a T-briddle joint.
4. To prepare a flat filing.
5. To prepare a step cutting.
6. To prepare a angular cutting.
7. To prepare a open scoop.

8. To prepare a rectangular tray.
9. To prepare a square tin.
10. To understand and to give the connections for one light point control by one single pole switch.
11. To understand and to give the connections for one light point control by two-two way switchs (parallel connections).
12. To understand and to give the connections for to-connect a electrical bell by using bell- push.
13. To understand and to give the connections for two light point controlled by one single pole switch.
14. To prepair a pipe joint,tap and pressing- connections by using pluming.
15. To apply different operations to be performed on the lathe machines.
16. To prepare a switch boards, wood drilling and threading different various sizes.

TEXT BOOKS:

1. Work shop manual - P.Kannaiah/K.L Narayana/scitech publishers.
2. Workshop manual by Venkat Reddy

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MATHEMATICS – II
(Mathematical Techniques)

Course Objectives:

1. To introduce some special functions like Gamma, Beta and learn how to evaluate definite integrals with the help of special functions.
2. Able to know the Laplace , Inverse Laplace transform and sol of ODE by using Laplace transforms
3. Evaluate the multiple integrals and analyze the DEL properties.
4. Apply the theorems by using line, surface and volume integrals
5. Determine the Fourier coefficients of a given function. Analyze the characteristics and properties of Fourier transforms

UNIT-I: Laplace transform and its applications to Ordinary differential equations

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

UNIT-II: Gamma and Beta Functions:

Gamma and Beta Functions-Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions.

UNIT – III: Multiple Integrals

Multiple integrals - double and triple integrals – change of order of integration-change of variables. Gradient- Divergence- Curl and their related properties - Potential function - Laplacian and second order operators.

UNIT-IV: Vector Calculus

Line integral – work done —- Surface integrals - Flux of a vector valued function. Vector integrals theorems: Green's – Stoke's and Gauss's Divergence Theorems (Only Statements & their Verifications).

UNIT-V: Fourier series

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

Course Outcomes:

1. Apply Beta and Gamma functions to evaluate many integrals which cannot be expressed in terms of elementary functions.
2. Apply Laplace transform to solve differential equations which will be converted to algebraic
3. Evaluate double integrals by changing variables , changing order and triple integration Calculate line integrals along piecewise smooth paths, interpret such quantities as work done by a force
4. Apply Green's theorem to evaluate line integrals along simple closed contours on the plane, Stoke's theorem to give physical interpretation of the curl of a vector field and Divergence theorem to give physical interpretation of the divergence of a vector field
5. Develop Fourier series of periodic functions.

TEXT BOOKS:

1. Grewal B.S (2007), Higher Engineering Mathematics, 40th Edition, New Delhi, Khanna Publishers.
2. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Mathematical Methods, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
3. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Engineering Mathematics Vol - I, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
4. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley.

REFERENCE BOOKS:

1. Shahanaz Bathul (2007), Mathematical Methods, 3rd Edition, Hyderabad, Right Publishers.
2. Jain R. K., and Iyengar S. R. K (2008), Advanced Engineering Mathematics, 3rd Edition, New Delhi, Narosa Publication House.

3. Dass H.K. and Rajnish Verma Er (2007), Higher Engineering Mathematics, First Edition, New Delhi, S. Chand & Company Limited.
4. Integral Transforms by A.R.Vasista
5. Schaum's outline series on Vector Analysis; Linear Algebra.
6. Larry C. Andrews and Bhimsen K. Shivamoggi, Integral Transforms for Engineers, Prentice – Hall of India Private Limited, New Delhi.
7. Mathematical Methods of Science and Engineering (Aided with Matlab) Kanti B.Datta (2012), Seventh Edition, CENGAGE Learning.

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MATHEMATICS-III
(Numerical Techniques and Partial Differential Equations)

Course Objectives:

1. Determination of roots of an equation and calculate some simple methods of obtaining approximate roots of algebraic and transdental equations.
2. Interpolate the values using the techniques of newtons forward and backward, Gauss forward and backward, lagranges and splines interpolations.
3. Analyze and calculate numerical differentiation and numerical integration methods.
4. Calculate sol of ODE using Taylor's, Euler's, Picasrd's, Runga Kutta and Predictor-Corrector method.
5. Evaluate the sol of PDE and calculate boundary value problems.

UNIT-I: Solution of Non- linear Equations and Linear System of Equations.

Solution of Algebraic and Transcendental Equations – The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method.Solving system of non-homogeneous equations by L-U Decomposition method(Crout's Method)Jacobi's and Gauss-Seidel Iteration method,

UNIT-II: Interpolation:

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

UNIT-III: Numerical Differentiation, Numerical Integration & Curve fitting

Numerical Diferentiation, Generalized Quadrature (Newton's Cote's formula), Trapezoidal, Simson's and Weddle's rules and problems. Curve fitting: Fitting a straight line – Second degree curve – exponentional curve-power curve by method of least squares.

UNIT – IV: Numerical solution of IVP's in ODE

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

UNIT-V: Partial differential equations

Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and nonlinear (Standard type) equations, Charpits Method, Method of separation of Variables for second order equations. Classification of general second order partial differential equations. Applications of Partial Differential Equations-One dimensional wave equation, Heat equation.

Course Outcomes:

1. Determination of roots of an equations of the form f(x)=0 has great importance in the fields of science and engineering. Calculate some simple methods of obtaining approximate roots of algebraic and transcendental equations.
2. Solutions of linear system of equations can be found by numerical methods known as direct and indirect methods such as Gauss elimination and its modifications ,Jacobi's and Gauss -seidal iterative methods, made the difference between of those methods.
3. Interpolate the values using the techniques of Newton's forward and backward, Gauss forward and backward, Lagrange's interpolation, and spline'sinterpolation..
4. Analyze and calculate numerical differentiation and numerical integrations methods.
5. Calculate solutions of ODE using Taylor's, Euler's, picard's, Runge-Kutta, Predictor and corrector methods.
6. Calculate boundary value problems
7. Calculate Solutions of partial differential equation

TEXT BOOKS:

1. Grewal B.S (2007), Higher Engineering Mathematics, 40th Edition, New Delhi, Khanna Publishers.
2. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Mathematical Methods, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
3. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley.

REFERENCE BOOKS:

1. Shahanaz Bathul (2007), Mathematical Methods, 3rd Edition, Hyderabad, Right Publishers.
2. Jain R. K., and Iyengar S. R. K (2008), Advanced Engineering Mathematics, 3rd Edition, New Delhi, Narosa Publication House.
3. Introductory Methods of Numerical Analysis. S.S. Sastry, Prentice Hall.
4. Numerical Analysis (Paper IV), First Edition 2010, Telugu Akademi, Hyderabad.
5. Schaum's outline series on Matrices.
6. Mathematical Methods of Science and Engineering (Aided with Matlab) Kanti B.Datta (2012), Seventh Edition, CENGAGE Learning.

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ENGLISH-II

1. INTRODUCTION:

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

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc. The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. *However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.*

2. OBJECTIVES:

a. To improve the language proficiency of the students in English with emphasis on LSRW skills.

b. To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.

c. To develop the study skills and communication skills in formal and informal situations.

LEARNING OUTCOMES:

1. Usage of English Language, written and spoken.

2. Enrichment of comprehension and fluency

3. Gaining confidence in using language in verbal situations.

SYLLABUS:

Listening Skills:

Objectives

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW Skills approach to language and improve their pronunciation

2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

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

• Listening for general content

• Listening to fill up information

• Intensive listening

• Listening for specific information

Speaking Skills:

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.

2. To enable students to express themselves fluently and appropriately in social and

Professional contexts.

• Oral practice

• Describing objects/situations/people

• Role play – Individual/Group activities (Using exercises from the five units of the

prescribed text: ***Skills Annexe - Functional English for Success)***

• Just A Minute(JAM) Sessions.

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.

2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.

• Skimming the text

• Understanding the gist of an argument

• Identifying the topic sentence

• Inferring lexical and contextual meaning

• Understanding discourse features

• Scanning

• Recognizing coherence/sequencing of sentences

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

Writing Skills :

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill

2. To equip them with the components of different forms of writing, beginning with the lower order ones.

• Writing sentences

• Use of appropriate vocabulary

• Paragraph writing

• Coherence and cohesiveness

• Narration / description

• Note Making

• Formal and informal letter writing

• Describing graphs using expressions of comparison

TEXTBOOKS PRESCRIBED:

For Detailed study:

First Textbook: ***"Skills Annexe -Functional English for Success***", Published by Orient Black Swan, Hyderabad

For Non-detailed study:

Second text book ***"Epitome of Wisdom",*** Published by Maruthi Publications, Guntur

UNIT-I

Chapter 1:**'Leela's Friend'** by R.K. Narayan from "Epitome of Wisdom", Published by Maruthi Publications, Hyderabad 2 hrs

G – Present Tense 2

V – Synonyms and Antonyms 2

UNIT-II

Chapter 2: **'Human Values and Professional Ethics'** from "Skills Annexe - Functional English for Success" Published by Orient Black Swan, Hyderabad 2 hrs

L -Listening for specific details and information 1

S- Narrating, expressing opinions and telephone interactions 1

R -Reading for specific details and information 1

W- Writing formal letters and CVs 1

UNIT-III

Chapter 3: **'The Convocation Speech'** by N.R. Narayanmurthy' from "Epitome of Wisdom", Published by Maruthi Publications, Hyderabad 2 hrs

G- Past and future tenses 2

V- Vocabulary - idioms and Phrasal verbs 2

UNIT-IV

Chapter 4: **'Sports and Health'** from "Skills Annexe -Functional English for Success" Published by Orient Black Swan, Hyderabad 2 hrs

L- Critical Listening and Listening for speaker's tone/ attitude 1

S- Group discussion and Making presentations 1

R- Critical reading, reading for reference 1

W-Project proposals; Technical reports, Project Reports and Research Papers 1

UNIT-V

Chapter5: '**The Secret of Work'** from "Epitome of Wisdom", Published by Maruthi Publications Hyderabad.2 hrs

G- Adjectives, Prepositions and Concord 2

V- Collocations and Technical Vocabulary 2

REFERENCES:

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi.2010.

2. Innovate with English: A Course in English for Engineering Students, edited by T Samson,Foundation Books.

3. English Grammar Practice, Raj N Bakshi, Orient Longman.

4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.

5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao**,** P Sreehari, Published by Pearson

6. Handbook of English Grammar& Usage, Mark Lester and Larry Beason, Tata Mc Graw –Hill.

7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.

8. Technical Communication, Meenakshi Raman, Oxford University Press

9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education

10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.

11. Murphy's English Grammar with CD, Murphy, Cambridge University Press.

12. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt Ltd.,

13. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.

14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education

15. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw –Hill.

16. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO

17. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education

18. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,

19. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers

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ENGINEERING PHYSICS – II

Course Objectives:

1. To impart the knowledge of mathematics and science to determine the working of semiconductor devices .
2. Emphasize the study of Quantum mechanics to apply it to solve problems of micro & macro particles.
3. To have the knowledge of laser technology to know about the working & applications of laser.
4. To inculcate the importance of nanotechnology which has the world wide importance.

UNIT- I PRINCIPLES OF QUANTUM MECHANICS: 08

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

UNIT- II FREE ELECTRON THEORY OF METALS: 06

Classical Theory, Electrical Conductivity and Ohm's Law – Drawbacks, Sommerfield theory (Qualitative), Density of States, Effect of temperature on the Fermi-Dirac distribution.

BAND THEORY OF SOLIDS:

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

UNIT- III SEMICONDUCTOR PHYSICS: 08

Fermi level in Intrinsic and Extrinsic semiconductors - Intrinsic semiconductor and carrier concentration – Extrinsic semiconductor and carrier concentration – Characteristics of p-n junction diode - Hall effect, LED, Photodiode.

FIBRE OPTICS 04

Basic principle of optical fibre, Acceptance angle, Acceptance cone, numerical aperture (Quantitative), Types of optical fibre, applications of optical fibre.

UNIT IV LASERS: 06

Characteristics of Lasers – Spontaneous and Stimulated Emission of radiation, meta stable state, population inversion, lasing action, Einstein's coefficients and relation

between them –– Ruby Laser – Helium-Neon Laser –Semiconductor Laser – Applications of lasers.

UNIT V BASIC PRINCIPLES OF NANO SCIENCE: 07

Introduction, surface to volume ratio, quantum confinement – Fabrication of nano materials- Top down fabrication, Bottom up fabrication: sol-gel Technique, CVD method– Characterization (XRD & TEM) - Applications of nanomaterials.

Course Outcomes:

1. Having the knowledge of semiconductors & fiber optics, there will be a chance to know their applications.
2. There will be a chance for them to use the subject as a mathematical tool to solve their real life problems.
3. The students will be able to know the working of different lasers & their real life applications.

TEXT BOOKS:

1. Engineering Physics by P K palanisamy :Scietech publication
2. Solid State Physics by M Armugam; Anuradha Publications

REFERENCE BOOKS:

1. Introduction to Solid State Physics by Charles Kittel : John Wiley & Sons
2. Engineering Physics by R.K.Gaur and S.L.Gupta; Dhanpat Rai and Sons
3. Engineering Physics by V Rajendran; McGraw hill education private ltd.
4. A Text book of Engineering Physics by M N Avadhanulu, P G Kshirsagar; S Chand
5. Engineering Physics by K Malik, A K Singh; Tata Mc Graw hill book publishers
6. Engineering Physics by M.R.Srinivasan, New Age Publishers

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ENGINEERING CHEMISTRY

Course objectives:

1. To appraise the students about the importance and role of chemistry in the field of Engineering by explaining the relevant topics.
2. To enable students to apply the knowledge acquired in improving the properties of engineering materials.
3. To provide the students with the necessary knowledge to solve the problems and make decisions with regards to the application of materials in a variety of engineering disciplines.
4. To equip the students with the required fundamentals of engineering chemistry carry out in the interdisciplinary research such that the findings benefit the common man.
5. After the completion of the course, the student would understand about the important chemistry of water, corrosion and its control, polymer chemistry, electrochemistry (including batteries) and advanced engineering materials.

UNIT I: WATER: Hardness of water, expression of hardness ($CaCO_3$ equivalent), units and types of hardness. Estimation of temporary and permanent hardness of water by EDTA method. Numerical problems based on hardness of water. Potable water: characteristics, treatment of water for domestic supply. Desalination of brackish water: reverse osmosis. Alkalinity of water and its determination. Boiler troubles: priming and foaming, boiler corrosion, scales, sludges and caustic embrittlement. Boiler feed water and its treatment: Internal treatment (colloidal, phosphate calgon conditioning of water). External treatment (zeolite process and ion –exchange process) , Numerical problems on softening of water.

UNIT II: ELECTROCHEMISTRY : Conductance and its types . Electrode, electrode potential, galvanic cell , cell reactions and cell notation, cell EMF , types of electrodes (Normal Hydrogen Electrode , calomel electrode, glass electrode and quinhydrone electrode) , Nernst equation Numerical problems. Potentiometric titrations. Concentration cells, classification with examples.

BATTERIES: Introduction to cell and battery, characteristics of a cell. Primary (dry cell and lithium cell) and secondary cells, (lead-Acid cell, Ni-Cd cell and Lithium ion cells,). Solar battery, engineering applications of batteries. Fuel cells – Hydrogen – Oxygen fuel cell, advantages and engineering applications of fuel cells.

UNIT III: CORROSION AND ITS CONTROL Introduction, types of corrosion : chemical and electrochemical corrosion, mechanism of chemical and electrochemical corrosion , galvanic , water line and pitting corrosion, factors affecting the rate of corrosion : nature of the metal , galvanic series, purity of metal, nature of corrosion product , nature of environment : effect of temperature, effect of pH, humidity. Corrosion control methods: Cathodic protection: sacrificial anode method and impressed current cathode method. Protective coatings : metallic coatings (anodic and cathodic), methods of application on metals , hot dipping (galvanizing), cladding, cementation, electroplating(of copper) electroless plating (of nickel) . Organic coatings – paints, its constituents and their functions.

UNIT IV: POLYMER CHEMISTRY : Introduction, classification of polymers, types of polymerization (addition and condensation, *mechanisms not included*). Plastics-types of plastics -thermoplastics and thermosetting plastics. Compounding and moulding of plastics. Preparation, properties and engineering applications of PVC, Teflon and Bakelite. Fibers: Nylon 6, 6 and Terelene (Dacron). Elastomers: natural rubber, structure, vulcanization. Synthetic rubbers: Buna-S, butyl rubber, Thikol rubber. Conducting polymers: classification, mechanism of conduction, Poly acetylene - preparation and effects of doping on conduction. Applications of conducting polymers.

UNIT V: ADVANCED ENGINEERING MATERIALS: Biodegradable polymers, types, examples: Polyhydroxy butyrate (PHB) ,Poly-Hydroxybutyrate-co-b-Hydroxy valerate (PHBV) ,Polyglycolic acid (PGA) , Polylactic acid (PLA) ,Poly (Î-caprolactone) (PCL). Applications of biodegradable polymers.

Composite materials: Constituents of composite materials. Types of composite materials. Advantages and engineering applications of composite materials.

Nano materials: Introduction, basic methods of preparation and applications of nano meterials.

Insulators- Classification, characteristics of thermal & electrical insulators and applications.

Biofuels – biodiesel, general methods of preparation and advantages

Course Outcomes:

1. As commences with fundamentals which indeed takes the individual students to be more conversant with apparatus and allied .
2. Gets equipped with the technical importance of knowing the extent of hardness and consciousness of units.
3. Students gets augmented the adroitness and keep aware of some industrial determination techniques
4. As commences with fundamentals which indeed takes the individual students to be more conversant with apparatus and allied .

5. Gets equipped with the technical importance of knowing the extent of hardness and consciousness of units.
6. Students gets augmented the adroitness and keep aware of some industrial determination techniques

Text Books:

1. Engineering Chemistry by NYS.Murthy, Pearson, India.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpat Rai Publishing Company

Reference Books:

1. 1.Text Book of Engineering Chemistry by Shasi Chawla, Dhantpat Rai publishing Company,
2. Engineering Chemistry by C.Daniel Yesudian , Anuradha publications

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ELECTRONIC DEVICES AND CIRCUITS

Course Objectives:

1. To provide clear explanation about the operation of basic semiconductor devices available today.
2. To show how each device and its characteristics is used in appropriate circuits
3. Demonstration of Amplifier Design with different gain & Oscillator circuits with different frequency operation.

UNIT I – P-N JUNCTION DIODE AND RECTIFIERS:

Quantative theory of P-N Junction, P-N Junction as Diode, Diode Equation, Volt-Ampere Characteristics, Temperature Dependence of VI Characteristic, Transition and Diffusion Capacitances, Diode Equivalent Circuits, Breakdown Mechanisms in Semi Conductor Diodes, Zener Diode Characteristics, Principle of Operation and Characteristics of Tunnel Diode, Schottky Barrier Diode.

The P-N Junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic Components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L-Section Filters, Π-Section Filters, Comparison of Filters, Voltage Regulation Using Zener Diode, SCR.

UNIT II - BIPOLAR JUNCTION TRANSISTOR AND FIELD EFFECT TRANSISTOR:

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

The Junction Field Effect Transistor (Construction, Principle of Operation, Symbol), Pinch –Off Voltage –Volt –Ampere Characteristics, The JFET Small Signal Model, MOSFET (Construction, Principle of Operation, Symbol) MOSFET Characteristics In Enhancement and Depletion Modes.

UNIT III - TRANSISTOR BIASING AND STABILIZATION:

Operating Point, The DC and AC Load Lines, Need For Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization Against Variation In V_{BE} and β, Bias Compensation Using Diodes and Transistors. Thermal Runway, Thermal Stability, Biasing FET.

UNIT IV - **BJT AND FET AMPLIFIERS:**

BJT Hybrid Model, Determination of h-Parameters From Transistor Characteristics, Analysis of A Transistor Amplifier Circuit Using h-Parameters, Comparison of CB, CE And CC Amplifier Configurations.FET Common Source Amplifier, Common Drain Amplifier, Generalized FET Amplifier, FET, As Voltage Variable Resistor, Comparison of BJT And FET, The Uni Junction Transistor

UNIT – V: FEED BACK AMPLIFIERS AND OSCILLATORS:

Concepts of feedback. Claffication of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on Amplifier characteristics, Simple problems.

OSCILLATORS: Condition for oscillations. RC and LC type oscillators, Crystal oscillators, Frequency and amplitude stability of oscillators, Generalized analysis of LC oscillators, Quartz (Hartley, Colpitts), RC-phase shift and Wien-bridge oscillators.

Course Outcomes:

1. Concepts of physical electronics particularly solid state devices and its conductivity.
2. Operation of PN-junction diode, zener diode and other diodes and interpret its characteristics.
3. Construction of different rectifier circuits with and without filters.
4. Ability to draw characteristics of a transistor in various configurations and interpret its usages in different regions.
5. The concepts of the load line or bias-curve which are used to establish the quiescent operating conditions in a different amplifier circuits.
6. Design specifications and circuit construction for Amplifiers & Oscillators.

TEXT BOOKS:

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit Tata McGraw Hill, 2nd Ed., 2007.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall,9th Edition,2006.
3. Introduction to Electronic Devices and Circuits- Rober T. Paynter PE.

4. Electronics Devices and Circuits – A. P. Godse Technical Publications.

REFERENCE BOOKS:

1. Electronic Devices and Circuits – T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, 6th edition, 2004.
2. Principles of Electronic Circuits – S.G.Burns and P.R.Bond, Galgotia Publications, 2nd Edn.., 1998.
3. Microelectronics – Millman and Grabel, Tata McGraw Hill, 1988.
4. Electronic Devices and Circuits – Dr. K. Lal Kishore, B.S.

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ENGLISH LANGUAGE COMMUNICATION SKILLS LAB-II

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

Objectives

1. To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
2. To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency in spoken English and neutralize mother tongue influence
5. To train students to use language appropriately for interviews, group discussion and public speaking

Learning Outcomes:

1. Better Understanding of nuances of language through audio- visual experience and group activities
2. Neutralization of accent for intelligibility
3. Speaking with clarity and confidence thereby enhancing employability skills of the students

Syllabus: English Language Communication Skills Lab shall have two parts:

1. **Computer Assisted Language Learning (CALL) Lab**
2. **Interactive Communication Skills (ICS) Lab**

The following course content is prescribed for the English Language Communication Skills Lab

Exercise-I

CALL Lab: Minimal Pairs
Word accent and Stress Shifts
Listening Comprehension

Exercise-II

ICS Lab: Descriptions- Narrations- Giving Directions and Guidelines

Question Tags and One-Word Substitutes

Concord (Subject in agreement with verb) and Words often misspelt-confused/misused

Exercise-III

CALL Lab: Intonation and Common Errors in Pronunciation.**-**Neutralization of Mother Tongue Influence and Conversation Practice.

Exercise-IV

ICS Lab: Extempore- Public Speaking

Active and Passive Voice,

Common Errors in English,

Idioms and Phrases

Exercise-V

ICS Lab: Information Transfer

Oral Presentation Skills

Reading Comprehension

Job Application with Resume preparation.

Minimum Requirement of infra structural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):

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

i) P – IV Processor

a) Speed – 2.8 GHZ

b) RAM – 512 MB Minimum

c) Hard Disk – 80 GB

ii) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab :

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

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

1. Suresh Kumar, E. & Sreehari, P. 2009. A Handbook for English Language Laboratories. New Delhi: Foundation

2. **Strengthen Your Steps -** Dr. M. Hari Prasad and others, Maruthi Publications

3. Speaking English Effectively 2nd Edition by Krishna Mohan and N. P. Singh, 2011.Macmillan Publishers India Ltd. Delhi.

4. Sasi Kumar, V & Dhamija, P.V. How to Prepare for Group Discussion and Interviews.Tata McGraw Hill

5. Hancock, M. 2009. English Pronunciation in Use. Intermediate. Cambridge: CUP

6. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison.2013. Orient Blackswan. Hyderabad.

7. Hewings, M. 2009. English Pronunciation in Use. Advanced. Cambridge: CUP

8. Marks, J. 2009. English Pronunciation in Use. Elementary. Cambridge: CUP

9. Nambiar, K.C. 2011. Speaking Accurately. A Course in International Communication.New Delhi : Foundation

10. Soundararaj, Francis. 2012. Basics of Communication in English. New Delhi: Macmillan

11. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.

12. **English Pronouncing Dictionary** Daniel Jones Current Edition with CD.

13. **A textbook of English Phonetics for Indian Students** by T. Balasubramanian

(Macmillan)

14. **Lab Manual:** A Manual entitled "**English Language Communication Skills (ELCS)**

Lab Manual- cum- Work Book", published by Cengage Learning India Pvt. Ltd, New Delhi. 2013

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(An Autonomous Institution)

I Year B.Tech. ECE – II Sem	L	T/P/D	C
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ELECTRONIC DEVICES AND CIRCUITS LAB

PART A: (Only for Viva-voce Examination)

ELECTRONIC WORKSHOP PRACTICE (in 3 lab sessions):

1. Identification, Specifications, Testing of R, L, C, Components (Color Codes),

Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays,Bread Boards, PCB's

2. Identification, Specification and Testing of Active Devices, Diodes, BJT's LOW powerJFET's, MOSFET's, Power Transistors, LED's, SCR, UJT.

3. Study and operation of

- Multi-meters (Analog and Digital**)**
- Regulated Power Supplies
- Function Generator
- CRO

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

1. Forward & Reverse Bias Characteristics of PN Diode.

2. Zener diode characteristics and Zener as voltage Regulator.

3. Half Wave Rectifier with & without filters.

4. Full Wave Rectifier with & without filters

5. Input &output characteristics of Transistor in CB Configuration.

6. Input &output Characteristics of Transistor in CE Configuration.

7. FET characteristics.

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

9. Frequency Response of CC Amplifier.

10. Frequency Response of CE Amplifier.

11. Frequency Response of FET Amplifier (Common source).

12. SCR Characteristics

13. UJT Characteristics.

PART C: Equipment required for laboratories:

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

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ENGINEERING CHEMISTRY LAB

Course objectives:

1 To impart fundamental knowledge in handling the equipment /glassware and chemicals in the chemistry laboratory.
2. To offer hands on experience on the basic equipment related to engineering chemistry.
3. For practical understanding of theoretical concepts of chemistry.

(Any ten experiments out of the following fourteen experiments should be performed) Titrimetry:

1. Fundamentals of volumetric analysis : (a) Determination of strength of an acid (HCl)
2. Estimation of ferrous iron by dichrometry
3. Estimation of hardness of water by EDTA method.
4. Determination of alkalinity of water.
5. Determination of free chlorine or chlorides in water.
6. Determination of iron by permanganometry.
7. Estimation of copper by colorimetric method.
8. Estimation of HCl by conductometry using standard NaOH solution.
9. Estimation of HCl by potentiometry using standard NaOH solution.
10. Determination of viscosity of sample oil by Redwood/Oswald's viscometer
11. Determination surface tension of lubricants.
12. Determination of the rate constant of acid catalyzed hydrolysis of methyl acetate .
13. Preparation of thiokol rubber and nylon 6,6.
14. Preparation of Biodiesel from Waste Vegetable Oil (WVO).

TEXT BOOKS:

1. Vogel's Textbook of Quantitative Chemical Analysis
2. Essentials of experimental engineering chemistry, Shashi Chawla, Dhanpat Rai & Co
3. Laboratory manual of engineering chemistry, S.K.Bhasin and Sudha Rani , Dhanpat Rai & Co.
4. A text book on experiments and calculations. S.S. Dara, S. Chand & Co

REFERENCE BOOKS:

1. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

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IT WORKSHOP

Objectives:

The IT Workshop for engineers is a training lab course spread over 40 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, and Power Point.

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

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email.

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

PC Hardware

Exercise 1 – Task 1: Identify the peripherals of a computer, components in a System Cabinet and its functions. Draw the block diagram of the compute mother board along with the configuration of each peripheral and submit to your instructor.

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

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

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

Internet & World Wide Web

Exercise 5 - Task 1 : **Orientation & Connectivity Boot Camp :** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Exercise 6 - Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

MS Word

Exercise 7&8: The mentor needs to give an overview of Microsoft (MS) word 2007: Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word. Give a task covering to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Inserting table, using Drawing toolbar in word.

MS Excel

Exercise 9&10: The mentor needs to tell the importance of MS office 2007 Excel as a Spreadsheet tool covering Accessing, overview of toolbars, saving excel files, Using help and resources., Also give a task that is covering the features like Gridlines, Format Cells, Summation, auto fill, Formatting Text.

MS Power Point

Exercise 11&12: Students will be working on MS power point which help them create basic power point presentation. Topic covered during this Exercise includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

REFERENCES:

1. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dream tech

2. The Complete Computer upgrade and repair book,3rd edition Cheryl A Schmidt, WILEY Dreamtech

3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.

4. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft)

5. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.

6. IT Essentials PC Hardware and Software Labs and Study Guide Third Edition by Patrick Regan – CISCO Press, Pearson Education.

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MATHEMATICS-IV

COURSE OBJECTIVE:
This course aims the increasing importance of Mathematics IV in applied sciences have led to greater demand for courses which deal with the techniques of Complex analysis. The reason is that Mathematics IV can give solutions to applied problems when ordinary analytical methods fail.

UNIT-I: Fourier Transformations

Fourier integral theorem – Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms – properties –inverse transforms – Convolution theorem – Finite Fourier transforms.

UNIT-II: Functions of a complex variable

Continuity – Differentiability – Analyticity – Properties – Cauchy-Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions – Milne – Thompson method. Elementary functions: Exponential, trigonometric, hyperbolic functions and their properties – General power Z (c is complex), principal value.

UNIT-III: Complex Integration and Complex Power series
Line integral – evaluation along a path and by indefinite integration – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula.Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point –Isolated singular point – pole of order m – essential singularity.

UNIT-IV: Contour Integration

Residue – Evaluation of residue by formula and by Laurent series - Residue theorem.
Evaluation of integrals of the type

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

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

UNIT-V: Conformal mapping

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

TEXT BOOKS

1) Grewal B.S (2007), Higher Engineering Mathematics, 40th Edition, New Delhi, Khanna Publishers.
2) Schaum's outline series on Complex Anlysis.
3) S.R.K Iyengar text book of complex variables

REFERENCE BOOKS:

1) A text Book of Engineering Mathematics, C. Sankaraiah, V. G. S. Book Links.
2) A text Book of Engineering Mathematics, P. Nageshwara Rao, Y. Narasimhulu & N.Prabhakar Rao, Deepthi Publications.
3) A text Book of Engineering Mathematics, B. V. Raman, Tata Mc Graw Hill.
4) Advanced Engineering Mathematics, Irvin Kreyszig, Wiley India Pvt. Ltd.
5) A Text Book of Engineering Mathematics, Thamson Book Collection.
6) Mathematical Methods of Science and Engineering (Aided with Matlab) Kanti B.Datta (2012), Seventh Edition, CENGAGE Learning.

COURSE OUTCOMES:

- To develop a working knowledge of complex variables
- To develop a working knowledge of Complex integration.
- To develop a working knowledge of Complex power series
- To develop a working knowledge of Contour Integration
- To develop a working knowledge of Conformal Mapping and
- To develop a working knowledge of Z Transforms

TEXT BOOKS:

1. A text Book of Engineering Mathematics, Vol-III T. K. V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
2. Grewal B.S (2007), Higher Engineering Mathematics, 40th Edition, New Delhi, Khanna Publishers.
3. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Mathematical Methods, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
3. A text Book of Engineering Mathematics, C. Sankaraiah, V. G. S. Book Links.
5. A text Book of Engineering Mathematics, P. Nageshwara Rao, Y. Narasimhulu & N.Prabhakar Rao, Deepthi Publications.

REFERENCE BOOKS:

1. A text Book of Engineering Mathematics, B. V. Raman, Tata Mc Graw Hill.
2. Advanced Engineering Mathematics, Irvin Kreyszig, Wiley India Pvt. Ltd.
3. A text Book of Engineering Mathematics, Thamson Book Collection.
4. Shahanaz Bathul (2010), Engineering Mathematics - III, 2nd Edition, Hyderabad, PHI Learning Private Limited.
5. Schaum's outline series on Complex Anlysis.
6. Mathematical Methods of Science and Engineering (Aided with Matlab) Kanti B.Datta (2012), Seventh Edition, CENGAGE Learning.

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SWITCHING THEORY AND LOGIC DESIGN

Course objectives:

- To learn basic technique for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
- To implement simple logical operations using combinational logic circuits.
- To design combinational logic circuits, sequential logic circuits.

UNIT-1: Number Systems and Codes:
Review of number systems binary arithmetic, binary weighted and non-weighted codes. Error detecting and error correcting codes.

Boolean algebra:
Postulates and theorems: representation of switching functions, SOP and POS forms Karnaugh Map representations, minimization using K Maps.

UNIT- II: Design of Combinational Circuits:
Tabular minimization – design of single output and multi output functions design using conventional and, or, not, nand, nor & ex-or gates. design using msi & lsi devices, digital multiplexer/selector, decode demultiplexer, design of 4 bit adder, carry look-ahead adder, magnitude comparator, bcd converter. Logic implementations using rom, pal & pla**.**

Unit-III: Introduction to Sequential Circuits:
Combinational versus sequential circuits, asynchronous versus synchronous circuits, state table and state diagram, state assignment, memory elements and their excitation functions, T flip flop, RS flip flop, JK flip flop and their excitation requirements. Design of synchronous sequential circuits like sequence detectors and binary counters.

UNIT-IV: Capabilities and Minization Of Sequential Machines:
Melay and Moore machines, capabilities and limitations of finite state machine, state equivalence and machine minimization.

UNIT-V: Algorithmic State Machines:
ASM chart, timing considerations, control implementation, design with multiplexers and PLA control. Introduction to unite functions and threshold logic.

Out comes:

- Be able to manipulate numeric information in different forms, e.g. different bases, signed integers, various course such as ASCII, gray and BCD.
- Be able to manipulate simple Boolean expressions using the theorem and postulate of Boolean algebra and to minimize combinational functions.

Text Books:

1. Switching And Finite Automata Theory – By Zvi Kohavi, TMH Edition.
2. Digital Logic Computer Design – By M. Morris Mano, PHI.
3. Digital Logic Design Principles – By Norman Balbamian and Bradley, John Wiley

References:

1. Introduction to Switching Theory and Logic Design- By F. J. Hill and Peterson, John Wiley Publications.
2. Digital Logic – Applications & Design – By- John M. Yarbrough, Vikas Publications, 1997.
3. Digital System Design – By R. P. Jain TMH.
4. Digital Systems Principles, Applications– By Ronald J. Tocci, Pearson Education/Phil

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ENVIRONMENTAL STUDIES

UNIT – I

Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance.

(a) Ecosystems: Concept of an ecosystem – Classification, structure and function of Forest, Pond, Grass Land ecosystems - Producers, consumers and decomposers. - Energy flow in the ecosystem - Food chains, food webs and ecological pyramids- Ecological succession.

(b) Biodiversity and its conservation: Introduction - Definition: genetic, species and ecosystem diversity. - Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. ICUN categories of biodiversity and RED DATA book - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT - II

Natural Resources: Renewable and non-renewable – Natural resources and associated problems

Forest resources – Use and over – exploitation, deforestation,– Timber extraction, mining, dams and other effects on forest and tribal people

Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.

Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.

Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources.

Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Role of an individual in conservation of natural resources: Equitable use of resources for sustainable lifestyles.

UNIT – III

(a) Environmental Pollution: Definition, Cause, effects and control measures of different kinds of pollution (Air, Water , Soil , Nuclear, e –Waste)

(b) Social Issues and the Environment: From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, and watershed management. -Climate change, global warming, ozone layer depletion, nuclear accidents and holocaust.

UNIT – VI:

(a) Waste management technology: Solid waste Management: Causes, effects and control measures of Solid and Biomedical wastes. Disaster management: floods, earthquake, cyclone and landslides.

Waste water treatment technology: Sewage Water and Effluent Water- primary, secondary and tertiary treatments. Brief account on Bioremediation and Phyto-remediation, R.O technology. Application of GIS and GPS system in environment.

(b) Environmental policy, Rules and regulations. EIA (Environmental Impact Assessment) –Definition, Baseline Data acquisition, Impacts Assessment, EIS(Environment Impact Statement) & EMP (Environment Management Plan) – Environment Protection Act-1986, - Air (Prevention and Control of Pollution) Act-1981, -Water (Prevention and control of Pollution) Act-1974, -Wildlife Protection Act-1974, –Forest Conservation Act.

UNIT – V

(a) Towards sustainable future: concept of sustainable development, threats of sustainability, population and its explosion, over exploitation of resources, strategies for achieving sustainable development. Environmental education, Conservation of resources. Urban sprawl, sustainable cities and sustainable communities, human health. Environmental ethics, concept of green building, Basic principles of Green engineering, clean development mechanism (CDM), Low carbon life cycle, Polluters-pay principle.

(b)Field work: Visit to a local area to document environmental assets River/forest grassland/hill/ mountain Visit to a local polluted site-Urban/Rural/industrial/Agricultural Study of common plants, insects, birds, Visit to effluent treatment plant/sewage treatment plant Study of simple eco systems pond, river, hill slopes, etc.

Mini projects by students which is mandatory.

TEXT BOOK:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, University Press.
2. Environmental studies, From Crisis to cure by R.Rajagopalan,2005

REFERENCES:

1. Environmental Science: towards a sustainable future by Richard T.Wright.2008 PHL Learning Private Ltd .New Delhi
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P.Ela.2008 PHI Learning Pvt. Ltd.

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ELECTRONIC CIRCUIT ANALYSIS

Course objective:

- To familiarize the student with the analysis and design of basis transistor amplifier circuits
- To analysis the frequency response characteristics transistor amplifier circuits, feedback amplifiers, oscillators, large signal amplifier and turned amplifiers.

Unit-I : **Single Stage Amplifiers :**

Classification Of Amplifiers, Distortion In Amplifiers, Analysis Of CB, CE And CC Configurations Using Simplified (Approximate) Hybrid Model, Millers Theorem And Its Dual, Analysis Of CE Amplifier With Emitter Resistor, Design Of Single Stage Rc Coupled Amplifier Using BJT.

Unit-II : **BJT Amplifiers - Frequency Response:**

Logarithms, Decibels, General Frequency Considerations- Frequency Response Of BJT Amplifiers, Analysis At Low And High Frequencies, Effect Of Coupling and Bypass Capacitors, Hybrid Pi Model For CE Transistor, CE Short Circuit Current Gain, Current Gain With Resistive Load, Single Stage CE Transistor Amplifier Response, Alpha, Beta Cut-Off Frequencies, Gain Bandwidth Product , Emitter Follower At High Frequencies

Unit-III : **Multi Stage Amplifiers:**

Analysis Of Cascaded RC Coupled BJT Amplifiers, Cascade Amplifiers, Darlington Pair, Different Coupling Schemes Used In Amplifiers- RC Coupled Amplifiers, Transformer Coupled Amplifiers And Direct Coupled Amplifiers.

Unit – IV: Large Signal Amplifiers:

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

Unit –V: Tuned Amplifiers:

Introduction- Factor, Small Signal Tuned Amplifiers, Effect Of Cascading Single Tuned & Double Tuned Amplifier on Bandwidth, Stagger Tuned Amplifiers, Stability Of Tuned Amplifiers

Out comes:

- Design and analysis the Dc bias circuitry of BJT and FET.
- Analyze the different types of amplifiers, operation and its characteristics.
- Design circuits like amplifiers, oscillators using the transistors diodes and oscillators.

TEXT BOOKS:

1. Integrated Electronic- Jacob Millman &Christor C Halkias, 1991 Ed.,2008, Tmh
2. Electronic Devices And Circuits - -S.Salivahana, N. Suresh Kumar, A Vallavaraj, 2ed.,
3. Design Of Analog Cmos Integrated Circuits – Behzad Razavi, 2008, Tmh.

REFERENCES:

1. Introductory Electronic Devices and Circuits- Robert T. Paynter, 7ed. 2009, Pel.
2. Electronic Circuit Analysis- K.Lal Kishore, 2004, Bsp.
3. Electronic Devices & Circuit –David A Bell-5ed, Oxford University Press.

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PROBABILITY THEORY AND STOCHASTIC PROCESS

Course objective:

- To provide mathematical background and sufficient experience that the student can read, write, and understand sentences in language of probability theory, as well as solve probabilistic problems in signal processing and communication engg.
- To introduce students to the basic methodology of probability thinking and to apply it to problems
- To understand difference between time averages and static averages
- Analysis of random process and application to the signal process in the communication system

UNIT- I: Probability

Probability Introduced through Sets and Relative Frequency, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Probability as a Relative Frequency, Joint Probability, Conditional Probability, Total Probability, Bays' Theorem,IndependentEvents

UNIT II: Random Variable And Operations On One Random Variable Random Variable : Definition of a Random Variable, Types of Random Variables, Conditions for a Function to be a Random Variable, Distribution and Density functions, and their Properties- Binomial, Poisson, Uniform ,Gaussian, Conditional Distribution, Conditional Density, Properties.

Operation On One Random Variable : Introduction, Expected Value of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Characteristic Function, Moment Generating Function, Transformations of a Random Variable: Monotonic Transformations for a Continuous Random Variable, Non monotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable.

UNIT III: Multiple Random Variables And Operations On Multiple Random Variables

Multiple Random Variables:

Vector Random Variables, Joint Distribution Function and its Properties, Marginal Distribution Functions and its Properties, Conditional Distribution and Density , Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, (Proof not expected). Unequal Distribution, Equal Distributions.

OPERATIONS ON MULTIPLE RANDOM VARIABLES:
Expected Value of a Function of Random Variables, Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables.

UNIT IV: STOCHASTIC PROCESSES- TEMPORAL CHARACTERISTICS:
The Stochastic Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Concept of Stationary and Statistical Independence. First-Order Stationary Processes, Second-Order and Wide-Sense Stationary, Nth Order and Strict-Sense Stationary, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes Autocorrelation Function and Its Properties, Cross-Correlation Function and its Properties, Covariance and Its Properties, Gaussian Random Processes, Poisson Random Process.

UNIT V: RANDOM PROCESSES – SPECTRAL CHARACTERISTICS:
Power Spectrum and its Properties, Relationship between Power Spectrum and Autocorrelation Function, Cross-Power Density Spectrum and its Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

OUTCOMES:
Identify Bessel equation and legendary equation and solve the under special condition with the help series solution method. Also recurrence relation and orthogonolity properties of Bessel and legendary polynomials

TEXT BOOKS:

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 4th Edition, 2001.TMH.
2. Probability, Random Variables and Stochastic Processes – Athanasius Papoulis and S. Unnikrishna Pilli, PHI, 4th Edition, 2002.

REFERENCES:

1. Probability and random processes with stochastic processes- Mallikarjuna Reddy Cengae Learning
2. Probability and Random Processes with Application to Signal Processing – Henry Stark and John W. Woods, Pearson Education, 3rd Edition.
3. Probability Methods of Signal and System Analysis. George R. Cooper, Clave D. MC Gilliam, Oxford, 3rd Edition, 1999.
4. Statistical Theory of Communication - S.P. Eugene Xavier, New Age Publications, 2003.

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COMPUTER PROGRAMMING - II

Course Objectives:

1. To explain various sorting and searching techniques
2. To explain structures, unions, and enumeration types and operations on them
3. To understand dynamic memory management using pointers.
4. To introduce basic data structures such as stacks, queues and linked lists.
5. To explain various types of files in 'C' Language.

UNIT - I
Searching and Sorting – Sorting- selection sort, bubble sort, Insertion sort, Quick Sort, Merge sort, Searching-linear and binary search methods.

UNIT - II
Structures - Declaration, initialization, accessing structures, operations on structures, nested structures, arrays of structures, Unions, Enumerated types, Type Definition(typedef), C programming examples.

UNIT - III
Pointers – Concepts, declarations, usage, pointers to pointers, pointer expressions, Arrays and Pointers, array of pointers, parameter passing of pointers, pointers to void, pointers to functions, structures through pointers, self referential structures, C programming examples

UNIT - IV
Lists- Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Push and Pop Operations, Queues- Enqueue and Dequeue operations.

UNIT - V
Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling),Positioning functions, command –line arguments, C program examples.

Course Out Comes:

1. Upon completion of this course the students will have an:
2. Ability to design various sorting and searching techniques
3. Ability to design user defined data types to solve real world problems
4. Ability to manage heap memory
5. Ability to implement and use data structures like stacks, queues and linked lists
6. Ability to create and use various types of files in 'C' Language.

TEXT BOOKS:

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Oxford University Press.

REFERENCE BOOKS:

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. C for All, S. Thamarai Selvi, R.Murugesan, Anuradha Publications.
3. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition, Pearson education.
4. Programming in C, Ajay Mittal, Pearson.
5. Programming with C, B.Gottfried, 3rd edition, Schaum's outlines, TMH.
6. Problem solving with C, M.T.Somasekhara, PHI
7. Programming with C, R.S.Bickar, Universities Press.
8. Computer Programming & Data Structures, E.Balagurusamy, 4th edition, TMH.

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ELECTRONIC CIRCUIT ANALYSIS LAB

List of Experiments (12 Experiments to be done):

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

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

II. Testing in the Hardware Laboratory (6 Experiments)

A) Any Three circuits simulated in simulation laboratory
B) Any Three of the following

1. Class A Power Amplifier (with transformer load)
2. Class C Power Amplifier.
3. Single Tuned Voltage Amplifier.
4. Hartley & Colpitt's Oscillators.
5. Darlington Pair.
6. RC Phase Shift Oscillator using Transistors.
7. Class B Complementary Symmetry Amplifier.

Equipments required for Laboratories:

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

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

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COMPUTER PROGRAMMING II LAB

Course Objectives:

1. To make the student to implement various sorting and searching techniques
2. To introduce the student to structures, unions, and enumeration types and operations on them
3. To introduce the student dynamic memory management using pointers.
4. To introduce basic data structures such as stacks, queues and linked lists.
5. To make the student to create various types of files in 'C' Language.

Week 1:

Review of Arrays and functions.

Week 2:

Write programs to illustrate the implementation of Bubble Sort and Selection Sort

Week 3:

Write programs to illustrate the implementation of Insertion Sort and Quick Sort

Week 4:

Write programs to illustrate the implementation of Merge Sort.

Week 5:

Write programs to illustrate the implementation of Binary Search and Linear Search.

Week 6 & 7:

Write programs to illustrate the various concepts of structures

Week 8:

Write programs to illustrate the concepts of accessing variables using pointers

Week 9:

Write programs to illustrate the implementation of call by reference

Week 10:

Write programs to illustrate the implementation of arrays using pointers

Week 11:

Write programs to implement structures using pointers

Week 12:

Write program to illustrate the implementation of Single Linked List

Week 13:

Write programs to illustrate Stack operations using arrays and pointers

Week 14:

Write programs to illustrate Queue operations using arrays and pointers

Week 15:

Write programs to illustrate the various concepts of files.

Week 16:

Review

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STRUCTURED DIGITAL SYSTEM DESIGN

Course objective:
This course teaches**:**

- Designing digital circuits, behavioral and rtl modeling of digital circuits using Verilog HDL, verifying these models, and synthesizing RTL models to standard cell libraries and FPGAs
- Students gain practical experience by designing, modeling, implementing and verifying several digital circuits
- understanding of the diffent technologies related to HDLS, construct, compile and execute Verilog HDL programs using provided software tools.
- Design digital components and circuits that testable, reusable and synthesizable

UNIT-I: Introduction To Verilog HDL:
Verilog as HDL, Levels of Design Description, Simulation & Synthesis, Language Constructions. Gate Level Modeling: AND, OR, INVERTER and Other Gate Primitives.

UNIT-II: Design of Combinational Circuits:
Introduction, Examples of Useful Digital Circuits, Arithmetic Circuits, Comparators, Multiplexers, Code Converters, EXOR and AOI Gates, Wired Logic, Tristate Bus Systems Design Using Verilog HDL, Implementation on FPGA.

UNIT-III: Sequential Analysis and Design:
Fundamentals of Sequential Machines, State Diagrams, Design Steps for Traditional Synchronous Sequential Circuits, Flip-Flops: RS, JK, And T & D. Counters: Single Mode Counters, Multi Mode Counters, Ripple Counters, Ring Counters, Shift Registers Implementation Using Verilog HDL.

UNIT-IV: Introduction to System Controller Design:
System Controllers, Controller Design Phases & System Documentation, Defining the Purpose and Role of the System, Timing and Frequency Considerations, Using MSI Decoder in System Controllers, Using MSI Multiplexer in System Controllers, Read Only Memories(ROM), ROM's & PROM's Applications, PLA's Using FPGA & Applications of PLA & FPGA.

UNIT-V: Asynchronous Finite State Machines:
Introduction, Asynchronous Circuits, Scope, Asynchronous Analysis, The Design of Asynchronous Machines, Cycles and Races, Plotting and Reading the Excitation Map, Hazards, Essential Hazards, The Map-Entered-Variable Approaches to Asynchronous Design, A Contemporary Approach to Asynchronous Design, Hazards in Circuits Developed By MEV Method, Worked Examples.

Outcomes:

By the end of this course, students should be able to:

- Describe Verilog hardware descript on languages (HDL).
- Design digital circuits
- Write behavioral models of digital circuits
- Write register transfer level(RTL)models of digital circuits
- Verify behavioral and RTL models
- Describe standard cell libraries and FPGAS
- Synthesize RTL models to standard cell libraries and FPGAS
- Implement RTL Models On FPGA and testing & verification

TEXT BOOKS:

1. Fundamentals Of Logic Design-Charles H. Roth, Jr. – 5th Edition,
2. An Engineering Approach To Digital Design- William I. Fletcher- Phi Publications
3. Design through Verilog HDL- T. R. Padmanabhan, B. Bala Tripura Sundari. Wiley, 2009,

REFERENCES:

1. Switching And Finite Automata Theory – Z. Kohavi , 2nd Ed., 2001, Tmh
2. Digital Design – Morris Mano, M.D.Ciletti, 4th Edition, Phi.
3. Digital Circuits and Logic Design – Samuel C. Lee, Phi.

REFERENCES:

1. Networks, lines and fields - *John.D.Ryder*, 2nd edition, PHI, 2008.
2. Engineering circuit analysis -*W.H.Hayt and J.E.Kemmerly and S.M.Durbin*, TMH, 6th edition, 2008,.
3. Network analysis and synthesis - C.L.Wadhwa, 3rd edition, New Age International Publishers, 2007.
4. Network analysis - *N.C.Jagan and C.Lakshmi Narayana*, BSP, 2006

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PRINCIPLES OF ELECTRICAL ENGINEERING

Course Objective:
This course facilitates to study Basic Electrical Engineering and Electronics Engineering concepts. About DC and AC machines.

UNIT-I D. C Transient Analysis

Transient response of R-L, R-C, R-L-C circuits (series and parallel) for D.C excitation-Initial conditions- Solution method using differential equation approach and Laplace transform method.

UNIT-II Two Port Networks

Z, Y, ABCD and Hybrid parameters, conversion of one parameter to another, conditions for reciprocity and symmetry, interconnection of two port networks in series, parallel and Cascaded, illustrative problems.

UNIT-III Filters and Attenuators

Classification of filters, filter networks, classification of pass Band and stop Band, characteristic impedance in the pass and stop bands, constant K low pass filter, high pass filter, band pass filter, band Elimination filter, illustrative problems. Symmetrical attenuators-T-type attenuators, π type attenuators, bridged T-type attenuators. Lattice attenuators.

UNIT-IV D.C. Generators & D.C. Motors

Principle of operation of DC machines, E.M.F Equation, types of generator, magnetization and load characteristics of DC generators**.** Illustrative problems.
D.C Motors – types of DC motors, characteristics of DC motors, losses and efficiency ,Swinburne's test, speed control of D.C. Motor, armature voltage and flux voltage control methods. Illustrative problems.

UNIT –V Transformers and their Performance

Principle of operation of Single phase transformer, types, constructional features, phasor diagram on no-load and load equivalent circuit, losses and efficiency of transformer and regulation, EMF equation- O.C & S.C tests, simple problems, introduction to single phase induction motor-split phase induction motor, capacitor motors, AC servomotors.

Course Outcomes:
After going through this course the student can able to understand

- Transient response of different circuitswith DC excitation, different two-port network parameters (Z, Y, ABCD, H), and their inter-relations, .
- Design filters and attenuators.
- Identify type of electrical machine for a given application

TEXT BOOKS:

1. Circuits & Networks - *A.Sudhakar* and *Shyammohan S.Palli*, Tata McGraw Hill.
2. Principle of Electrical Engineering - *V.K. Mehtha,*,S.Chand Publications.

REFERENCES:

1. Networks, lines and fields - *John.D.Ryder*, 2nd edition, PHI, 2008.
2. Engineering circuit analysis -*W.H.Hayt and J.E.Kemmerly and S.M.Durbin*, TMH, 6th edition, 2008,.
3. Network analysis and synthesis - C.L.Wadhwa, 3rd edition, New Age International Publishers,2007.
4. Network analysis - *N.C.Jagan and C.Lakshmi Narayana*, BSP, 2006
5. Introduction To Electrical Engineering - *M.S Naidu* and *S. Kamakshiah*,TMH
6. Basic Electrical Engineering – *B.L. Theraja and A.K. Theraja,* S.Chand Publications.

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PULSE AND DIGITAL CIRCUITS

Course Objectives:

- To explain the complete response of RC and RLC transient circuits
- To explain clippers clampers switching characteristics of transistor and sampling gates.
- To construct various multi vibrators using transistors, design of sweep circuits and sampling gates.
- **To discuss and realize logic gates using diodes and transistors**

UNIT I: Linear Wave Shaping:

High pass, Low pass RC circuits and their responses for sinusoidal, step voltage, pulse, square wave and ramp inputs. High pass RC networks as Differentiator; Low pass RC as an Integrator, Attenuators and their applications in CRO probe. RL and RLC circuit their response for step input, ringing circuit.

UNIT II: Non-Linear Wave Shaping:

Diode clippers, Transistor clippers, Clipping at two independent levels, Emitter coupled clipper, Diode comparators, Diode differentiator.
Applications of Voltage comparators, Clamping operation, Clamping circuits using Diodes with different inputs, Clamping circuit theorem, Practical clamping circuits, Effect of Diode characteristics on clamping voltage.

Switching Characteristics Of Devices:

Diode as a switch, Piecewise Linear Diode Characteristics, Transistor as a switch, Breakdown voltage consideration of transistors, Saturation parameters of transistors and their variation with temperature. Design of a transistor switch, Transistor-switching times.

UNIT III: Multivibrators:

Analysis and Design of Bitable, Monostable and A stable Multivibrator using Transistors, Schmitt trigger using transistors

UNIT IV: Time Base Generators:

General features of Time Base Signal, Methods of Generating a Time Base Waveform, Voltage sweeps, Bootstrap and Miller circuits, linear current sweep, and Application in T.V. synchronization.

Synchronisation And Frequency Division:

Principles of Synchronization, Synchronization of A stable Multivibrator, Phase Delay and phase Jitters, Synchronization of sweep circuits with symmetrical signals.

UNIT V: Sampling Gates:

Basic Operating Principles of Sampling Gates, Unidirectional and Bi-directional sampling gates, Application of Sampling Gates.

Blocking Oscillators:

Mono Stable Blocking Oscillator (Base timing & Emitter timing). A stable blocking Oscillator (Diode Controlled), Applications of Blocking Oscillators.

Outcomes:

- Understand the applications of diode as integrator. differentiator , clipper ,clamper circuits
- Learn various switching devices such as diode , transistor, SCR
- Difference between logic gates ,sampling gates
- Realizing using diode and transistor

TEXT BOOKS:

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

REFERENCES:

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

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ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

Course Objectives:

- To introduce the student to the fundamental theory and concept electromagnetic waves and transmission lines, and their practice applications.
- To study the propagation, reflection and transmission of plane bounded and unbounded

UNIT – I: Electrostatics:

Coulomb's Law , Electric Field Intensity- Fields Due to Continuous Charge Distributions, Electric Flux Density, Gauss Law and Applications , Electric Potential, Relations Between E and V , Maxwell's Two Equations for Electrostatic Fields, Energy Density , Illustrative Problems.

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

UNIT – II: Magnetostatics:

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

UNIT –III: Maxwell's Equations (Time Varying Fields):

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

UNIT-IV*: Em Wave Characteristics*:

Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves-Definition, All Relations Between E & H, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media, Conductors and Dielectrics- Characterization, Wave Propagation in Good Dielectrics and Good Conductors , Polarization, Reflection and Refraction of Plane Waves –Normal and Oblique Incidences, for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem-Applications, Power Loss in a Plane Conductor, Illustrative Problems.

UNIT-V: Transmission Lines:

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

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

Out comes:

- Study time varying Maxwell equations and their applications in electromagnetic problems.
- Determine the relationship between time varying electric and magnetic field and electro motive force.
- Analysis basic transmission line parameters in phasor domain.

TEXT BOOKS:

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

REFERENCES:

1. Engineering Electromagnetic – Nathan Ida, Springer (India) Pvt. Ltd., New Delhi, 2nd ed., 2005.
2. Networks, Lines and Fields – John D. Ryder, PHI, 2nd ed., 1999.
3. Engineering Electromagnetic – William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.
4. Electromagnetic Field Theory and Transmission Lines – G.S.N. Raju, Pearson Edn.Pte. Ltd., 2005.

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SIGNALS AND SYSTEMS

Course objectives:

- This course focuses on to get in-depth knowledge about signals, systems and analysis of the same using various transforms

UNIT-I: Signal Analysis:
Analogy between vectors and signals, Orthogonal vector and signal spaces, Approximation of a function by a set of mutually orthogonal functions, Evaluation of mean square error, Closed or complete set of orthogonal functions, Orthogonality in complex functions, Trigonometric and Exponential
Fourier series, Representation of periodic function by Fourier series Dirchelets Conditions, Complex Fourier spectrum,

UNIT-II : **Fourier Transforms and Sampling**
Fourier Transforms: Deriving Fourier Transform (F.T.) from Fourier Series, F.T. of arbitrary and standard signals, Concept of impulse function, Fourier Transforms involving Impulse function, Properties of Fourier transforms,
Sampling: Sampling theorem and its proof, Effect of under sampling-Aliasing, Reconstruction of signal from its samples.

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

UNIT-IV: Convolution and Correlation of Siganls:
Concept of convolution in Time domain and Frequency domain, Graphical representation of Convolution, Convolution property of Fourier Transforms, Cross Correlation and Auto correlation of functions, Properties of Correlation function, Energy density spectrum, Parse-Val's Theorem, Power density spectrum, Relation between Autocorrelation function and Energy/Power spectral density function.

UNIT-V: Laplace Transforms And Z-Transforms:
Laplace Transforms: Review of Laplace transforms Partial fraction expansion, Inverse Laplace transform, Concept of Region of convergence (ROC) for Laplace transforms, Constraints on ROC for various classes of signals, Properties of Laplace transforms, Relation between Laplace transform and Fourier transform of a signal. Laplace transform of certain signals using waveform synthesis.

Z-Transforms: Fundamental difference between Continuous and Discrete time signals, Discrete time signal representation using Complex exponential and Sinusoidal signals, Periodicity of Discrete time complex exponential signal, Concept

of Z-transform of a discrete sequence. Distinction between Laplace, Fourier and Z-Transforms. Region of convergence in Z-Transforms, Constraints on ROC for various classes of signals, Inverse Z-Transforms, properties of Z-Transforms.

Outcomes:

- Represent any arbitrary signals in terms of complete sets orthogonal functions and understands the principles of impulse function, step function and signum function.
- Under stands the principle of linear system, filter characteristics of system and its band width, the concept of autocorrelation and cross co relation and power density spectrum.
- Can design a system for sampling a signal.
- For a given system, response can be obtained using Laplace transform, properties and ROC of L.T.

TEXT BOOKS

1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.

REFERENCES:

1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2nd Edition.
2. Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition, 2008.
3. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, Pearson education.3rd Edition, 2004.Publications, 2nd Edition, 2005.

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PULSE AND DIGITAL CIRCUITS LAB

Minimum Twelve experiments to be conducted:

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

Equipment required for Laboratories:

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

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BASIC SIMULATION LAB

Part-B: Minimum 10 Experiments to be conducted

Simulate the following circuits using MATLAB, SCILAB or equivalent software tools

1. Basic operation on matrices.
2. Generation on various signals and Sequences (periodic), such as unit impulse, unit step, square, saw tooth, triangular, sinusoidal, ramp, sinc.
3. Operation on signal and sequence such as addition, multiplication scaling, folding, computation of energy and average power.
4. Finding the event and odd parts of signals/sequence and real and imaginary part of signals.
5. Convolution between signals and sequences.
6. Auto correlation and cross correlation between signals and sequences.
7. Verification of linearity and time invariance properties of a given continues /discrete system.
8. Computation of unit sample, unit step and sinusoidal response of the given LTI system and verifying its physical Realization and stability properties.
9. Gibbs phenomenon.
10. Finding the Fourier transform of a given signal and plotting its magnitude and phase spectrum.
11. Waveform synthesis using Laplace transforms.
12. Locating the zeros and poles and plotting the pole zero maps in s-plane and z-plane for the given transfer function.
13. Generation of Gaussian Noise (real and complex), computation of its mean, M.S. Value and its skew, kurtosis, and PSD, probability distribution function.
14. Sampling theorem verification.
15. Removal of noise by auto correlation/ cross correlation.
16. Extraction of periodic signal masked by noise using correlation.
17. Verification of Weiner-Khinchine relations.
18. Checking a random process for stationarity in wide sense.

Part-B: Minimum 6 Experiments to be conducted

Simulate the following circuits using VerilogHDL and verify by realization on FPGA

1. Design of 8- to -3 Encoder.
2. Design of 4 bit comparator.
3. Design of 8-to-1 multiplexer.
4. Design of full Adder.
5. Design of 1-to-8 Demultiplexer.
6. Design a 10 bit shift register.
7. Design of 4-Bit Binary counter.
8. Design of a Sequence detector.

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PRINCIPLES OF ELECTRICAL ENGINEERING LAB

PART-A:

All eight experiments are to be conducted compulsorily

1) Verification of Kirchhoff's voltage law and Kirchhoff's current law.
2) Verification of Series and Parallel Resonance circuit.
3) Time response of first order RL/RC network for periodic non-sinusoidal inputs. Time constant and steady state error determination.
4) Two port networks parameters- Z and Y Parameters.
5) Two port networks parameters- A, B, C, D and H- Parameters.
6) Verification of Superposition and Reciprocity theorem.
7) Verification of Maximum Power Transfer Theorem.
8) Experimental determination of Thevenin's and Norton's equivalent circuits.

PART-B:

Any two of the following experiments are to be conducted

1) Magnetization characteristics of DC shunt generator. Determination of critical field resistance.
2) Swinburne's test on DC shunt machine. Predetermination of efficiency at various loads as motor and generator.
3) OC &SC tests on single phase transformer. Predetermination of efficiency at various loads.
4) Speed control of DC Shunt Motor by
   a) Armature voltage control b) field flux control method.

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(A55018) ANTENNAS AND WAVE PROPAGATION

Course Objectives:

- To know about the fundamentals and design of various Antennas.
- To discuss the major applications of antennas emphasis is on how antennas are employed to meet electronic system requirements.
- To understand the concepts of radio wave propagation in the atmosphere.

UNIT I:

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

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

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

VHF, UHF AND Microwave Antennas - I: Arrays with Parasitic Elements, Yagi - Uda Arrays, Folded Dipoles & their characteristics, Illustrative Problems.

UNIT III:VHF, UHF AND Microwave Antennas - II:

Helical Antennas - Helical geometry, Helix Modes, Practical Design Considerations for Monofilar Helical Antenna in Axial and Normal Modes. Horn Antennas - Types, Fermat's Principle, Optimum Horns, Design Considerations of Pyramidal Horns, Microstrip Antennas - Introduction, Features, Advantages and Limitations, Rectangular Patch Antennas - Geometry and Parameters, Characteristics of Microstrip Antennas

UNIT IV: Impact of Different Parameters on Characteristics, Reflector Antennas - Introduction, Flar Sheet and Corner Reflectors, Paraboloidal Reflectors - Geometry, Pattern Characteristics, Feed Methods, Reflector Types - Related Features, Illustrative Problems.

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

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

UNIT V: Wave Propagation - I: Introduction, Definitions, Categorizations and General Classifications, Different Modes of Wave Propagation, Ray/Mode Concepts, Ground Wave Propagation (Quantitative Treatment) - Introduction, Plane Earth Reflections, Space and Surface Waves, Wave Tilt, Curved Earth Reflections, Space Wave Propagation - Introduction, Field Strength Variation with Distance and Height, Effect of Earth's Curvature, Absorption, Super retraction, M-Curves and Duct Propagation, Scattering Phenomena, Troposphere Propagation.

Wave Propagation - II: Sky Wave Propagation - Introduction, Structure of Ionosphere, Refraction and Reflection of Sky Waves by Ionosphere, Ray Path, Critical Frequency, MUF, LUF, OF, Virtual Height and Skip Distance, Relation between MUF and skip Distance, Multi-hop Propagation.

Course Outcomes:

- To list the basics of antennas and various parameters of antenna along with Maxwell's equations
- To interpret the fields radiated power, directivity, effective length of small electric dipole & half wave-dipole, loop Antennas
- To explain the concepts of different types of arrays
- To summarize antennas operated in VHF & UHF ranges
- To analyze the reflectors used along with antennas
- To study the experimental arrangements for measuring the radiation properties of antenna
- To interpret the concepts of ground wave Propagation, Space-Wave Propagation, various factors affecting radio wave propagation. To explain Propagation effects of radio waves in atmosphere
- To interpret the concepts of sky wave Propagation

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Antenna Theory - C.A. Balanis, John Wiley & Sons, 3rd ed., 2005.
2. Antennas and Wave Propagation – K.D. Prasad, Satya Prakashan, Tech India Publications, New Delhi, 2001.
3. Transmission and Propagation – E.V.D. Glazier and H.R.L. Lamont, The Services Text Book of Radio, vol. 5, Standard Publishers Distributors, Delhi.
4. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th edition, 1955.
5. Antennas – John D. Kraus, McGraw-Hill (International Edition), 2nd Ed. 1988.

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(A55019)ANALOG COMMUNICATIONS

Course Objectives:

- To know the need for modulation in radio communication system.
- To learn about various Analog and Pulse modulation techniques like Amplitude Modulation, Frequency Modulation, Phase Modulation, Pulse Amplitude Modulation, Pulse Position Modulation and Pulse Width Modulation.
- To know about the transmitters, receivers of Analog Modulation.
- To analyze the noise performance of Analog Modulation systems.

UNIT I:

Amplitude Modulation: Introduction to communication system, Need for modulation, Frequency Division Multiplexing, Amplitude Modulation, Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves: Square law detector, Envelop detector, Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSB-SC Modulated waves, COSTAS Loop.

UNIT II:

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

UNIT III:

Angle Modulation: Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM and AM.

UNIT IV:

Noise in Analog Communication System: Types of Noise: Resistive (Thermal) Noise Source, Shot noise, Extraterrestrial Noise, Arbitrary Noise Sources, White Noise, Narrowband Noise- In phase and quadrature phase components and its Properties, Modelling of Noise Sources, Average Noise Bandwidth, Effective Noise Temperature, Average Noise Figures, Average Noise Figure of cascaded networks. Noise in DSB and SSB System Noise in AM System, Noise in Angle Modulation System, Noise Triangle in Angle Modulation System, Pre-emphasis and de-emphasis.

UNIT V:

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

Pulse Modulation: Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation and demodulation of PWM, PPM, Generation and demodulation of PPM, Time Division Multiplexing.

Course outcomes:

- To describe various modulation techniques like AM, DSBSC and Variations among them in terms of power, modulation index, Band width
- To classify and experiment the functionality of modulators, demodulators of each modulation technique like AM, DSBSC and selection of appropriate filters
- Summarize various modulation techniques like SSB,VSB and apply applications in terms of Speech, Television
- To differentiate the spectrum of input message signals, different modulated outputs and resulting demodulated message signals for FM
- To classify the functionality of modulators, demodulators of each modulation technique like Narrow band ,Wideband FM for selection of appropriate filters

  Assess different Receiver Models in Analog Modulation and Compare different Figure of Merits

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Electronic Communications - Dennis Roddy and John Coolean, 4th Edition, PEA, 2004.

2. Electrnic Communication Systems - Modulation and Transmission - Robert J. Schoenbeck, 2nd Edition, PHI.
3. Analog and Digital Communication - K. Sam Shanmugam, Wiley, 2005.
4. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.
5. Principles of Communication Systems - H Taub & D. Schilling, Gautam Sahe, TMH, 2007, 3rd Edition

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III Year B.Tech (ECE), I Semester	**L**	**T/P/D**	**C**
	4	**- /-/ -**	**4**

(A55007) IC APPLICATIONS

Course Objectives:

- Study about electrical properties of analog ICs like Op-Amps, IC 555 timer, PLL.
- Analyze and know the design concepts of various applications of ICs.
- Study the design concepts Digital circuits using ICs.

UNIT I:

Operational Amplifier: Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation - Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger, Introduction to Voltage Regulators, Features of 723 Regulator, Three Terminal Voltage Regulators.

UNIT II:

Op-Amp, IC-555 & IC 565 Applications: Introduction to Active Filters, Characteristics of Band pass, Band reject and All Pass Filters, Analysis of 1st order LPF & HPF Butterworth Filters, waveform Generators - Triangular, Saw tooth, Square wave, IC555 Timer - Functional Diagram, Monostable and Astable Operations, Applications, IC565 PLL - Block Schematic, Description of Individual Blocks, Applications.

UNIT III:

Data Converters: Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs - Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications.

UNIT IV:

Digital Integrated Circuits: Classification of Integrated Circuits, Comparison of Various Logic Families, CMOS Transmission Gate, IC interfacing. TTL Driving CMOS & CMOS Driving TTL, Combinational Logic ICs - Specifications and Applications of TTL-74XX & CMOS 40XX Series ICs - Code Converters, Decoders, De-multiplexers, LED & LCD Decoders with Drivers, Encoders, Priority Encoders, Multiplexers, De-multiplexers, Priority Generators/Checkers, Parallel Binary Adder/ Subtractor, Magnitude Comparators.

UNIT V: Sequential Logic IC's and Memories: Familiarity with commonly available 74XX & CMOS 40XX Series ICs - All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers.

Memories - ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.

Course Outcomes:

- To Summarize the basics of linear integrated circuits and explain operational amplifiers with applications
- Be able to explain the characteristics of op-amp
- Able to explain the comparator circuits like Schmitt trigger, Astable multivibrator etc
- Able to construct filter circuits for particular application
- To describe analog to digital converters (ADC), and digital to analog converters (DAC) with its Specifications
- Be able to explain a stable voltage regulators
- To construct and explain the timer circuits
- To interpret the applications of PLL and special ICs like 565,566

TEXT BOOKS:

1. Linear Integrated Circuits, D. Roy Chowdhury, New Age International (p) Ltd.
2. Op-Amps & Linear ICs, Ramakanth A. Gayakwad, PHI

REFERENCES BOOKS:

1. Operational Amplifiers & Linear Integrated Circuits, R.F. Coughlin & Fredrick F. Driscoll, PHI.
2. Operational Amplifiers & Linear Intergrated Circuits: Theory & Applications, Denton J. Daibey, TMH.
3. Design with Operational Amplifiers & Analog Integrated Circuits, Sergio Franco, McGraw Hill.
4. Digital Fundamentals - Floyd and Jain, Pearson Education.

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	3	**1 /-/ -**	**3**

(A55020)ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Course Objectives:

- Develop an awareness to various electronic measurement Concepts
- Explain the operation and design of different electronic instruments
- Compare different ADC and DAC techniques and explain various circuits for conversion.
- Explain the transmission line effects pertaining to linear and non-linear loads in the context of bounce diagrams.

UNIT I:

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

UNIT II:

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

UNIT III:

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

Special Purpose Oscilloscopes: Dual Trace, Dual Beam CROs, Sampling Oscilloscopes, Storage Oscilloscopes, Digital Storage CROs.

UNIT IV:

Transducers: Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers,

LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Digital Temperature sensing system, Piezoelectric Transducers, Variable Capacitance Transducers, Magneto Strictive Transducers.

UNIT V:

Bridges: Wheat Stone Bridge, Kelvin Bridge, and Maxwell Bridge.

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

Course Outcomes:

- Able to calculate the basic parameters like voltage, resistance etc. And predict the behavior of the instrument.
- Able to compose the instruments based on desired application with desired accuracy Able to differentiate working and design the different digital voltmeters and signal generators
- Able to explain signal analyzers
- Able to design different types of bridges and unknown components are determined
- Able to interpret working and design the CRO and Able to calculate the frequency and time by using CRO
- Able to explain different types of special purpose Oscilloscopes
- Explain the different types of the transducers and basic working principle.
- Able to measure physical parameters by using different methods

TEXTBOOKS:

1. Electronic instrumentation: H.S.Kalsi - TMH, 2nd Edition 2004.
2. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbincs, W.D. Cooper: PHI, 5th Edition, 2003.

REFERENCE BOOKS :

1. Electronic Instrumentation and Measurements - David A. Bell, Oxford Uiv. Press, 1997.
2. Electronic Measurements and Instrumentation: B. M. Oliver, J. M. Cage TMH Reprint.
3. Measurement Systems - Emest O. Doebelin and Dhanesh N Manik, 6th Ed., TMH.
4. Electronic Measurements and Instrumentations by K. Lal Kishore, Pearson Education - 2010.
5. Industrial Instrumentation: T. R. Padmanabham Spiriger 2009.

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	3	**1/-/ -**	**3**

(A55021)COMPUTER ORGANIZATION

Course Objectives:

- This course is used to master the basic hardware and software issues of computer organization.
- The students are expected to know the inner workings of a computer
- Ability to analyze the hardware and software issues related to computers and the interface between the two.
- The students are able to work out the tradeoffs involved in designing a modern computer.

UNIT I

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

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

UNIT II

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction Codes, Computer Registers, computer instructions – instruction Cycle, memory reference instructions, input-output and interrupt.

Central Processing Unit: Stack organization, instruction formats, addressing modes, data transfer and manipulation, program control, CISC and RISC.

UNIT III

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

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

UNIT IV

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

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

UNIT V

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

Course Outcomes:

- Student will learn the concepts of computer organization for several engineering applications.
- Student will develop the ability and confidence to use the fundamentals of computer organization as a tool in the engineering of digital systems.
- An ability to identify, formulate, and solve hardware and software computer engineering problems using sound computer engineering principles

TEXT BOOKS:

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

REFERENCES:

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

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	3	**- /-/ -**	**3**

(A55021)CONTROL SYSTEMS ENGINEERING

Course Objectives:

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

UNIT I:

Introduction: Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feedback Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer functions.

Transfer Function Representation: Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using mason's gain formula.

UNIT II:

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

UNIT III:

Stability Analysis in S-Domain: The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability.

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

UNIT IV:

Frequency Response Analysis: Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and Phase margin and Gain margin-Stability Analysis from Bode Plots. Polar Plots, Nyquist Plots Stability Analysis. Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain, PID Controllers.

UNIT V:

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

Course Outcomes:

- To Summarize the mathematical models of translational and rotational mechanical systems from their idealized elements
- To Calculate the transfer function using block diagram reduction techniques and signal flow graph method
- To Apply their mathematical knowledge to calculate the response of a linear system to various types of inputs
- Be able to Develop familiarity and confidence to explain transient and steady state responses of a linear system
- Be able to Construct Routh array and Root-Locus to describe the stability of linear time invariant system
- To predict the stability of a linear time invariant systems using frequency response plots
- Be able to design and construct the compensators for linear systems to achieve the desired specifications.
- Be able to explain the stability of modern control systems using state space approach

TEXT BOOKS:

1. Control Systems Theory and Applications - S. K. Bhattacharya, Pearson.
2. Control Systems - N. C. Jagan, BS Publications.

REFERENCE BOOKS:

1. Control Systems - A. Ananad Kumar, PHI.
2. Control Systems Engineering - S. Palani, TMH.
3. Control Systems - Dhanesh N. Manik, Cengage Learning.
4. Control Systems Engineering - I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers.
5. Control Systems - N. K. Sinha, New Age International (P) Limited Publishers.

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	-	**- /3/ -**	**2**

(A55207) IC APPLICATIONS LAB

Note: Minimum 12 experiments should be conducted.

TO VERIFY THE FOLLOWING FUNCTIONS

1. IC 741 OP AMP Applications – Adder, Subtractor, Comparator.
2. Integrator and Differentiator Circuits using IC 741.
3. Active Filter Applications – LPF, HPF (Second order)
4. RC Phase shift and Wein Bridge Oscillator using 741 Op-Amp
5. IC 555 Timer in Monostable Operation
6. Schmitt Trigger Circuits Using IC 741 & IC555
7. ADC/DAC 4 bit DAC
8. Voltage Regulator using IC 723, Three Terminal Voltage Regulators - 7805, 7809, 7912.
9. Sampled and Hold LF 398 IC

TO VERIFY THE FUNCTIONS OF FOLLOWING 74 SERIES TTL ICs

10. D Flip Flop (74LS74) and JK Master Slave Flip Flop (74LS73)
11. Decade counter (74LS90) and Up-Down Counter (74LS192)
12. Universal Shift Register-74LS194/195
13. 3-8 Decoder-74LS138
14. Design of 4 bit binary to gray code converter
15. 4 bit Comparator 74LS85
16. 8X1 Multipler-74151 and 1X4 Demultiplexer-74155.
17. BCD to Seven segment Decoder 7490-7447

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(A55208)ANALOG COMMUNICATIONS LAB

Note: Minimum 12 experiments should be conducted:

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

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

Equipment required for Laboratories:

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

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	4	**- /-/ -**	**4**

(A56025)**MICROPROCESSORS AND MICROCONTROLLERS**

Course Objectives:

- To learn the Architecture, addressing modes and instruction set of 8086, 8051 and ARM processor.
- To learn the programming concepts of 8086, 8051 and ARM processor.
- Interface various peripherals to 8086 and 8051

UNIT I:

8086 Architecture: Functional Diagram, Register Organization, Addressing modes, Instructions, Functional schematic, Minimum and Maximum mode operations of 8086, 8086 Control signal interfacing, Timing Diagrams.

UNIT II:

Assembly Language Programming Of 8086: Assembly Directives, Macro's, Simple Programs using Assembler, Implementation of FOR Loop, WHILE, REPEAT and IF-THEN-ELSE Features.

UNIT III:

I/O Interface: 8255 PPI, Various modes of operations and interface of I/O devices to 8086, A/D, D/A Converter Interfacing.

Interfacing with advanced devices:8086 System bus structure, Memory and I/O Interfacing with 8086, Interfacing through various IC Peripheral Chips, 8257 (DMA Controller), 8259 (Interrupt Priority Control).

Communication Interface: Serial Communication Standards, USART Interfacing RS-232, IEEE-488, 20mA Current Loop, Prototyping and Trouble shooting, Software Debugging tools, MDS.

UNIT IV:

Introduction To Micro Controllers : Overview of 8051 Micro Controller, Architecture, I/O ports and Memory Organization, Addressing modes and Instruction set of 8051, Simple Programs using Stack Pointer, Assembly language programming.

UNIT V:

8051 Real Time Control and Industrial Applications: Interrupts, Timer/Counter and Serial Communication, Programming Timer Interrupts, Programming External H/W interrupts, Programming the serial communication interrupts, Interrupt Priority in the 8051, Programming 8051 Timers, Counters and Programming. Applications of Micro Controllers, Interfacing 8051 to LED's, Push button, Relay's and Latch Connections, Keyboard Interfacing, Interfacing Seven Segment Display, ADC and DAC Interfacing.

Course Outcomes:

- Explain the internal Architecture of 8086 microprocessors and evolution of microprocessors, Demonstrate the 8086 microprocessor Maximum mode and Minimum mode systems
- Use 8086 Instructions and Assembler directives for developing 8086 assembly programs with an assembler
- Develop interfacing of 8086 microprocessor with digital peripherals using Programmable parallel port, analog peripherals – ADC and DAC
- Discover the use of Interrupts and Interrupt responses, Demonstrate Direct Memory Access data transfer
- Explain the serial communication standards, USART architecture and interfacing
- Explain the 8051Architecture and evolution of microcontrollers
- Demonstrate about real time control(Interrupts serial communication, timers/counters)
- Demonstrate the internal architecture of AVR RISC MI

TEXT BOOKS:

1. Kenneth J Ayala, " The 8051 Micro Controller Architecture, Programming and Applications", Thomson Publishers, 2nd Edition.
2. D.V.Hall, "Micro Processor and Interfacing ", Tata McGraw-Hill.

REFERENCE BOOKS:

1. Ajay V. Deshmukh, "Microcontrollers – theory applications", Tata McGraw-Hill Companies – 2005.
2. Ray and BulChandi, " Advanced Micro Processors", Tata McGraw-Hill.
3. Kenneth J Ayala, " The 8086 Micro Processors Architecture, Programming and Applications", Thomson Publishers, 2005.
4. Microcomputer Systems: The 8086/8088 Family: Architecture, Programming and Design, 2nd ed., Liu & Gibson

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	3	**1/-/-**	**3**

(A56026) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Objective: To explain the basic principles of managerial economics, accounting and current business environment underlying business decision making.

UNIT – I

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

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

UNIT – II

Theory of Production and Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of inputs, Laws of Returns, internal and External Economics of scale.

Cost Analysis: Cost concepts, Opportunity cost, Out of pocket costs vs. Imputed costs. Break
– Even Analysis (BEA) – Determination of Break – Even Point (simple problems) – Managerial Significance and limitations of BEA.

UNIT – III

Introduction to Markets & Pricing Policies:

Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition, Price – Output determination in case of Perfect Competition

Objectives and Policies of Pricing – Methods of Pricing: Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two – Part Pricing, Block Pricing, Peak Load Pricing, Cross Subsidization.

UNIT – IV

Capital and Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method, Profitability Index, Internal rate of return (simple problems)

UNIT – V

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

Financial Analysis through ratios: Computation, Analysis and interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt – Equity, interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Profit Ratio, P/E Ratio and EPS).

TEXT BOOKS:

1. Aryasri, Managerial Economics and Financial Analysis, TMH, 2009.
2. Varshney & Maheshwari; Managerial Economics, Sultan Chand, 2009.

REFERENCES:

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

Codes / **Tables**: Present Value Tables need to be permitted into the examinations Hall.

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III year B.Tech (ECE), II Semester	**L**	**T/P/D**	**C**
	4	**1 /-/ -**	**4**

(**A56027**)**DIGITAL SIGNAL PROCESSING**

Course Objectives:

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

UNIT I:

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

Realization Of Digital Filters: Review of Z-transforms, Applications of Z – transforms, solution of difference equations of digital filters, Block diagram representation of linear constant-coefficient difference equations, Basic structures of IIR systems, Transposed forms, Basic structures of FIR systems, System function,

UNIT II

Discrete Fourier Series: Properties of discrete Fourier series, DFS representation of periodic sequences, Discrete Fourier transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT. Relation between Z-transform and DFS

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

UNIT III

IIR Digital Filters: Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters, Step and Impulse Invariant Techniques, Bilinear Transformation Techniques, Spectral transformation, Design Examples: Analog-Digital transformations.

UNIT IV

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

UNIT V

Multirate Digital Signal Processing: Decimation, interpolation, sampling rate conversion, Implementation of sampling rate conversion and applications. Finite Word Length Effects: Limit Cycles, Overflow Oscillations, Round Off Noise In IIR Filters, Computational Output Round Off Noise, Methods To Prevent Overflow, Trade Off Between Round Off And Overflow Noise, Dead Band Effects.

Course Outcomes:

- Perform time frequency and Z transform analysis on signals and systems
- Understanding the inter-relationship between DFT and various transforms
- Understand the significance of various filter structures and effects of round-off errors.
- Design a digital filter for a given specification.
- Understand the fast computation of DFT and appreciate the FFT processing.
- Understand the trade-offs between normal and Multirate DSP techniques and finite length word effects.

TEXT BOOKS:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis,
Pearson Education / PHI, 2007.
2. Discrete Time Signal Processing – A.V.Oppenheim and R.W. Schaffer, PHI
3. Digital Signal Processors – Architecture, Programming and Applications,, B.Venkataramani, M. Bhaskar, TATA McGraw Hill, 2002

REFERENCE BOOKS:

1. Digital Signal Processing: Andreas Antoniou, TATA McGraw Hill , 2006
2. Digital Signal Processing: MH Hayes, Schaum's Outlines, TATA Mc-Graw Hill, 2007.
3. DSP Primer - C. Britton Rorabaugh, Tata McGraw Hill, 2005.
4. Fundamentals of Digital Signal Processing using Matlab – Robert J. Schilling, Sandra L. Harris, Thomson, 2007.
5. Digital Signal Processing – Alan V. Oppenheim, Ronald W. Schafer, PHI Ed., 2006

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	4	**- /-/ -**	**4**

(**A56028**)**DIGITAL COMMUNICATIONS**

Course Objectives:

- To learn about various pulse and digital modulation techniques
- To study about concepts of base band transmissions
- To learn about information theory and various block codes

UNIT-I

Pulse Digital Modulation: Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Comparing in PCM systems. Differential PCM systems (DPCM).

Delta Modulation: Delta modulation, its draw backs, adaptive delta modulation, comparison of PCM and DM systems, noise in PCM and DM systems.

UNIT-II

Digital Modulation Techniques: Introduction, ASK, FSK, PSK, DPSK, DEPSK, QPSK, M-ary PSK, ASK, FSK, similarity of BFSK and BPSK.

UNIT-III

Data Transmission : Base band signal receiver, probability of error, the optimum filter, matched filter, probability of error using matched filter, coherent reception, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK,QPSK. Differential PSK

Information Theory : Discrete messages, concept of amount of information and its properties. Average information, Entropy and its properties. Information rate, Mutual information and its properties,

UNIT IV

Source Coding : Introductions, Advantages, Shannon's theorem, Shanon-Fano coding, Huffman coding, efficiency calculations, channel capacity of discrete and analog Channels, capacity of a Gaussian channel, bandwidth –S/N trade off

Linear Block Codes : Introduction, Matrix description of Linear Block codes, Error detection and error correction capabilities of Linear block codes, Hamming codes, Binary cyclic codes, Algebraic structure, encoding, syndrome calculation, BCH Codes.

Convolution Codes : Introduction, encoding of convolution codes, time domain approach, transform domain approach. Graphical approach: state, tree and trellis diagram decoding using Viterbi algorithm.

UNIT V

Spread Spectrum Modulation: Use Of Spread Spectrum, Direct Sequence Spread Spectrum (DSSS),Code Division Multiple Access, ranging Using DSSS,Frequency Hopping Spread Spectrum,PN Sequences, Generation And Characteristics, Synchronization In Spread Spectrum.

Course Outcomes:

- Describe the process of Sampling, Quantization and PCM techniques
- Determine the error rate due to noise in the Baseband Pulse transmission
- Understand the Passband transmission model and detection of signals in noise
- Describe the generation and detection of various shift keying techniques and determine their performance in terms of BER
- Understand and Implement the concepts of information theory for source coding and discrete memoryless channels
- understand channel coding theorem and Information capacity theorem
- Implement linear block codes and Convolutional codes for error detection and correction
- Understand and implement the decoding of different channel codes

TEXT BOOKS :

1. Digital communications - Simon Haykin, John Wiley, 2005
2. Principles of Communication Systems – H. Taub and D. Schilling, TMH, 2003

REFERENCES :

1. Digital and Analog Communication Systems - Sam Shanmugam, John Wiley, 2005.
2. Digital Communications – John Proakis, TMH, 1983. Communication Systems Analog & Digital – Singh & Sapre, TMH, 2004.
3. Modern Analog and Digital Communication – B.P.Lathi, Oxford reprint, 3rd edition, 2004.

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III Year B.Tech (ECE), II Semester	**L**	**T/P/D**	**C**
	3	**1/-/ -**	**3**

(A56031)INDUSTRIAL ELECTRONICS

(OPEN ELECTIVE)

Course Objectives:

- Develop an understanding of electrical relationships.
- Develop familiarity with power distribution equipment and requirements.
- Develop skills to identify proper electrical safety equipment and electrical safety procedures.
- Develop skills to calculate electrical circuit parameters.

UNIT I

DC AMPLIFIERS:

Need for DC amplifiers, DC amplifiers—Drift, Causes, Darlington Emitter Follower, Cascode amplifier, Stabilization, Differential amplifiers—Chopper stabilization, Operational Amplifiers, Ideal specifications of Operational Amplifiers, Instrumentation Amplifiers.

UNIT II

REGULATED POWER SUPPLIES:

Block diagram, Principle of voltage regulation, Series and Shunt type Linear Voltage Regulators, Protection Techniques— Short Circuit, over voltage and Thermal Protection.

SWITCHED MODE & IC REGULATORS:

Switched Mode voltage regulator, Comparison of Linear and Switched Mode Voltage Regulators, Servo Voltage Stabilizer, monolithic voltage regulators Fixed and Adjustable IC Voltage regulators, 3-terminal Voltage regulators—Current boosting .

UNIT III

SCR AND THYRISTOR:

Principles of operation and characteristics of SCR, Triggering of Thyristors, Commutation Techniques of Thyristors—Classes A, B, C, D, E and F, Ratings of SCR.

APPLICATIONS OF SCR IN POWER CONTROL:

Static circuit breaker, Protection of SCR, Inverters—Classification, Single Phase inverters, Converters – single phase Half wave and Full wave.

UNIT VI

DIAC, TRIAC AND THYRISTOR APPLICATIONS:

Chopper circuits – Principle, methods and Configurations, Diac and Triac, Triacs – Triggering modes, Firing Circuits, Commutation.

UNIT V

INDUSTRIAL APPLICATIONS - I

Industrial timers -Classification, types, Electronic Timers – Classification, RC and Digital timers, Time base Generators.

INDUSTRIAL APPLICATIONS - II

High Frequency heating – principle, merits, applications, High frequency Source for Induction heating, Thermal losses and Applications. Ultrasonics – Generation and Applications.

Course Outcomes:

- The student will demonstrate an understanding of electrical relationships, power distribution and requirements, safety equipment and procedures, and electrical calculations by passing quizzes and exams.
- The student will demonstrate an understanding of electrical phenomena by completing laboratory exercises.

TEXTBOOKS:

1. Industrial and Power Electronics – G.K. Mithal and Maneesha Gupta, Khanna Publishers, 19th Ed., 2003.

2. Integrated Electronics – J. Millman and C.C Halkias, McGraw Hill, 1972.

REFERENCES :

1. Electronic Devices and circuits – Theodore.H.Bogart, Pearson Education,6th Edn., 2003.

2. Thyristors and applications – M. Rammurthy, East-West Press, 1977.

3. Integrated Circuits and Semiconductor Devices – Deboo and Burroughs, ISE.

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	3	**1/-/ -**	**3**

(A56029) OOPS THROUGH JAVA

(OPEN ELECTIVE)

Course Objectives:

1. Understand the concept of OOP and learn the basic syntax and semantics of the Java
   language and programming environment
2. Be familiar with the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading.
3. Understand Exceptional handling and multithreading concepts
4. Be familiar with GUI applications.

Course Outcomes:

Student will be able to:

1. Design, write and test a java program to implement a working Understand the fundamental concepts of the object oriented paradigm and their implementation in the Java programming language.
2. Write code to define classes and interfaces that uses class libraries such as java.lang, java.util, java.io.
3. Use exception handling and multithreading in programs.
4. Develop GUI applications.
5. Give object oriented solutions for the complex and real world problems.

UNIT -- I:Fundamentals of Object Oriented Programming: Object-Oriented Paradigm, Basic Concepts of Object Oriented Programming- Objects and Classes, Data abstraction and encapsulation, inheritance ,Polymorphism, Data binding, Message Communication, Benefits of OOP, Applications of OOP. Java Basics History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, nested and inner classes, Strings.

UNIT -- II: Inheritance – Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, Object class

Packages and Interfaces : Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, File, Byte Streams, Character Streams, Stream I/O.

UNIT -- III: Exception handling - Concepts of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Package java.util- The Collection Interface, list interface, Queue interface, The Collection class: LinkedListClass, HashSetClass. TreeSetClass, StringTokenizer, Date, Random, Scanner.
Multi threading: Differences between multi threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication.
UNIT -- IV: Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.
AWT: class hierarchy, component, container, panel, window, frame, canvas, graphics, Layout Manager – layout manager types – boarder, grid, flow, card and grib bag.

UNIT -- V: AWT controls: Labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scroll pane, dialogs, menu bar.
Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, create applets, passing parameters to applets.
JDBC Connectivity: JDBC Type 1 to 4 Drivers, connection establishment, Query Execution.

Text Books:

1. Java- the complete reference, Seventh edition, Herbert schildt, Tata McGraw Hill.
2. Database Programming with JDBC&JAVA, Second Edition,GeorgeReese, O'ReillyMedia.

Reference Books:

1. Thinking in Java Fourth Edition, Bruce Eckel
2. Introduction to Java programming, Y. Daniel Liang, pearson education.

Understanding OOP with Java, updated edition, T. Budd, pearsoneduction

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(A56023)NANOTECHNOLOGY

(OPEN ELECTIVE)

Course Objectives:

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

UNIT I

Introduction to Nanotechnology: Importance of Nano scale, Electronic, Magnetic, Optical Properties of Nano materials, Approaches to Nanostructures.

Quantum Mechanical Phenomenon in Nanostructures: Quantum Confinement of Electrons in Semiconductor Nanostructures, Quantum Wells, Quantum Wires, Quantum Dots.

UNIT II

Carbon Nanostructures: CNTs ,Fullerenes, C60, C80, C240 nanostructures, Properties (Mechanical, Optical and Electrical) and applications.

UNIT II

Fabrication of Nanomaterials: Physical Methods: Inert Gas Condensation, Arc Discharge, RF plasma, Plasma arc technique, Ion sputtering, Laser ablation, Laser Pyrolysis, Molecular beam epitaxial, CVD method.

UNIT III

Nanoscale Characterization Techniques: Scanning Probe Techniques (AFM ,MFM, STM, SEM,TEM) , XRD.

Nanomedicine: Lab on chip for bio analysis, Core/Shell Nanoparticles in drug delivery systems, Targeted drug delivery, cancer treatment , and bone tissue treatment.

UNIT IV

Nano and Molecular Electronics: Resonant Tunnelling Structures, Single Electron Tunnelling, SET, Coulomb Blockade, Giant Magneto Resistance, Tunnelling Magneto Resistance.

UNIT V:

Nanolithography and Nanomanipulation: e- beam lithography an SEM based nanolithography and nanomanipulation, ion beam lithography, Oxidation and metallization, Mask and its application, Deep UV lithography, X ray based lithography.

Course outcomes:

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

TEXT BOOKS:

1. Charles.p.Poole, Introuction to nanotechnology, Springer publications.
2. Springer Handbook of Nanotechnology- Bharath Bhushan.
3. Phani Kumar,Principles of Nanotechnology, Scietech publications.

REFERENCE BOOKS :

1. David Ferry " Transport in Nanostructures " Cambridge University press 2000.
2. Nan biotechnology, ed. C.M.Neimeyer, C.A. Mirkin.
3. Nanofabrication towards bio medical applications: Techniques,tools,Application and impact,t-E. Challa S.S.R.Kumar ,J.H Carola.
4. Encyclopedia of Nanotechnology-Hari Singh Nawla.
5. Carbon Nanotubes:Properties and applications- Michael J. O'Connell.
6. S.Dutta " Electron Transport in microscopic System " Cambridge University press.
7. H. Grabert and Devoret " Single Charge Tunnelling " Plenum press 1992.

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	-	**- /3/ -**	**2**

(**A56207)MICROPROCESSORS AND MICROCONTROLLERS LAB**

Note: Minimum 12 experiments should be conducted:

The Following programs are to be written for assembler and to be executed the same with 8086 and 8051 kits

List of Experiments:

1. Programmes for 16 bit arithmetic operations for 8086 (Using Various Addressing Modes).
2. Program for sorting an array for 8086.
3. Program for searching for a number or character in string for 8086.
4. Program for string manipulations for 8086.
5. Program for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Interfacing 8255 to 8086.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 an programming to control stepper motor.
10. Interfacing LCD to 8086
11. Interfacing 8259 PIC to 8086.
12. Interfacing 8279 keyboard controller to 8086.
13. SRAM/DRAM Interfacing to 8086.
14. Programming using arithmetic, logical and bit manipulation instructions of 8051.
15. Program and verify Timer/counter in 8051.
16. Program and verify Interrupt handling in 8051.
17. Communication between 8051 kit and PC.
18. Interfacing Matrix/Keyboard to 8051.
19. Data Transfer from Peripheral to Memory through DMA controller 8237/8257.

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	-	**- /3/ -**	**2**

(**A56208**)**DIGITAL SIGNAL PROCESSING LAB**

Note:

- Minimum 12 experiments are to be conducted.
- The programs shall be implemented in software(Using MATLAB/Lab view/C programming/OCTAVE Equivalent) and hardware (Using TI / Analog devices/Motorola/Equivalent DSP processor)

List of Experiments:

1. Generation of Sinusoidal waveform/ signal based on recursive difference equations.
2. To find DFT/IDFT of given DT signal.
3. To find frequency response of given system given in(Transfer Function/Differential equation form).
4. Implementation of FFT of given sequence.
5. Determination of power spectrum of a given signal(s).
6. Implementation of LP FIR filters for a given sequence.
7. Implementation of HP FIR filters for a given sequence.
8. Implementation of LP IIR filters for a given sequence.
9. Implementation of HP IIR filters for a given sequence.
10. Generation of Sinusoidal signal through filtering.
11. Generation of DTMF signals.
12. Implementation of Decimation Process.
13. Implementation of Interpolation Process.
14. Implementation of I/D sampling rate converters
15. Noise removal: Add noise above 3 KHz and then remove, interference suppression using 400 Hz tone.
16. Impulse response of first order and second order systems.

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	-	**- /3/ -**	**2**

(A56209)Advanced English Communication Skills Lab

1. Introduction

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

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

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

2. Objectives:

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

To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.

Further, they would be required to communicate their ideas relevantly and coherently in writing.

3. Syllabus:

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

1. **Vocabulary Building** – synonyms and antonyms, Word Roots, One-Word Substitutes, Prefixes and Suffixes, Study of Word Origin, Analogy, Idioms and Phrases.
2. **Reading Comprehension –** Reading for Facts, Guessing meanings from context, Scanning, Skimming, Inferring Meaning, and Critical Reading.
3. **Writing Skills** –Structure and presentation of different types of writing - Resume Writing /E-Correspondence/Statement of Purpose.
4. **Technical Writing**- Technical Report Writing, Research Abilities/Data Collection/Organizing Data/Tools/Analysis.
5. **Group Discussion** – Dynamics of Group Discussion, Intervention, Summarizing, Modulation of Voice, Body Language, Relevance, Fluency and Coherence.
6. **Presentation Skills** – Oral presentations (individual and group) through JAM sessions/Seminars, Written Presentations through Projects/ PPTs/e-mails etc.
7. **Interview Skills** – Concept and Process, Pre-Interview Planning, Opening Strategies, Answering Strategies, Interview through Telephone and Video-Conferencing.

4. Minimum Requirement: The English Language Lab shall have two parts:

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

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

System Requirement (Hardware component): Computer network with Lan with minimum 60 multimedia systems with the following specifications:

i) P – IV Processor

a) Speed – 2.8 GHZ

b) RAM – 512 MB Minimum

c) Hard Disk – 80 GB

ii) Headphones of High quality

5. Suggested Software:

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

Suggested Software:

- Clarity Pronunciation Power – part II
- Oxford Advanced Learner's Compass, 7th Edition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech.
- TOEFL & GRE(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- The following software from train2success.com'
  i. Preparing for being Interviewed,
  ii. Positive Thinking,
  iii. Interviewing Skills,
  iv. Telephone Skills,
  v. Time Management
  vi. Team Building,
  vii. Decision making
- English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

6. **Books Recommended:**

Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.

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

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3	1/-/-	3

(A57029)MICROWAVE ENGINEERING

Course Objectives:

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

UNIT I: **Microwave Transmission Lines**

Introduction, Microwave Spectrum and Bands, Applications of Microwaves.

Rectangular Waveguides: Solution of Wave Equations in Rectangular coordinates. TE/TM mode Analysis, Expression for fields, Characteristic Equation and Cut-off Frequencies. Filter characteristics, Dominant and Degenerate Modes, Mode Characteristics: Phase and Group Velocities, Wavelengths and Impedance Relations. Power Transmission and Power Losses in Rectangular Waveguides.

Micro strip Lines- Introduction, Z0 Relations, Effective Dielectric Constant, Q Factor and Losses. Illustrative Problems.

UNIT II: **Waveguide components-I**

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

Coupling Mechanisms: Probe, Loop, Aperture types.

Waveguide Discontinuities: Waveguide Windows, Tuning Screws and Posts, Matched Loads.

Waveguide Attenuators: Different types, Resistive Card and Rotary vane Attenuators;

Waveguide Phase shifters: Types, Dielectric and Rotary vane Phase shifters.

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

UNIT III:

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

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

UNIT IV

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

Microwave Solid State Devices:

Transferred Electronic Devices: Introduction, Gunn Diode-Principle, Two valley theory, High field domain, Basic modes of operation.

UNIT V

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

Microwave Measurements

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

Course Outcomes:

- Learn the applications and advantages of microwaves and study the characteristics of waveguide and their mode patterns etc.
- Ability to describe the characteristics of cavities and microstrip lines.
- Develop an ability to assess reciprocal and nonreciprocal devices at microwave frequencies(attenuators, circulators Power dividers, Phase shifters etc).
- Describe and derive the waveguide multi port networks and their Scattering parameters
- Learn the principle of operation of klystron theory for microwave signal generation and amplification
- Learn the principle of operation of magnetron and TWT for microwave signal generation and amplification
- Differentiate the principle of operation of solid state devices and Interpret the theory for microwave signal generation and amplification
- Ability to do experiments for the measurement of RF power, Impedance, Attenuation, Frequency, VSWR etc

TEXT BOOKS

1. Microwave Devices and Circuits – by Samuel Y. Liao, Pearson,3rd Edition,2003
2. Microwave Principles – Herbert J. Reich, J.G. Skalnik, P.F. Ordung and H.L. Krauss, CBS Publishers and distributors, New Delhi, 2004.
3. Foundations for Microwave Engineering – R.E. Collin, IEEE Press, John Wiley, 2nd Edition, 2002.

REFERENCES

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

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(A57030)MANAGEMENT SCIENCE

Course Aim: The aim of this course is to enable the students to see that many managerial decision-making situations can be addressed using standard techniques and methods, provide a comprehensive and concise introduction to the key techniques and methods used within management science that are directly relevant to the managerial context, enable you to see both the benefits, and limitations, of the techniques and methods presented.

Unit-I:

Introduction to Management: Nature and importance of management, Functions of Management, Taylor's Scientific Management Theory, Fayol's principles of management, Maslow's theory of Human Needs, Douglas Mc Gregor's Theory X and Theory Y, Herzberg's Two factor Theory of Motivation. Systems Approach to Management, Leadership Styles, Social Responsibilities of Manager, Organization levels and types of organization structures.

Unit-II

A) Operations Management: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass production), Work Study - Basic procedure involved in Method Study and Work measurement- Statistical Quality Control - X chart, R chart, C chart, P chart, (simple problems), Acceptance Sampling, Deming's contribution to quality.
B) Materials Management: Objectives, Need for inventory control, EOQ, ABC Analysis, Purchase procedure, Stores management and Stores records, Supply chain management.

Unit –III

A) Human Resources Management (HRM): Evolution of HRM, Concepts of HRM, Basic functions of HR Manager - Manpower Planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.
B) Marketing: Functions of Marketing, Marketing Mix, Marketing strategies based on Product Life cycle, Channels of distribution.

Unit –IV

Project Management(PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method(CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing.(Simple problems)

Unit –V

Strategic & Contemporary Management Practices: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of corporate planning process, Environmental Scanning, SWOT analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Basic concepts of Just-In-Time(JIT) system, Total Quality Management(TQM), Six Sigma and Capability Maturity Model(CMM) levels, Value chain Analysis.

Course Outcomes: On completion of the course, the student should be able to discuss the main techniques and methods used within management science, critically appraise the strengths and limitations of these techniques and methods, carry out simple exercises using such techniques and methods themselves.

Text books:

1. Aryasri, Management Science, TMH, New Delhi, 2009

References:

1. Kotler Philip and Keller Kevin Lane, Marketing Management, Pearson, 2012.
2. Koontz and Weihrich, Essentials of Management, McGraw Hill, 2012.
3. Thomas N. Duening and John M. Ivancevich Management, Principles and Guidelines, Biztantra, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2012.
5. Samuel C. Certo, Modern Management, 2012.
6. Schermerhorn, Capling, Poole and Wiesner, Management, Wiley, 2012.
7. Parnell, Strategic Management, Cengage, 2012.
8. Lawrence R Jauch, R. Gupta and William F. Glueck: Business Policy and Strategic Management Science, McGraw Hill, 2012.

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IV Year B.Tech. ECE - I Sem

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3	1/-/-	3

(A57014)VLSI DESIGN

Course Objectives:

- To learn the various fabrication steps of IC and come across basic electrical properties of MOSFET.
- To study the concepts of stick diagrams and layouts with the knowledge of MOS layers through design rules.
- To study gate level design of subsystem, integrated circuit and CMOS testing.

UNIT I

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

Basic Electrical Properties : Basic Electrical Properties of MOS ,CMOS and Bi-CMOS Circuits: IDS-VDS relationships, MOS transistor threshold Voltage, g_m, g_{ds}, figure of merit, Pass transistor, NMOS inverter, Various pull - ups, Determination of pull-up to pull-down ratio(Z_{pu} / Z_{pd}) , CMOS Inverter analysis and design, Bi-CMOS inverters, Latch-up in CMOS circuits.

UNIT II

Vlsi Circuit Design Processes : VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layouts, Lambda based design rules, Contact cuts , CMOS Lambda based design rules, Layout Diagrams for logic gates, Transistor structures, wires and vias, Scaling of MOS circuits- Scaling models, scaling factors, scaling factors for device parameters, Limitations of Scaling.

UNIT III

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

UNIT IV

Subsystem Design: Subsystem Design, Shifters, Adders, ALUs, Multipliers: Array multiplier, Serial-Parallel multiplier, Parity generator, Comparators, Zero/One

Detectors, Up/Down Counter, Memory elements.

Semiconductor Integrated Circuit Design: PLDs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Programmable Logic Array Design Approach.

UNIT V

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

Course Outcomes:

- Acquire qualitative knowledge about the fabrication process of integrated circuit using MOS transistors.
- Choose an appropriate inverter depending on specifications required for a circuit.
- Draw the layout of any logic circuit which helps to understand and estimate parasitic of any circuit.
- Design different types of logic gates using CMOS inverter and analyze their transfer characteristics.
- Provide design concepts required to design building blocks of data path using gates.
- Design simple memories using MOS transistors and can understand design of large memories.
- Design simple logic circuit using PLA, PAL, FPGA and CPLD.
- Understand different types of faults that can occur in a system and learn the concept of testing and adding extra hardware to improve testability of a system.

TEXTBOOKS

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

REFERENCES

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

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IV Year B.Tech. ECE - I Sem

L	T/P/D	C
3	1/-/-	3

(A57031)COMPUTER NETWORKS

Objectives:

- To introduce the fundamental various types of computer networks.
- To demonstrate the TCP/IP and OSI models with merits and demerits.
- To introduce UDP and TCP Models.

UNIT - I:

Overview of the Internet: Protocol, Layering Scenario, TCP/IP Protocol Suite: The OSI Model, Internet history standards and administration; Comparison of the OSI and TCP/IP reference model.

Physical Layer: Guided transmission media, wireless transmission media.

Data Link Layer - design issues, CRC codes, Elementary Data Link Layer Protocols, sliding window protocol

UNIT - II:

Multi Access Protocols - ALOHA, CSMA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, data link layer switching & use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

UNIT - III:

Network Layer: Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Control to Infinity Problem, Hierarchical Routing, Congestion control algorithms, admission control.

UNIT - IV:

Internetworking: Tunnelling, Internetwork Routing, Packet fragmentation, IPv4, IPv6 Protocol, IP addresses, CIDR, IMCP, ARP, RARP, DHCP.

Transport Layer: Services provided to the upper layers elements of transport protocol-addressing connection establishment, connection release, Connection Release, Crash Recovery.

UNIT - V:

The Internet Transport Protocols UDP-RPC, Real Time Transport Protocols, The Internet Transport Protocols- Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Connection Management Modelling, The TCP Sliding Window, The TCP Congestion Control, The future of TCP.

Application Layer- Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS, SSH

Outcomes:

- Students should be understand and explore the basics of Computer Networks and Various Protocols.
- He/She will be in a position to understand the World Wide Web concepts.
- Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile, and ad hoc networks.

TEXT BOOKS:

1. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.
2. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education.

REFERENCES BOOKS:

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
3. Introduction to Computer Networks and Cyber Security, Chwan-Hwa (John) Wu, J. David Irwin, CRC Press.
4. Computer Networks, L. L. Peterson and B. S. Davie, 4th edition, ELSEVIER.
5. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

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IV Year B.Tech. ECE - I Sem

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3	-/-/-	3

(A57032)DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES

(ELECTIVE-I)

Course Objectives:

- To enable the student to quickly understand the basic concepts of digital signal processing using a DSP processor, specifically the TMS320C54xx.
- To introduce ARM Cortex M4 processors architectures, programming and detailed uses of floating point unit and DSP instruction.

UNIT-I: Introduction to Digital Signal Processing:

Introduction, A digital Signal – Processing system, the sampling process, Discrete time sequences, Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), linear time-invariant systems, Digital filters, Decimation and interpolation.

Architectures for Programmable DSP devices:

Basic Architectural features, DSP computational building blocks, Bus Architecture and Memory, Data addressing capabilities, Address generation UNIT, programmability and program execution, speed issues, features for external interfacing. [TEXTBOOK-1]

UNIT-II: Programmable Digital Signal Processors:

Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX processors, memory space of TMS320C54XX processors, program control, TMS320C54XX instructions and programming, On-Chip peripherals, Interrupts of TMS320C54XX processors, Pipeline operation of TMS320C54XX processors. [TEXTBOOK-1]

UNIT-III: Architecture of ARM Processors:

Introduction to the architecture, Programmer's model- operation modes and states, registers, special registers, floating point registers, Behaviour of the application program status register(APSR)-Integer status flags, Q status flag, GE bits, Memory system-Memory system features, memory map, stack memory, memory protection unit (MPU), Exceptions and Interrupts-what are exceptions?, nested vectored

interrupt controller(NVIC), vector table, Fault handling, System control block (SCB), Debug, Reset and reset sequence.

Technical Details of ARM Processors:

General information about Cortex-M3 and cortex M4 processors-Processor type, processor architecture, instruction set, block diagram, memory system, interrupt and exception support, Features of the cortex-M3 and Cortex-M4 Processors-Performance, code density, low power, memory system, memory protection unit, interrupt handling, OS support and system level features, Cortex-M4 specific features, Ease of use, Debug support, Scalability, Compatibility. [TEXTBOOK-2]

UNIT-IV: Instruction SET:

Background to the instruction set in ARM Cortex-M Processors, Comparison of the instruction set in ARM Cortex-M Processors, understanding the assembly language syntax, Use of a suffix in instructions, Unified assembly Language (UAL), Instruction set, Cortex-M4-specific instructions, Barrel shifter, Accessing special instructions and special registers in Programming. [TEXTBOOK-2]

UNIT-V: Floating Point Operations:

About Floating Point Data,Cortex-M4 Floating Point Unit (FPU)- overview, FP registers overview, CPACR register, Floating point register bank, FPSCR, FPU->FPCCR, FPU-> FPCAR, FPU->FPDSCR, FPU->MVFR0, FPU->MVFR1.

ARM Cortex-M4 and DSP Applications:

DSP on a microcontroller, Dot Product example, writing optimised DSP code for the Cortex-M4-Biquad filter, Fast Fourier transform, FIR filter. [TEXTBOOK-2]

Course Outcomes:

- Student can use DSP operations on TMS320C54xx processors.
- Gets introduced to cortex M4 processors along with ARM architectures supporting DSP operations.
- DSP instructions can be used by the students, for floating point unit.
- DSP applications can be developed by the students.

TEXTBOOKS:

1. Digital Signal Processing- Avtar Singh and S. Srinivasan, Thomson Publications,2004.
2. The Definitive Guide to ARM Cortex-M3 and Cortex-M4 Processors by Joseph Yiu, Elsevier Publications, Third edition.

REFERENCES:

1. ARM System Developer's Guide Designing and Optimizing System Software by Andrew N. SLOSS, Dominic SYMES, Chris WRIGHT, Elsevier Publications, 2004.

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IV Year B.Tech. ECE - I Sem

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3	-/-/-	3

(A57033)OPTICAL COMMUNICATIONS

(ELECTIVE-I)

Course Objectives:

- To learn about the basic elements of optical fiber transmission link, fiber modes configurations and structures
- To understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors
- To learn about various optical sources and photo detectors
- To learn about the fiber optical network components and networking of optical fibers.

UNIT I :

Optical fiber communication - The general system, Advantages of optical fiber communications. Optical fiber wave guides- Introduction, Ray theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew rays. Cylindrical fibers- Modes, V number, Mode coupling, Step Index fibers, Graded Index fibers. Single mode fibers- Cut off wavelength, Mode Field Diameter, Effective Refractive Index. Signal distortion in optical fibers- Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses.

UNIT II :

Group delay, Types of Dispersion – Intra model dispersion: Material dispersion, Wave-guide dispersion, Polarization mode dispersion, Intermodal dispersion. Optical fiber Connectors- Connector types, Single mode fiber connectors, Connector return loss. Fiber Splicing- Splicing techniques, Fiber alignment and joint loss- Multimode fiber joints, single mode fiber joints.

UNIT III:

Optical sources - LEDs, Structures, Materials, Quantum efficiency, Power, Modulation, Power bandwidth product. Injection Laser Diodes- Modes, Threshold conditions, External quantum efficiency, Laser diode rate equations, Resonant frequencies. Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling.

UNIT IV:

Optical detectors - Physical principles of PIN and APD, Detector response time,

Temperature effect on Avalanche gain, Comparison of Photo detectors. Optical receiver operation-fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit, Analog receivers

UNIT V:

Optical system design — System Considerations, Component choice, Multiplexing. Point-to-point links, System specifications, Link power budget with examples, Rise time budget with examples. WDM - Principles, Types of WDM, Measurement of Attenuation and Dispersion

Course Outcomes:

- Posses and understanding various fiber optic components used in optical fiber communication systems. Evaluate and design analog and digital optical fiber communication system..
- Summarize the optical fiber waveguide transmission through SM & MM fibers
- Ability to analyze the Types of Dispersions
- Understand basics of LASER Diodes & LEDs and study their characteristics. Ability to analyze characteristics of optical fiber
- Ability to Understand the how to Launch the Power into Optical Fiber
- Understand basics of Optical Detectors and their characteristics
- To gain the Knowledge of Optical System Design
- Explain the WDM concepts

TEXT BOOKS

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

RERFERENCES

1. Fiber Optic Communications – D.K. Mynbaev , S.C. Gupta and Lowell L. Scheiner, Pearson Education, 2005.
2. Text Book on Optical Fibre Communication and its Applications – S.C.Gupta, PHI, 2005.
3. Fiber Optic Communication Systems – Govind P. Agarwal , John Wiley, 3rd Ediition, 2004.
4. Fiber Optic Communications – Joseph C. Palais, 4th Edition, Pearson Education, 2004.

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IV Year B.Tech. ECE - I Sem

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3	-/-/-	3

(A57034)DIGITAL IMAGE PROCESSING

(ELECTIVE-I)

Course Objectives

- Able to acquire and represent the image in spatial domain.
- Able to transform images from spatial to frequency domains.
- To introduce students to a large variety of processing techniques of practical interest related to recent developments in Digital image processing

UNIT I

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

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

UNIT II

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

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

UNIT III

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

UNIT IV

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

UNIT V

Image Restoration: Image Restoration Degradation model, Algebraic approach to

restoration, Inverse Filtering, Least Mean square filters.

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

Course Outcomes:

- Apply to current technologies and issues that are specific to image processing systems.
- Leverage the student's knowledge of image processing to a practical system.
- Compress the Digital image which is required for storage and transmission of digital images.

TEXT BOOKS

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

REFERENCES

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

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IV Year B.Tech. ECE - I Sem

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(A57018)NEURAL NETWORKS AND FUZZY LOGIC

(ELECTIVE-II)

Course Objectives:

- This course introduces the basics of Neural Networks and essentials of Artificial Neural Networks with Single Layer and Multilayer Feed Forward Networks.
- It also deals with Associate Memories and introduces Fuzzy sets and Fuzzy Logic system components. The Neural Network and Fuzzy Network system application to Electrical Engineering is also presented.

UNIT – I

Introduction to Neural Networks

Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, , ANN Architectures, Types of neuron models: Integrate-and-Fire Neuron Model, Spiking Neuron Model, McCulloch-Pitts Model, Characteristics and Operation of ANN, Historical Developments and Potential Applications of ANN. Types of Neuron Activation Function, Classification Taxonomy of ANN – Connectivity, Neural Dynamics (Activation and Synaptic), Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules, Types of Applications

UNIT–II

Feed Forward Neural Networks

Single layer: Introduction, Perception Models- Discrete, Continuous, Training Algorithms- Discrete and Continuous Perception Networks,
Multi layer: Generalized Delta Rule, Derivation of Back propagation (BP) Training, Summary of Back propagation Algorithm, Learning Difficulties and Improvements.

UNIT- III

Associative Memories

Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory (Associative Matrix, Association Rules, Hamming Distance, The Linear Associator, Matrix Memories, Content Addressable Memory), Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms:

Storage and Recall Algorithm Architecture of Hopfield Network: Discrete and Continuous versions

UNIT – IV

Classical & Fuzzy Sets

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

Fuzzy Logic System Components: Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

UNIT- V

Applications

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

TEXT BOOKS:

1. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications - Rajasekharan and Rai – PHI Publication, 2009.
2. Introduction to Artificial Neural Systems – Jacek M Zurada, Jaico publishing house 1997

REFERENCE BOOKS:

1. Neural and fuzzy systems : Foundations, Architectures and applications – N Yadaiah and S.BapiRaju, Pearson Education
2. Neural Networks – James A Freeman and Davis Skapura, Pearson Education, 2002.
3. Neural Networks – Simon Hakins , Pearson Education, 2 nd edition, 2008.
4. Neural Engineering - C.Eliasmith and CH.Anderson, PHI, 2003.
5. Neural Networks and Fuzzy Logic System - Bart Kosko, PHI Publications,2003

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IV Year B.Tech. ECE - I Sem

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3	-/-/-	3

(A57035)SATELLITE COMMUNICATIONS

(ELECTIVE-II)

Course Objectives:

- Know, design understand the construction and principles of Satellites used for communications, GPS and other applications
- Know the tracking techniques of satellites
- Learn about various multiple accessing techniques

UNIT I:

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

Orbital Mechanics and Launchers: Orbital Mechanics, Look Angle determination, Orbital perturbations, Orbital determination, Launches and Launch vehicles, Orbital effects in communication systems performance.

UNIT II:

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

UNIT III:

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

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

UNIT IV:

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

UNIT V:

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

Course Outcomes:

- Understand the communication satellite mechanics
- Know about the satellite internal sub systems for communication applications
- Design the power budget for satellite links
- Know about the principles of GPS
- Understand various constellations of satellite and their applications

TEXT BOOKS

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

REFERENCES

1. Satellite Communications: Design Principles- M. Richharia, B S publications, 2nd Edition, 2003.
2. Satellite Communication- D.C Agarwal, Khanna Publications, 5th Edition.
3. Fundamentals of Satellite Communications- K.N. Raja Rao, PHI, 2004
4. Satellite Communications- Dennis Roddy, McGraw Hill, 4th Edition, 2009

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IV Year B.Tech. ECE - I Sem

L	T/P/D	C
3	-/-/-	3

(A57036)TELECOMMUNICATION SWITCHING SYSTEMS
(ELECTIVE-II)

Course Objectives:

- To study about the basic concepts of telephony switching.
- To learn about the telecommunication networks.
- To learn about the telecommunication signalling.

UNIT I

Switching Systems: Evolution of Telecommunications; Basics, functions, types and design parameters of switching system. 100/1000/10,000 Line exchange. Principles of Crossbar switching; A general trunking; Electronic and digital switching systems.

UNIT II

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

Switching Networks: Introduction, Single stage networks; Grading Principles; Design of progressive grading; other forms of grading; Traffic capacity of Grading; Applications of grading; Link systems-grading; Two, Three and four stage networks; Grades of service of link systems.

UNIT III

Time Division switching: Basics of time division space switching; basics of time division time switching; Time multiplexed space switch; Time multiplexed time switch; Combination switching; Three stage Combination switching. Control of switching systems; call processing functions; sequence of operations; signal exchanges; State transition diagrams; common control; reliability; availability and security ; Stored program control.

UNIT IV

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

UNIT V

Packet Switching: Introduction; Statistical multiplexing; Local and wide Area networks- network topologies and their comparison; Optical fiber Networks; Large scale networks-General; Datagram's and virtual circuits; Routing; Flow control; Standards; Frame relay;

Broadband networks-general; Asynchronous Transfer mode; ATM switches; ISDN; Cellular radio networks; private networks; charging; Routing-general, automatic, Alternative routing.

Course Outcomes:

- Describe the Elements of switching systems.
- Calculate network traffic load and parameters
- Classify different switching systems
- Interpret the switching network configurations
- Explain subscriber loop systems and routing
- Explain the signalling techniques
- Summarize LAN, WAN and MAN
- Describe network architectures and protocol for ISDN & SONET

TEXT BOOKS

1. Telecommunication Switching and Traffic Networks, J.E Flood, Pearson Eduction, 2006.
2. Telecommunication Switching system and Networks, Tyagarajan Viswanathan Prentice hall of India Pvt. Ltd., 2006

REFERENCES

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

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IV Year B.Tech. ECE - I Sem

L	T/P/D	C
	-/3/-	2

(A57210) MICROWAVE AND DIGITAL COMMUNICATIONS LAB

Note:- minimum 12 experiments to be conducted

Part-A: Microwave Engineering Lab (Any 6 experiments)

1. Reflex klystron characteristics
2. Gunn diode characteristics
3. Directional coupler characteristics
4. VSWR measurement
5. Measurement of waveguide parameters
6. Measurement of impedance of a given load
7. Measurement of a scattering parameters of a magic tee
8. Measurement of scattering parameters of circulator
9. Attenuation measurement
10. Microwave frequency measurement

Part-B: Digital Communication Lab (Any 6 Experiments)

1. PCM generation and detection
2. Differential pulse code modulation
3. Delta modulation
4. Time division multiplexing of 2 band limited signals
5. Frequency shift keying
6. Phase shift keying
7. Amplitude shift keying
8. DPSK: generation and detection
9. QPSK: generation and detection
10. Study of the spectral characteristics of PAM,QAM

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IV Year B.Tech. ECE - I Sem

L	T/P/D	C
	-/3/-	2

(A57211) ECAD AND VLSI LAB

E-CAD Programs

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

1. HDL code to realize all the logic gates.
2. Design of 3-to -8 decoder.
3. design of full adder using half adders
4. design of binary adder
5. Design of 4 bit binary to gray converter, gray to binary converter.
6. Design of flips: SR, D, JK, T.
7. Design of decade counter
8. Finite state machine design

VLSI Program

1. Introduction to layout design rules
   Layout, physical verification, placement and route for complex design static timing analysis, IR drop analysis and cross talk analysis of following.
2. Basic logic gates
3. CMOS inverter, CMOS NOR/ NAND gates
4. CMOS XOR gate and MUX, CMOS 1-bit full adder
5. static/dynamic logic circuit (register cell)
6. Latch
7. Pass transistor
8. Layout of any combinational circuit (complex CMOS logic gates)

Note: Minimum of 12 experiments to be conducted.

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IV Year B.Tech. ECE - II Sem

L	T/P/D	C
3	-/-/-	3

(A58022) CELLULAR AND MOBILE COMMUNICATIONS (ELECTIVE-III)

Course Objectives:

- To understand concepts of cellular and mobile radio systems
- To design cellular radio system and the required antennas
- To learn about digital cellular networks
- To understand concepts of cellular and mobile radio systems
- To design cellular radio system and the required antennas
- To learn about digital cellular networks

UNIT I

CELLULAR MOBILE RADIO SYSTEMS: Introduction to Cellular Mobile System, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems.

ELEMENTS OF CELLULAR RADIO SYSTEM DESIGN : General description of the problem, concept of frequency reuse, Co-channel Interference Reduction Factor, desired C/I from a normal case in a omni-directional Antenna system, Cell splitting, consideration of the components of Cellular system.

UNIT II

INTERFERENCE: Introduction to Co-Channel Interference, real time Co-Channel interference, measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-co-channel interference-different types.

CELL COVERAGE FOR SIGNAL AND TRAFFIC : Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation, path loss from of a point to point prediction model.

UNIT III

CELL SITE AND MOBILE ANTENNAS : Sum and difference patterns and their synthesis, omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas.

FREQUENCY MANAGEMENT AND CHANNEL ASSIGNMENT: Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channel assignment.

UNIT IV

HANDOFFS AND DROPPED CALLS:

Handoff, dropped calls and cell splitting, types of handoff, handoff initiation, delaying handoff, forced handoff, mobile assisted handoff, Intersystem handoff, micro cells, vehicle locating methods, dropped call rates and their evaluation.

UNIT V

DIGITAL CELLULAR NETWORKS: GSM architecture, GSM channels, GSM Standards, multiple access schemes -TDMA, CDMA.

Course Outcomes:

- Understanding the cellular and frequency reuse concept
- Understanding of wireless propagation of Electromagnetic wave (reflection, diffraction, and scattering) and associated losses
- Understanding and application of trunking theory and application of Erlang B, and Erlang C formulas
- Basic Design and Planning of a wireless cellular system
- Understanding some of the contemporary issues in the cellular communications engineering profession
- Applying analog and digital communications principles to cellular and wireless communications
- Successfully conduct and present term project
- Differentiate the generations of cellular communications

TEXTBOOKS

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2nd Edition, 2006.
2. Principles of Mobile Communications – Gordon L. Stuber, Springer International 2nd Edition, 2007.

REFERENCES

1. Wireless Communications - Theodore. S. Rapport, Pearson education, 2nd Edition, 2002.
2. Wireless and Mobile Communications – Lee McGraw Hills, 3rd Edition, 2006.
3. Wireless Communication and Networking – Jon W. Mark and Weihua Zhqung, PHI, 2005.

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IV Year B.Tech. ECE - II Sem

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(A58023) BIO-MEDICAL SIGNAL PROCESSING (ELECTIVE-III)

Course Objectives

- Identify and obtain biological parameters and relationship between them.
- Understand the principles involved in acquiring different bio-signals.
- Represent these principles in form of mathematical equations.

UNIT I:

Bio-signals and their characteristics,organization of cell, Nernst equation of membrane, Resting and Action potentials. Bio-amplifiers,characteristics of medical instruments, problems encountered with measurements from living systems. Bio-potential electrodes – Body surface recording electrodes, Internal electrodes, micro electrodes. Bio-chemical transducers– reference electrode, the pH electrodes, Blood gas electrodes.

UNIT II:

Heart and cardiovascular system Heart electrical activity, blood pressure and heart sounds. Cardiovascular measurements electro cardiography – electro cardiogram, ECG Amplifier, Electrodes and leads, ECG recorder principles. Types of ECG recorders. Principles of blood pressure and blood flow measurement.

UNIT III:

Anatomy of the nervous system-neuronal communication, electro encephalogram (EEG), EEG Measurements EEG electrode-placement system, interpretation of EEG, EEG system Block diagram, pre-amplifiers and amplifiers, Anatomy of vision, electrophysiology of the Eye (ERG) Spatial properties of ERG, the electrooculogram (EOG), Ophthalmoscopes, Tonometer for eye pressure measurement.

UNIT IV:

Therapeutic equipment, Pacemaker, Defibrillator, Shortwave diathermy. Hemodialysis machine. Respiratory Instrumentation - Mechanism of respiration, Spirometry, Pneumotachograph, Ventilators.

UNIT V:

Modern medical imaging systems-Radiography, computed Radiography, Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Nuclear Medicine, Single Photon Emission Computed Tomography(SPECT), Positron Emission Tomography (PET), Ultrasonography.

Course Outcomes:

- Apply fundamental knowledge of mathematics coupled with electronics and use it for designing bio amplifiers for different applications.
- Understand or become aware of artifacts caused by an incorrect diagnosis of the symptoms through sample data.
- Apply these equations to analyze real time problems by making good assumptions and learn systematic engineering method design robust amplifiers.

TEXT BOOKS

1. Biomedical Instrumentation and Measurements – by Leslie Cromwell, F.J. Weibell, E.A. Pfeiffer, PHI.
2. Medical Instrumentation, Application and Design – by John G. Webster, John Wiley.

REFERENCES

1. Principles of Applied Biomedical Instrumentation – by L.A. Geoddes and L.E. Baker, John Wiley and Sons.
2. Hand-book of Biomedical Instrumentation – by R.S. Khandpur, McGraw-Hill, 2003.
3. Introduction to Biomedical equipment technology-by Joseph Carr and Brown.
4. Biomedical Electronics and Instrumentation by Omkar N Pandey and Rakesh Kumar

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(A58024) EMBEDDED SYSTEMS (ELECTIVE-III)

Course Objectives:

- Describe what makes a system a real-time system.
- Explain the presence of and describe the characteristics of latency in real-time systems.
- Summarize special concerns that real-time systems present and how these concerns are addressed.

Unit - I

Embedded Computing: Introduction, Complex Systems and Microprocessor, The Embedded System Design Process, Formalisms for System Design, Design Examples.

The 8051 Architecture : Introduction, 8051 Micro controller Hardware, Input/output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/output, Interrupts.

Unit - II

Basic Assembly Language Programming Concepts: The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051. Data Transfer and Logical Instructions.

Arithmetic Operations, Decimal Arithmetic. Jump and Call Instructions, Further Details on Interrupts.

Unit - III

Applications: Interfacing with Keyboards, Displays, D/A and A/D Conversions, Multiple Interrupts, Serial Data Communication.

Introduction to Real – Time Operating Systems: Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment.

Unit - IV

Basic Design Using a Real-Time Operating System : Principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (Open Source); Embedded Software Development

Tools: Host and Target machines, Linker/Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System.

Unit - V

Introduction to advanced architectures: ARM and SHARC, Processor and memory organization and Instruction level parallelism; Networked embedded systems: Bus protocols, I2C bus and CAN bus; Internet-Enabled Systems, Design Example-Elevator Controller.

Course Outcomes:

- Identify the unique characteristics of real-time systems
- Explain the general structure of a real-time system
- Define the unique design problems and challenges of real-time systems
- Apply real-time systems design techniques to various software programs
- Understand the basics of an embedded system
- Program an embedded system
- Design, implement and test an embedded system

TEXT BOOKS :

1. Computers as Components-principles of embedded computer system design, Wayne Wolf, Elseveir.
2. The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson.

REFERENCES :

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

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(A58025) RADAR SYSTEMS
(ELECTIVE-IV)

Course Objectives:

• To derive and discuss the Range equation and the nature of detection.
• To apply Doppler principle to radars and hence detect moving targets, cluster, also to understand tracking radars
• To refresh principles of antennas and propagation as related to radars, also study of transmitters and receivers.
• To understand principles of navigation, in addition to approach and landing aids as related to navigation
• To understand navigation of ships from shore to shore

UNIT I

Basics of Radar: Introduction, Radar block diagram and operation, Maximum Unambiguous Range, Simple form of Radar Equation, Radar frequencies and Applications. Prediction of Range Performance, Minimum detectable Signal, Receiver Noise, Modified Radar Range Equation, Illustrative Problems.

Radar Equation: SNR, Envelope Detector, False Alarm Time and Probability, Integration of Radar Pulses, Radar Cross Section of Targets (simple targets: sphere, cone–sphere), Transmitter Power, PRF and Range Ambiguities. Systems Losses (qualitative treatment) Illustrative Problems.

UNIT II

CW and Frequency Modulated Radar: Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and receiver, Non zero IF Receiver , Receiver Bandwidth Requirements, Applications of CW Radar. Illustrative Problems.

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

UNIT III

MTI and Pulse Doppler radar: Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers – Filter Characteristics, Blind Speeds, Double Cancellation, Staggered PRFs. Range Gated

Doppler Filter. MTI Radar Parameters, Limitations to MTI Performance, MTI versus Pulse Doppler Radar.

Tracking Radar: Tracking with Radar, Sequential Lobbing, Conical Scan, Monopulse

Tracking Radar – Amplitude Comparison Monopulse (one- and two- coordinates), Phase Comparison Monopulse. Tracking in Range, Acquisition and Scanning Patterns. Comparison of Trackers.

UNIT V

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

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

COURSE OUTCOMES:

- Explain principles of navigation, in addition to approach and landing aids as related to navigation
- Derive and discuss the Range equation and the nature of detection.
- Describe about the navigation systems using the satellite.

TEXT BOOKS

1. Introduction to Radar Systems – Merrill I. Skolnik, TMH Special Indian Edition, 2nd ed., 2007.
2. Radar Principles – Peebles, Jr., P.Z., Wiley, New York, 1998.

REFERENCES

1. Introduction to Radar Systems – Merrill I. Skolnik, 3rd ed., TMH, 2001.
2. Radar : Principles, Technology, Applications – Byron Edde, Pearson Education, 2004.

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(A58026) RF SYSTEM DESIGN

(ELECTIVE-IV)

Course Objectives:

- To design and analyse basic resonators and RF Filters.
- To study the operation and device characteristics of RF Active components.
- To design and analyze RF transistor amplifier.

Unit-I: Introduction

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

Unit II: Single and multiport networks

The Smith Chart: Reflection Coefficient, Normalised Impedance- Impedance Transformation: Standing wave ratio, Special transformation conditions- Admittance Transformation Parellel and series RL & RC connections Basic Definitions of single and multi port networks- Interconnecting networks.

Unit III: Active RF Component modelling

RF diode models: Nonlinear and linear Models, Transistor models: Large signal and small signal BJT models, large signal and small signal FET models- scattering parameters, device characterisation.

Unit-IV: Matching and Biasing networks

Impedance matching using discrete components: Two component matching networks, forbidden regions, frequency response and quality factor, T and PI matching networks-Amplifier classification of operation and biasing networks: Classes of operation and efficiency of amplifiers, Biasing Networks for BJT and FET.

Unit V: RF Transistor amplifier design

Characteristics of amplifiers- Amplifier power relations: RF source , Transducer power gain , additional power relations-stability considerations: stability circles, unconditional stability , stabilisation methods-Uni-lateral and Bi-lateral designing for constant gain-Noise figure circles-Constant VSWR circles

Course Outcomes:

- To discuss design and analysis of filters and amplifiers.
- To understand the working concepts of RF active components.
- To study the operation of amplifiers.

TEXT BOOKS:

1. RF Circuit Design-Theory and applications by Reinhold Ludwig, Pavel BsetchkPearson education india 2000.

2. Radio Frequency and Microwave communication circuits-Analysis and design by Devendra K.Misra –Wiley student Edition-Jhon Wiley 5 Sons, Inc.

REFERENCES:

1. Radio Frequency and Microwave electronics-illustrated by Matthew M Radmanesh-PEI

2. RF Circuit Design-Christoper Bowick, Cheryl Aljuni and Jhon Biyler, Elseveir science,2008.

3. Secrets of RF Circuit Desihn by Joseph J.Carr,TMH ,2000.

4. Design of RF and Microwave Amplifiers and Oscillators, Peter L.D Abriff,Artech House,2000.

5 The Design of CMOS Radio Frequency Integrated circuits by Thomas H.Lee,2/e-cambridge University Press,2004.

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(A58027) CYBER SECURITY

(ELECTIVE-IV)

Course Objectives:

- The Objectives Of This Course Is To Enable Learner To Understand, Explore, And Acquire A Critical Understanding Cyber Law.
- To Develop Competencies For Dealing With Frauds And Deceptions (Confidence Tricks, Scams) And Other Cyber Crimes For Example, Child Pornography Etc. That Are Taking Place Via The Internet.

Unit-I: **Introduction to Computer Security:**

Definition, Threats to security, Government requirements, Information Protection and Access Controls, Computer security efforts, Standards, Computer Security mandates and legislation, Privacy considerations, International security activity.

Unit-II: **Secure System:**

Planning and administration, Introduction to the orange book, Security policy requirements, accountability, assurance and documentation requirements, Network Security, The Red book and Government network evaluations.

Unit-III: Information security policies and procedures:

Corporate policies- Tier 1, Tier 2 and Tier3 policies - process management-planning and preparation-developing policies-asset classification policy-developing standards.

Unit- IV Information security:

Fundamentals-Employee responsibilities- information classification Information handling- Tools of information security- Information processing-secure program administration.

Unit-V Organizational and Human Security:

Adoption of Information Security Management Standards, Human Factors in Security- Role of information security professionals.

Course Outcomes:

- Make Learner Conversant With The Social And Intellectual Property Issues Emerging From „Cyberspace.
- Explore The Legal And Policy Developments In Various Countries To Regulate Cyberspace;
- Develop The Understanding Of Relationship Between Commerce And Cyberspace; And
- Give Learners In Depth Knowledge Of Information Technology Act And Legal Frame Work Of Right To Privacy, Data Security And Data Protection.
- Make Study On Various Case Studies On Real Time Crimes.

REFERENCES

1. Debby Russell and Sr. G.T Gangemi, "Computer Security Basics (Paperback)", 2ndEdition, O' Reilly Media, 2006.

2. Thomas R. Peltier, "Information Security policies and procedures: A Practitioner's Reference", 2nd Edition Prentice Hall, 2004.

3. Kenneth J. Knapp, "Cyber Security and Global Information Assurance: Threat Analysis and Response Solutions", IGI Global, 2009.

4. Thomas R Peltier, Justin Peltier and John blackley, "Information Security Fundamentals", 2nd Edition, Prentice Hall, 1996

5. Jonathan Rosenoer, "Cyber law: the Law of the Internet", Springer-verlag, 1997

6. James Graham, " Cyber Security Essentials" Averbach Publication T & F Group.

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(A58028) WIRELESS COMMUNCIATIONS AND NETWORKS (ELECTIVE – V)

Course Objectives:

- To Provide the Students with the fundamental treatment about many Practical and theoretical concepts .
- To equip the students with various kinds of wireless networks and its operations.
- To prepare students to understand the concept of frequency reuse techniques.
- To prepare students to understand various modulation schemes and multiple access techniques.
- To improve an analytical perspective on the design and analysis of the traditional and emerging wireless networks.
- To train students to understand architecture and operation of various wireless wide area networks such as GSM, GPRS and SMS.
- To train students to understand wireless LAN architecture and operation.
- To prepare students to understand the emerging technique OFDM and its importance in the wireless communications.

UNIT I

The cellular concept sytem design fundamentals: Introduction,Frequency reuse,channel assignment stratagies,hand off stratagies-priritsing hand offs,pracitical hand off considarations,interference and system capacity-co channel interference and system capacity,channel planning for wireless systems,adjacent channel interference,power control for reduced interference,trunking and grade off service,improvind coverage in capacity in cellular systems-cell splitting,sectoring.

UNIT II

Mobile radio propagation:Large scale path loss: Introduction to radio wave propagation,freespace propagation model,relating power to E.F,the 3 basic propagation mechanisms,reflections from dielectric,brewster angle,reflection from prefect conductors,ground reflection(tworay)model,diffraction-fresnel zone geometry,knofe edge defraction model,multiple knife edge defraction,scattering,outdoor propagation models-longly-ryce models,okamura model,hata model,pcs extension to hata model,wafisch and bertoni model,white band pcs microcell model,indoor oropagation model-partition losses,same floor,partition losses between floor,log distance path loss model,Ericson multiple

break point model,attenuation factor model,signal penetration into buildings,retracing and sight specific modeling.

UNIT III

Moble radio propagation:small scale fading and multipath: Small scale multipath propagation,factors influencing smaal scale fading,Doppler shift,impulse respose model of a multipath channel-relation ship bewen bandwidth and received power.,Introduction to multiple access,FDMA,TDMA,Spred spectrum multiple access,space division multiple access,packet radio,capacity of a cellular systemsnetworks,Transmission hierarchy,traffic routing in wireless networks,wireless data services,common channel signaling.Differnce between wireless and fixed telephonelevel crossing and fadind characterstics ,Tworayleigh fadind model

UNIT IV

Equalisation and diversity: Introduction, fundamentals of equalization,training a generic adaptive equaiser,equalizer in a communication receiver,linear equalizers,non liner equailisation-decision,feeedback equalization(DFE)Mechanism to sipport a mobile environment, communication in the infrastructure,IS-95 CDMA forward channel,IS-95 CDMA reverse channel,Packet and frame formats in IS-95,IMT-2000,forward channel in W-CDMA and CDMA 2000,Reverce channels in W-CDMA and CDMA-2000,GPRS and higher data rates,Short messaging sevice In GPRS mobile application protocols,polarisastion diversty,frequency diversity,,Time diversity,RAKE Reciever

UNIT V:

Wireless Networks: Introduction to wirelss networks,Adventages and dis adventages of wireless lan,wlan tropolagies,wlan standard ieee 802.11.iee802.11 medium access control,comparision of ieee802.11 a,b,g and n standard,ieeee802.16 and its enhancements wireless pans ,hyper lan,WLL.

Course Outcomes:

Upon Completion of the Course, the student will be able to:

- Understand the Principles of wireless communications.
- Understand fundamentals of wireless networking.
- Understand cellular system design concepts.
- Analyze various multiple access schemes used in wireless communication.
- Understand wireless wide area network and their performance analysis.
- Demonstrate wireless local area networks and their specifications.
- Familiar with some of the existing and emerging wireless standards.
- Understand the concept of orthogonal frequency division multiplexing.

TEXT BOOKS:

1. Theodore s Rappaport ,"Wireless Communication and Applications." Pearson Education -2002.
2. Upen Datal,"Wireless Communications,"camebride University Press,2005.
3. Mobile cellular communications – gottapu shashibhushan rao,person education 2012.

REFERENCES:

1. P.Nicopolitidies, M.SObaidat,G.I.Papadimitria, A.S. Pomportsis,"Wireless Networks", Jhon Wiley & Sons, 2003.
2. X. Wang and H.V.poor, "Wireless Communication Systems," Pearson education, 2004.
3. Dr. Sunil Kumar S. Manavi, Mahaballeshwar S. Kakasageri,"Wireless and Mobile Networks: concepts and protocols,"Wiley India,2010.
4. Jhon W.Mark and Weilhua Zhqung,"Wireless Communiation and Networking,"PHI, 2005.
5. Jochen Schiller, "Mobile Communications," Pearson Education,2nd Edition,2003.

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(A58029)MIXED IC DESIGN
(ELECTIVE – V)

Course Objectives

- Exposure to analog and digital circuit design techniques in integrated context
- Learn to design mixed-signal building blocks including comparators and data converters
- Gain experience with system level design flow: bottom-up and top-down design methodologies
- Gain mixed-signal design experience in Cadence CAD tools, including both custom and automated design

UNIT -I: Switched Capacitor Circuits:

Introduction to Switched Capacitor circuits- basic building blocks, Operation and Analysis, Non-ideal effects in switched capacitor circuits, Switched capacitor integrators first order filters, Switch sharing, biquad filters.

UNIT -II: Phased Lock Loop (PLL):

Basic PLL topology, Dynamics of simple PLL, Charge pump PLLs-Lock acquisition, Phase/Frequency detector and charge pump, Basic charge pump PLL, Non-ideal effects in PLLs-PFD/CP non-idealities, Jitter in PLLs, Delay locked loops, applications

UNIT -III: Data Converter Fundamentals:

DC and dynamic specifications, Quantization noise, Nyquist rate D/A converters-Decoder based converters, Binary-Scaled converters, Thermometer-code converters, Hybrid converters

UNIT -IV: Nyquist Rate A/D Converters:

Successive approximation converters, Flash converter, Two-step A/D converters, Interpolating A/D converters, Folding A/D converters, Pipelined A/D converters, Time-interleaved converters.

UNIT -V: Oversampling Converters:

Noise shaping modulators, Decimating filters and interpolating filters, Higher order modulators, Delta sigma modulators with multi bit quantizers, Delta sigma D/A

Course Outcomes:

After going through this course the student will be able to

- Analyze the switched capacitor circuits and PLL and its practical applications.
- Understand the design issues and challenges involved in data converters such as offset, noise, gain, bandwidth etc.
- Analyze and design different types of data converter architectures such as Nyquist Rate
- A/D Converters and Oversampling Converters.

TEXT BOOKS:

1. Design of Analog CMOS Integrated Circuits- Behzad Razavi, TMH Edition, 2002
2. CMOS Analog Circuit Design - Philip E. Allen and Douglas R. Holberg, Oxford University Press, International Second Edition/Indian Edition, 2010.
3. Analog Integrated Circuit Design- David A. Johns,Ken Martin, Wiley Student Edition, 2013

REFERENCE BOOKS:

1. CMOS Integrated Analog-to- Digital and Digital-to-Analog converters-Rudy Van De Plassche, Kluwer Academic Publishers, 2003
2. Understanding Delta-Sigma Data converters-Richard Schreier, Wiley Interscience, 2005.
3. CMOS Mixed-Signal Circuit Design - R. Jacob Baker, Wiley Interscience, 2009.

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(A58030) DATABASE MANAGEMENT SYSTEMS (ELECTIVE-V)

Course Objectives:

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- To understand the relational database design principles.
- To become familiar with the basic issues of transaction processing and concurrency control.
- To become familiar with database storage structures and access techniques.

UNIT -- I: Introduction to Database System Concepts: Database-System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Data Mining and Information Retrieval, Spatial Databases, Database Users and Administrators, History of Database Systems.

Relational Databases: Introduction to the Relation Models: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations. **Introduction to SQL:** Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions Nested sub-queries, Modification of the Database.

UNIT -- II: Intermediate SQL: Join Expressions, Views, Transactions, Integrity Constraints, SQL Data Types and Schemas, Authorization. **Advanced SQL:** Functions and Procedures, Triggers, Cursors. **Formal Relational Query Languages:** The Relational Algebra, the tuple Relational Calculus, the Domain Relational Calculus.

UNIT -- III: Database Design: Database Design and the E-R Model: Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues, Extended E-R Features, Alternative Notations for Modeling Data, Other Aspects of Database Design. **Relational Database Design:** Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies,

Functional-Dependency Theory, Algorithms for Decomposition, Decomposition Using Multi valued Dependencies, More Normal Forms, and Database - Design Process.

UNIT -- IV: Data Storage And Querying: Storage and File Structure: Overview of Physical Storage Media, Magnetic Disk and Flash Storage, RAID, Tertiary Storage, File Organization, Organization of Records in Files Data-Dictionary Storage, Database Buffer. **Indexing and Hashing:** Basic Concepts, Ordered Indices, B+ Tree Index Files, B+ Tree Extensions, Multiple-Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices, Index Definition in SQL.

UNIT -- V: Transaction Management: Transactions: Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity, Transaction Isolation Levels, Implementation of Isolation Levels, Transactions as SQL Statements. **Concurrency Control :** Lock-Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Multi version Schemes, Concurrency in Index Structures.
Recovery System: Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Non-volatile Storage, Early Lock Release and Logical Undo Operations, ARIES, Remote Backup Systems.

Course Outcomes:

- Demonstrate the basic elements of a relational database management system,
- Ability to identify the data models for relevant problems.
- Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data.
- Apply normalization for the development of application soft wares.

TEXT BOOKS:

1. Database System Concepts, Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Sixth Edition, Tata McGraw-Hill.
2. Database Management System, Raghu Rama Kirshna, Johannes Gchrke, TATA MC Graw Hill Third Edition.

REFERENCE BOOKS:

1. Data base Systems design, Implementation and Management Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems Elmasri Navrate Pearson Education.