ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

ELECTRICAL AND ELECTRONICS ENGINEERING

FOR

B.TECH FOUR YEAR DEGREE COURSE

(Applicable for the batch admitted during 2012-2013)

G.NARAYANAMMA INSTITUTE OF TECHNOLOGY & SCIENCE

AUTONOMOUS (FOR WOMEN)

SHAIKPET, HYDERABAD – 500 008. A.P.

ACADEMIC REGULATIONS GN-R-12 FOR B.TECH. REGULAR COURSE

(Effective for the students admitted into I year from the Academic Year **2012-2013** and 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. Registered for **200 credits** and secured **200 credits**

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

3. Courses of study

The following courses of study are offered at present for specialization for the

Branch Code	Branch
02	Electrical and Electronics Engineering
04	Electronics and Communication Engineering
05	Computer Science and Engineering.
12	Information Technology
17	Electronics and Telematics Engineering.
22	Instrumentation and Control Engineering

4. 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 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(Objective Type) for 5 marks and Part-B(subjective paper) for 15 marks with a duration of 2 Hrs. Assignment carries 5 marks.

Subjective paper shall contain 5 questions(Covering all the units) of which student has to answer 3 questions each 5 marks

FOR THE 2012 ADMITTED BATCH ONLY Students performance in both the mid exams will be considered for evaluating the internal marks. For the best scored mid weightage of 75 % , and for the other 25 % weightage will be given.

FOR THE 2013 ADMITTED BATCH Students performance in both the mid exams will be considered for evaluating the internal marks. Average performance of the two mids will be considered for evaluating internal marks.

$$\text{Average Performance} = \frac{(X1 + X2)}{2}$$

X1= First Mid Marks, X2 = Second Mid Marks

The first mid term examination shall be conducted for 50 % of the syllabus and the second mid term examination shall be conducted for the remaining 50 % of the syllabus.

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

v. For the Engineering Drawing subject 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. Two internal tests will be conducted and Students performance in both the mid exams will be considered for evaluating the internal marks. For the best scored mid weightage of 75 % , and for the other 25 % weightage will be given

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 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, 100 marks shall be for Internal Evaluation and 100 marks for the End Semester Examination. The End Semester Examination (viva-voce) shall be conducted by the committee consists of External examiner, HOD, the supervisor of the major project and a senior faculty of the dept. 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 II Semester. Out of the 100 marks for Internal evaluation 50 marks will be awarded by the supervisor, 50 marks will be awarded by the committee constituted by HOD shall be on the basis of two seminars given by each student on the topic of her project.

5. Attendance Requirements:

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

ii. Shortage of Attendance below 65% in aggregate shall in <u>NO</u> case be condoned .

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

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

semester / I year when offered next.

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

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

6. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.**5**

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 36** credits from **TWO** regular and **ONE** supplementary examinations of I year I Semester, and **ONE** regular and **ONE** supplementary examination of I Year II Semester, and **ONE** regular examination of II year I semester irrespective of whether the candidate takes the examination or not.

iii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of total **60 c**redits from the following examinations, whether the candidate takes the examinations or not.

a. Three regular and two supplementary examinations of I year I Semester.

b. Two regular and two supplementary examinations of I year II Semester

c. Two regular and one supplementary examinations of II year I semester.

d. One regular and one supplementary examinations of II year II semester.

e. One regular examination of III year I semester.

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

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

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

7. Course pattern:

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

8. 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	From the aggregate marks secured for the best 200 Credits.
First Class with Distinction	70% and above	
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)

9. Minimum Instruction Days:

The minimum instruction days for each semester shall be 90 clear instruction days.

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

11. 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 PRINCIPAL/DIRECTOR 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 2013-2014 and onwards)

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

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 36 **credits from the examinations.**

   a. Two regular and one supplementary examinations of II year I semester.
   b. One regular and one supplementary examinations of II year II semester.
   c. One regular examination of III year I semester.
5. **Award of Class:**

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

Class Awarded	% of marks to be secured	From the aggregate marks secured for 150 Credits.(i.e. II year to IV year)
First Class with Distinction	70% and above	
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%	

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

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

3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all END 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/year. 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 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	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.

	orderly conduct of the examination.	
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all 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/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining

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

I YEAR I SEMESTER - COURSE STRUCTURE

Code	Subject	L	T/P/D	C
120004	English	4	-	3
120007	Mathematics-I	4	1	4
120501	Computer Programming	4	1	4
120008	Engineering Physics	4	1	4
120003	Engineering Drawing	2	4	3
120502	Computer Programming Lab	-	3	2
120005	English Lab	-	3	2
120009	Engineering Physics Lab	-	3	2
	Total	**18**	**16**	**24**

I YEAR II SEMESTER - COURSE STRUCTURE

Code	Subject	L	T/P/D	C
120015	Mathematics –II	4	1	4
120016	Mathematics –III	4	1	4
120206	Electrical Circuits	4	1	4
120010	Engineering Chemistry	4	-	4
120503	Data Structures	4	1	4
120011	Engineering Chemistry lab	-	3	2
120205	Electrical Circuits Lab	-	3	2
120504	Data Structures Lab	-	3	2
	Total	**20**	**13**	**26**

II YEAR I SEMESTER - COURSE STRUCTURE

Code	Subject	L	T / P / D	C
120020	Mathematics –IV	4	1	4
120210	Fluid Mechanics & Hydraulic Machinery	3	1	3
120403	Electronic Devices & Circuits	4	1	4
120212	Network Theory	3	1	3
120208	Electrical Measurements	3	1	3
120207	Electrical Machines –I	4	1	4
120211	Fluid Mechanics & Hydraulic Machinery Lab	-	3	2
120209	Electronic Devices & Circuits Lab	-	3	2
	Total	**21**	**12**	**25**

II YEAR I SEMESTER - COURSE STRUCTURE

Code	Subject	L	T / P / D	C
120021	Environmental Science	3	-	3
120219	Power Systems –I	4	1	4
120218	Electronic Circuits	3	1	3
121709	Switching Theory & Logic Design	4	1	4
120214	Electrical Machines –II	4	1	4
120217	Electro Magnetic Fields	3	1	3
120215	Electrical Machines Lab-I	0	3	2
120216	Electrical Measurements Lab	0	3	2
	Total	**21**	**11**	**25**

III YEAR I SEMESTER - COURSE STRUCTURE

Code	Subject	L	T / P / D	C
120022	Managerial Economics & Financial Analysis	3	-	3
120225	Power Systems –II	3	1	3
120416	IC Applications	3	1	3
120224	Power Electronics	4	1	4
120221	Computer Methods in Power Systems	4	1	4
120222	Electrical Machines –III	4	1	4
120220	Advanced English Communications Lab	0	3	2
120223	Electrical Machines Lab-II	0	3	2
	Total	**21**	**11**	**25**

III YEAR I SEMESTER - COURSE STRUCTURE

Code	Subject	L	T / P / D	C
120023	Management Science	3	-	3
120231	Power Semiconductor Drives	4	1	4
120226	Control Systems	4	1	4
121718	Micro Processors & Micro Controllers	4	1	4
	Open Elective			
120232	Renewable Energy Sources			
120227	Intellectual Property Rights			
120025	Nano Technology	3	1	3
120229	OOPS through JAVA	3	1	3
120230	Power Electronics Lab	0	3	2
120228	Micro Processors & Microcontrollers lab	0	3	2
	Total	**21**	**11**	**25**

IV YEAR I SEMESTER - COURSE STRUCTURE

Code	Subject	L	T / P / D	C
120243	Switch Gear & Protection	4	1	4
120244	Utilization Of Electrical Energy	4	1	4
120242	Power System Operation & Control	4	1	4
	Elective –I			
120238	High Voltage Engineering			
120235	Digital Signal Processing			
120234	Digital Control Systems	3	1	3
	Elective –II			
120241	Optimization Techniques			
120236	Electrical Distribution Systems			
121729	VLSI	3	1	3
120240	Instrumentation	3	-	3
120237	Electrical Simulation Lab	0	3	2
120233	Control Systems Lab	0	3	2
120239	Industry oriented Mini Project	-	-	2
	Total	**21**	**11**	**27**

IV YEAR II SEMESTER - COURSE STRUCTURE

Code	Subject	L	T / P / D	C
120249	HVDC Transmission	3	1	3
	Elective –III			
122235	Neural Networks & Fuzzy Logic			
120250	Linear Systems Analysis			
120252	Reliability Engineering and Application to Power Systems	3	1	3
	Elective –IV			
120245	Advanced Control Systems			
120248	EHV AC Transmission			
120247	Computer Organization	3	1	3
120253	Seminar	-	2	2
120251	Major Project	-	15	10
120246	Comprehensive Viva	-	-	2
	Total	**9**	**20**	**23**

Note: *All End Examinations (Theory and Practical are of Three hours duration)*

T – Tutorial L- Theory P- Practical D –Drawing C -Credits

ENGLISH

I Year - I Sem.	L	T/P/D	C
	4	/-/-	4

OBJECTIVES

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

b. To equip the students to cope the academic subjects with greater facility through the theoretical and practical components of the English syllabi.

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

SYLLABUS

UNIT – I

1. Chapter entitled *Heaven's Gate* from "Enjoying Everyday English", Published by Sangam Books, Hyderabad.

1. Chapter entitled *Heaven's Gate* from "Enjoying Everyday English", Published by Sangam Books, Hyderabad.
2. Chapters 1-6 from Wings of Fire: An Autobiography, APJ. Abdul Kalam with Arun Tiwari, University Press.
3. Grammar : Nouns, Pronouns, Articles, Prepositions and Conjunctions
4. Vocabulary : Usage of Dictionary – *to identify meaning, pronunciation and usage of a word.*
5. Writing : Paragraphs and Descriptions

UNIT – II

1. Chapter entitled *The Connoisseur* from "Enjoying Everyday English", Published by Sangam Books, Hyderabad.
2. Chapters 7-12 from Wings of Fire: An Autobiography, APJ. Abdul Kalam with Arun Tiwari, University Press.
3. Grammar : Adjectives and Adverbials
4. Vocabulary : Words often confused – *Homophones, Homonyms and Homographs*
5. Writing : Summarising and Note-making

UNIT – III

1. Chapter entitled *The Cuddalore Experience* from "Enjoying Everyday English", Published by Sangam Books, Hyderabad.
2. Chapters 13 - 18 from Wings of Fire: An Autobiography, APJ. Abdul Kalam with Arun Tiwari, University Press.
3. Grammar : Tenses and Concord

4. Vocabulary: Word Formation and Word Origins - *Prefixes and Suffixes.*
5. Writing : Official correspondence – *Memorandums, reports, letters and e-mails*

UNIT – IV

1. Chapter entitled *Odds Against Us* from "Enjoying Everyday English", Published by Sangam Books, Hyderabad.
2. Chapters 19 - 24 from Wings of Fire: An Autobiography, APJ. Abdul Kalam with Arun Tiwari, University Press.
3. Grammar : Interrogative Sentences and Question Tags
4. Vocabulary : One word substitutes and analogies
5. Writing : Covering letter and Resume writing

UNIT – V

Engineering Ethics, Values and Professionalism – Senses of Engineering Ethics, Variety of Moral issues, Professions and Professionalism, Assessment of Safety and Risk, Collegiality and Loyalty, Respect for Authority, Professional Rights, Computer ethics, Moral leadership, Corporate Code of Conduct.

TEXT BOOKS/BOOKS PRESCRIBED

1. "Enjoying Everyday English", Published by Sangam Books, Hyderabad.
2. "Wings of Fire : An Autobiography" APJ. Abdul Kalam with Arun Tiwari, University Press.
3. "Learn Correct English: A Book of Grammar, Usage and Composition" by Shiv K.Kumar and Hemalatha Nagarajan, Published by Pearson.

FOR GENERAL READING

The Diary of a Young Girl by *Anne Frank*
Short stories by *O'Henry*
Swami and his Friends by *R.K.Narayan*
How I taught my grand mother to read by *Sudha Murthy*
Brave New World by *H.G.Wells*

REFERENCES :

1. **Objective English**, Edgar Thorpe & Showick Thorpe, Pearson Education.
2. **Murphy's English Grammar** with CD, Murphy, Cambridge University Press.
3. **ABC of Common Errors**, Nigel D Turton, Mac Millan Publishers.
4. **Engineering Ethics** (Second Edition) Charles B.Fleddermann, Pearson Education.
5. **Professional Ethics**, Jayshree Suresh & B.S.Raghavan, S.Chand & Company Ltd.

MATHEMATICS-I

I Year - I Sem.	L	T/P/D	C
	4	1/-/-	4

OBJECTIVE : The objective of this course is to understand the concepts of calculus of single and several variables.

UNIT – I

SEQUENCES AND SERIES : Basic definitions of Sequences and Series – Convergences and Divergence – Ratio test – Comparison test – Integral test – Cauchy's Root test – Raabe's test – Absolute and Conditional Convergence.

Mean Value Theorems: Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's Mean Value Theorem – Generalized Mean Value theorem. (All theorems without proof)

UNIT – II

FUNCTIONS OF SEVERAL VARIABLES : Functions of Several Variables: Functional Dependence - Jacobian- Maxima and Minima of functions of two variables with constraints and without constraints.

Radius of Curvature - Centre and Circle of Curvature – Evolutes and Involutes-Envelopes. (All concepts in Cartesian Coordinates)

UNIT – III

DIFFERENTIAL EQUATIONS OF FIRST ORDER AND FIRST DEGREE & APPLICATIONS : Overview of Differential Equations - Exact, Linear and Bernoulli - Applications to Newton's Law of cooling, Law of Natural Growth and Decay - Orthogonal Trajectories.

UNIT – IV

VECTOR CALCULUS : Vector Calculus: Gradient-Divergence -Curl and Related Properties – Directional Derivatives & Angle between the Surfaces - Gradient, Divergence, and Curl in Cylindrical and Spherical Coordinate systems.

UNIT – V

MULTIPLE INTEGRALS AND VECTOR INTEGRAL THEOREMS : Multiple integrals: Double and Triple Integrals – Change of Order of Integration-change of variables.

Line integral – Work done – Surface Integral - Flux of a Vector Valued Function.

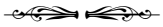
Vector Integral Theorems: Green's, Stoke's and Gauss's Divergence Theorems (Statement & their Verification).

TEXT BOOKS:

1. Advanced Engineering Mathematics by **Dr. S.R.K. Iyengar & Others**, Narosa, Publications.
2. Advanced Engineering Mathematics by **E.Kreyszig**, Wiley Publications.
3. Higher Engineering Mathematics by **B.S.Grewal**, Khanna Publications.

REFERENCES:

1. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand Publications.
2. A Text Book of Engineering Mathematics – 1 by B.V. Ramana, Tata MCGraw Hill Publications.
3. Engineering Mathematics- I by Dr. Shahnaz Bathul, PHI learning Pvt. Ltd. (In Press)



COMPUTER PROGRAMMING

I Year - I Sem.	L	T/P/D	C
	4	1/-/-	4

UNIT - I

INTRODUCTION TO COMPUTERS: Introduction to computers, computer systems, computing environments, computer languages, creating and running programs, software development method, algorithms, pseudo code, flow charts, applying the software development method.

INTRODUCTION TO C LANGUAGE: Basic structures of C language, C tokens, data types and sizes, declaration of variables, assigning values.

OPERATORS AND EXPRESSIONS: Statements, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bitwise operators, type conversions, expressions and evaluation, input and output statements, Header files, C preprocessor, Programming examples.

UNIT - II

CONTROL STATEMENTS: Conditional and control statements, programming examples.

FUNCTIONS: Defining and accessing, parameter passing, function prototypes, user defined functions, recursive functions , programming examples.

Storage Classes, Scope rules, programming example.

ARRAYS: Defining and processing, one dimensional and two dimensional arrays, initialization, passing arrays to a function, multi dimensional arrays, command line arguments.

UNIT - III

STRINGS: Defining and operations on strings, string variables declaration, reading, writing.

Passing strings as parameters , string handling functions.

POINTERS: Basic Concepts, pointer to pointer, passing pointers to a function, operations on pointers, pointer

arithmetic, pointers and arrays, arrays of pointers, function pointers, dynamic memory allocation.

UNIT - IV

STRUCTURES AND UNIONS: Structure definition, initializing, assigning values, passing of structures as arguments, arrays of structures, pointers to structures, self reference to structures, unions, typedef , enumerated, bit fields, programming examples.

UNIT - V :

CONSOLE AND FILE I/O: File, types of files, file vs. console, file structure, file attributes, file operations, standard I/O, formatted I/O, programming examples.

TEXT BOOKS:

1. B. A. Fouruzan and R. F. Gilberg (2006), Computer Science: A structured programming approach using C, 3rd Edition, Thomson Publications, New Delhi.
2. Yashawanth Kanethkar (2008), Let us C, 8th Edition, Jones & Bartlett Publishers, India.

REFERENCE BOOKS:

1. Herbert Schildt (2000), C: The Complete Reference, 4th Edition, New Delhi, Osborne Mc Graw Hill.
2. B. W. Kerninghan and Dennis M. Ritche (1988), The C Programming Language, 2nd Edition, Prentice Hall
3. Software Series, India.
4. Stephen G.Kochan (2004), Programming in C, 3rd Edition, Pearson Education Private Limited

ENGINEERING PHYSICS

I Year - I Sem.	L	T/P/D	C
	4	1/-/-	4

OBJECTIVES: This course imparts students, the basic knowledge of the electromagnetic properties, and optical properties which form the requirement for understanding and applying principles of physics for electronic, electrical and communicational engineering. This also enhances the classical to Quantum mechanical

UNIT- I

1. SOLIDS AND CRYSTALLOGRAPHY: Classification of bonding in solids. Calculation of Cohesive Energy. **(2 Periods)**

Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC. X-ray diffraction by powder method. **(4 Periods)**

2. DEFECTS IN CRYSTALS: Point Defects: Vacancies, Substitution, Interstitial, Frenkel and Schottky Defects; Equilibrium concentration of point defects (vacancies, Frenkel and Schottky defects.) **(4 Periods**)

UNIT- II

3. ELEMENTS OF STATISTICAL MECHANICS : Distinguishable and indistinguishable paticles. Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics (Qualitative Treatment), Fermi-Dirac Distribution function and its variation with temperature. Planck's Law of Black Body Radiation and derivation of Wien's Law, Rayleigh-Jeans law from Planck's law. **(5 Periods)**

4. PRINCIPLES OF QUANTUM MECHANICS: Waves and Particles, de Broglie Hypothesis , Matter Waves, Davisson and Germer Experiment**,** Heisenberg's Uncertatinty Principle (Qualitative Treatment), Schrodinger's Time Independent Wave Equation - Physical Significance of the Wave Function. Particle in One Dimensional Potential Box. **(5 Periods)**

UNIT-III

5. BAND THEORY OF SOLIDS: Behavior of Electron in a periodic Potential using Bloch solution. Kronig-Penny Model (Qualitative Treatment), Origin of Energy Bands in Solids, Classification of Materials into Conductors, Semi Conductors & Insulators, Concept of Effective Mass of an Electron. **(5 Periods)**

6. SEMICONDUCTOR PHYSICS: Fermi Levels in Intrinsic and Extrinsic Semiconductors, Carrier Concentration in Intrinsic and Extrinsic Semiconductors. Drift and diffusion current in semiconductors (Qualitative

Treatment) and Equation of Continuity, Direct & Indirect Band Gap Semiconductors, Hall Effect and its applications. **(7 Periods)**

UNIT - IV

7. DIELECTRIC PROPERTIES: Definition of Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector. Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities for Electronic and Ionic poarisations. Internal Field in solids , Clausius - Mossotti Equation, Piezo-electricity and Ferro-electricity, examples and applications. **(7 Periods)**

8. MAGNETIC PROPERTIES: Definition of Permeability, Field Intensity, Magnetic Field Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Domain Theory of Ferro Magnetism, Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials, Ferrites and their Applications.Perfect diamagnetism in super condectors(Meissner effect), Magnetic Levitation **(8 Periods)**

UNIT - V

9. LASERS: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, Population Inversion, Lasing Action, Einstein's Coefficients and Relation between them, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers (LASER Cooling & ablation). **(6 Periods)**

10. FIBER OPTICS: Principle of Optical Fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers (Step index and graded index fibers) and Refractive Index Profiles, Attenuation in Optical Fibers, Application of Optical Fibers (Engineering, Medical and Scientific fields). **(3 Periods)**

11. NANOTECHNOLOGY: Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Top-down Fabrication: Chemical Vapour Deposition, Characterization (XRD&TEM) and Applications. **(4 Periods)**

TEXT BOOKS:

1. Applied Physics - P.K.Palanisamy (SciTech Publications (India) Pvt. Ltd., Fifth Print 2008).
2. Applied Physics - S.O. Pillai & Sivakami (New Age International (P) Ltd., Second Edition 2008).
3. Applied Physics - T. Bhima Shankaram & G. Prasad (B.S. Publications, Third Edition 2008).
4. Concepts of Modern Physics –Aurther Beiser . et.al.

REFERENCES:

1. Solid State Physics - M. Armugam (Anuradha Publications).
2. Modern Physics - R. Murugeshan & K. Siva Prasath - S. Chand & Co. (for Statistical Mechanics).
3. Physics and Chemistry of Materials-Gersten, FW Smirth
4 . Material Science and Engineerin -Raghavan
5. Nanotechnology - M.Ratner & D. Ratner (Pearson Ed.).
6. Introduction to Solid State Physics - C. Kittel (Wiley Eastern).

ENGINEERING DRAWING

I Year - I Sem.	L	T/P/D	C
	2	-/-/4	3

CHAPTER 1 . Principles of Engineering Graphics and their Significance-Drawing Instrument and their Use- Conventions in Drawing-Lettering-Curves used in engineering Practice and Constructions. Conic sections-Ellipse, Parabola and Hyperbola. Construction of Cycloid, Epi-cycloid and Hypocycloid

CHAPTER 2. Principle of orthographic projections –Conventions-First angle and Third angle projections, Projections of Points and Lines. (Excluding traces of a line)

CHAPTER 3. Projections of regular planes inclined to both the planes.

CHAPTER 4. Projections of regular Solids inclined to both the planes.

CHAPTER 5. Principles of Isometric Projection- Isometric Scale-Isometric Views- Conventions- Isometric Views of Lines, Plane Figures, Simple and compound Solids. Conversion of Isometric Views to Orthographic Views

Text Book : Engineering Drawing by N.D.Bhatt

COMPUTER PROGRAMMING LAB

I Year - I Sem.	L	T/P/D	C
	0	-/3/-	2

Recommended Systems/Software Requirements:

Intel based desktop PC 'gcc' Compiler for CSE and IT branches, 'ANSI C' Complier for other branches.

Week l.

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

Sum=1-x2/2! +x4/4!-x6/6!+x8/8!-x10/10!

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

Week 2.

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

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

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

Week 3

a) The total distance travelled by vehicle in 't' seconds is given by distance = ut+1/2at2 where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec2). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

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

Week 4

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

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

Week 5

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

1+x+x2+x3+……..+xn

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

Print x, n, the sum

Perform error checking. For example, the formula does not make sense for

negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal ? If so, test for them too.

Week 6

Write a C program to implement:

i) Precedence and associativity

ii) Bit Manipulation using switch case

Week 7

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

i) To find the factorial of a given integer.
ii) To find the GCD (greatest common divisor) of two given integers.
iii) To solve Towers of Hanoi problem. (Recursion)

Week 8

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

b) Write a C program that uses functions to perform the following:
i) Addition & Multiplication of 2 matrices
ii Determinant of matrix and inverse of a matrix

Week 9

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

i) To insert a sub-string in to given main string from a given position.
ii) To delete n Characters from a given position in a given string.

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

Week 10

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

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

Week 11

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

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

(Note: represent complex number using a structure.)

Week 12

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

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

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

ENGLISH LAB

I Year - I Sem.	L	T/P/D	C
	0	-/3/-	2

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:

a. To expose the students to a variety of self-instructional, learner-friendly modes of language learning.
b. To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.
c. To train them to use language effectively to face interviews, group discussions, public speaking.
d. To initiate them into greater use of the computer in resume preparation, report writing, format-making etc.

SYLLABUS:

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

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants
2. Introduction to Accent and Rhythm – Stress and Intonation
3. Pronouncing words: Important patterns
4. Situational Dialogues / Role Play
5. Presentation Skills
6. 'Just A Minute' Sessions (JAM)
7. Descriptions and Narrations
8. Information Transfer
9. Debating Skills
10. Telephonic conversations
11. Group Discussions
12. Interview Skills

MINIMUM REQUIREMENT:

The English Language Lab shall have two parts:

i) **The Computer aided Language Lab** for 30 students with 30 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 Multimedia Projector a digital stereo – audio & video system and camcorder etc.

SYSTEM REQUIREMENT (HARDWARE COMPONENT):

Computer network with Lan with minimum 30 multimedia systems with the following specifications:

i) CPU Requirements

a) Duel Core Processor

b) Speed – 2.8 GHZ

c) RAM – 1 GB Minimum

d) Hard Disk – 80 GB Minimum

e) DVD ROM Drive

ii) Headphones of High quality

SUGGESTED SOFTWARE:

- Cambridge Advanced Learners' English Dictionary with CD.
- Murphy's English Grammar with CD, Cambridge University, Press.
- Pronunciation in Use by *Mark Hancock,* Cambridge University Press.
- Test Your English Vocabulary in Use by Michael Mc Carthy and Felicity O'Dell, Cambridge University Press.
- BBC Speak English

REFERENCES:

1. **A Practical Course in English Pronunciation**, (with two Audio cassettes) by J. Sethi, Kamlesh Sadanand & D.V. Jindal, Prentice-Hall of India Pvt. Ltd., New Delhi.
2. **A text book of English Phonetics for Indian Students** by T.Balasubramanian (Macmillan).
3. **Speak Well** Published by **Orient Blackswan Private Limited,** 2012.

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Paper:

1. The practical examinations for the English Language Laboratory shall be conducted as per the norms stipulated for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the semester for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with an external examiner from the other Universities or colleges.

ENGINEERING PHYSICS LAB

I Year - I Sem.	L	T/P/D	C
	0	-/3/-	2

List of the Experiments

1. Dispersive power of the material of a Prism – Spectrometer.
2. Determination of wavelength of a source – Diffraction Grating (Normal -Incidence).
3. Size of the particle and Quantum Confinement.
4. Time constant of R-C Circuit.
5. Magnetic field along the axis of the current carrying coil- Stewart &Gees'
6. Evaluation of Numerical Aperture
7. Evaluation Bending losses of fibers.
8. Energy gap of a Semiconductor material .
9. Torsional pendulum
10. Laser wavelength determination using Diffraction grating.
11. Dielectric constant.
12. Hall effect –simulation.

TEXT BOOKS:

1. Practical Enginieering Physics by T.Radha Krishna & V. Rajeshwar Rao (VGS Techno Series)
2. Laboratry Manual of Engineering Physics by Dr. Y. Aaprna & Dr. K. Venkateswara RAO (SM Enterprises.)

REFERENCE BOOKS:

1 Experiments in Engineerin Physics by MN Avadhanlu, AA Dani, PM Polkey - S.C HAND

MATHEMATICS – II

I Year - II Sem.	L	T/P/D	C
	4	1/-/-	4

OBJECTIVE : The prime objective of this course is to solve linear and nonlinear systems by using the concepts in Matrices and numerical methods.

UNIT – I

SOLUTION FOR LINEAR SYSTEMS : Real matrices: Symmetric, Skew-Symmetric and Orthogonal - Complex matrices: Hermitian, Skew-Hermitian and Unitary - Elementary Row Transformations – Rank - Echelon form - Normal form - Solutions of Linear Systems: By Rank Concept, LU Decomposition, and Solution of Tridiagonal Systems.

UNIT – II

LINEAR TRANSFORMATIONS : Eigen values, Eigen vectors – Properties – Cayley-Hamilton Theorem (without proof) - Inverse and Powers of a Matrix by Cayley-Hamilton theorem – Diagonolization of matrix - Calculation of Powers of matrix – Modal and Spectral Matrices.

QUADRATIC FORMS: Reduction of Quadratic form to Canonical form - Linear Transformation – Orthogonal Transformation – Rank, Index, and Signature – Sylvester's Law of Inertia (without proof).

UNIT – III

SOLUTION OF NON- LINEAR SYSTEMS & CURVE FITTING : Solution of Algebraic and Transcendental Equations: Introduction – The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method.

CURVE FITTING: Fitting a Straight line – Second Degree Curve-Exponentional curve - Power Curve by the Method of Least Squares.

UNIT – IV

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, Newton's Divided Difference Interpolation Formula

UNIT – V

NUMERICAL SOLUTION OF IVP'S IN ODE : Numerical Differentiation – Numerical Integration: Simpson's 3/8 Rule, Gaussian Integration.

Numerical Solution of Ordinary Differential equations: Taylor's series Method-Picard's Method of Successive Approximations – Euler's Method, Modified Euler's Method - Runge-Kutta Method – Predictor-Corrector Methods: Adams-Bashforth-Moulton (ABM) Method.

TEXT BOOKS:

1. Advanced Engineering Mathematics by **Dr. S.R.K. Iyengar & Others**, Narosa, Publications.
2. Advanced Engineering Mathematics by **Kreyszig**, Wiley Publications.
3. Higher Engineering Mathematics by **B.S. Grewal**, Khanna Publications.

REFERENCES:

1. Introductory Methods by Numerical Analysis by S.S.Sastry, PHI Learning Pvt. Ltd.
2. Mathematical Methods by B.V.Ramana, Tata McGraw Hill Publications.
3. Mathematical Methods by Dr.Shahnaz Bathul, PHI Learning Pvt, Ltd (in press)

MATHEMATICS – III

I Year - II Sem.	L	T/P/D	C
	4	1/-/-	4

OBJECTIVE : The core objective of this paper is to solve the differential equations by using analytical methods and integral transform methods.

UNIT – I

LINEAR DIFFERENTIAL EQUATIONS WITH CONSTANT COEFFICIENTS & APPLICATIONS : Linear differential equations with constant coefficients - Method of Variation of Parameters.

Applications in Electrical Circuits, Simple Harmonic Motion.

UNIT – II

LAPLACE TRANSFORMS & ITS APPLICATIONS TO ORDINARY DIFFERENTIAL EQUATIONS : Laplace Transform of Standard Functions - First and Second Shifting Theorems - Transform of Derivatives and Integrals – Multiplication and Division by 't' -Laplace Transform of a Periodic Function - Unit Step Function - Dirac's Delta Function – Inverse Laplace Transform– Method of Partial Fractions - Convolution Theorem - Application of Laplace Transforms to Ordinary Differential Equations.

UNIT – III

FOURIER SERIES & FOURIER TRANSFORMS : 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.

FOURIER TRANSFORMS : Fourier Sine and Cosine Transforms – Properties – Inverse Transforms – Convolution Theorem – Parseval's Identity.

UNIT – IV

PARTIAL DIFFERENTIAL EQUATIONS : Introduction - Formation of Partial Differential Equation: By Elimination of Arbitrary Constants and Arbitrary Functions - Solution of First Order Equations: Linear (Lagrange's) Equations - Nonlinear (Standard type) Equations and Charpit's Method

Second Order Partial Differential Equations: Method of Separation of Variables – One Dimensional Wave Equation – One Dimensional Heat Equation - Laplace Equation in Two Variables - Transmission Lines.

UNIT – V

APPLICATIONS OF LAPLACE AND FOURIER TRANSFORMS IN IVPS & BVPS : Applications of Laplace Transforms in IVPs and BVPs: Heat Equation - Wave Equation – Laplace Equation.

Applications of Fourier Transforms in IVPs and BVPs: Infinite Fourier

Transforms – Choice of Infinite Sine or Cosine Transforms Examples.

TEXT BOOKS:

1. Advanced Engineering Mathematics by **Dr. S.R.K. Iyengar & Others**, Narosa, Publications.
2. Advanced Engineering Mathematics by **Kreyszig**, Wiley Publications.
3. Higher Engineering Mathematics by **B.S. Grewal**, Khanna Publications.

REFERENCES:

1. Mathematical Methods by B. V. Ramana, Tata McGraw Hill Publications.
2. Integral Transforms by I.N. Sneddon, TATA McGraw Hill Edition.
3. Mathematical Methods by Dr.Shahnaz Bathul, PHI Learning Pvt, Ltd (in press).

ELECTRICAL CIRCUITS

I Year - II Sem.	L	T/P/D	C
	4	1/0/0	4

OBJECTIVE : This course introduces the basic concepts of circuit analysis which is the foundation for all the subjects of the Electrical Engineering discipline. The emphasis in this course is laid on the basic Analysis of circuits which includes single phase circuits, magnetic circuits, theorems and network topology.

UNIT - I

ANALYSIS OF ELECTRICAL CIRCUITS : Circuit concept – R-L-C Parameters – Voltage & Current Sources – Independent and dependent sources – Source Transformation - Voltage-Current relationships for passive elements (for different input signals – square, ramp, saw tooth, triangular)

Kirchoff's laws – Network reduction techniques – series, parallel, series parallel, star to delta & delta to star conversion, Nodal analysis, mesh analysis, Super node & super mesh for DC excitations

UNIT - II

SINGLE PHASE AC CIRCUITS : RMS & Average Values and form Factor for different periodic wave forms, Steady state Analysis of R, L, & C (in series, parallel and series parallel combinations) with sinusoidal excitation – Concept of Reactance, Impedance, Susceptance and Admittance – Phase & phase difference-Concept of power factor, Real & reactive powers – j-Notation, Complex and Polar forms of representation, Complex Power

Locus Diagrams-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 - III

MAGNETIC CIRCUITS : Magnetic Circuits- Comparision of Electric & Magnetic Circuits-Analysis of series and parallel magnetic circuits - Composite magnetic circuits.

Concept of self & mutual inductance - dot convention - Coefficient of coupling – Elementary treatment of Coupled circuits

UNIT - IV

NETWORK TOPOLOGY : Definitions – Graph – Tree, Basic cutset & basic tieset matrices for planar networks – Loop & nodal methods of Analysis of Networks with dependent & independent voltage & current sources – Duality & dual networks

UNIT - V

NETWORK THEOREMS (AC & DC EXCITATIONS) : Tellegan's, Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Millman's and Compensation theorems for AC & DC excitations

TEXT BOOKS :

1. Engineering Circuit Analysis by William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6th edition.
2. Circuits & Networks by A. Sudhakar and Shyammohan S.Palli, Tata Mc Graw- Hill.
3. Electical circuits by A.Chakrabarthy, Dhanipat Rai & sons.

REFERENCE BOOKS:

1. Network Analysis by M.E.Van Valkenberg.
2. Linear Circuit Analysis (time domain phasor and Laplace transform approaches) Spend edition by Raymond a.Decarlo and PEN-Min-LIN, Oxford University press. Second 2004.
3. Electric Cirucit theory by K.Rajeswaran, Person Education 2004.
4. Basic Circuit Analysis by D.R.Cunningham & J.A Stuller, Jaico Publication.

ENGG. CHEMISTRY

I Year - II Sem.	L	T/P/D	C
	4	-/-	4

OBJECTIVES:

1. To furnish the conceptual understanding of the basic principles of chemistry.
2. To develop the habit of scientific reasoning in students so that they can work with open and inquiring mind.
3. To impart extensive knowledge of the subject to make them understand the role of chemistry in the field of Engineering.
4. To develop analytical capabilities of chemistry so that they can apply knowledge gained in solving engineering related problems.

UNIT - I

ELECTRO CHEMISTRY AND CORROSION: Conductance-Specific conductance, Equivalent conductance, Molar conductance, Effect of dilution on conductance, measurement of electrolytic conductance. Galvanic cell, cell notation, concept of electrode potential, Nernst equation and its applications. Types of Electrodes-Hydrogen, Calomel electrodes. Single electrode potential, Measurement of cell EMF and its applications. Galvanic series and Electrochemical series and its significance. Determination of P^H by using Quinhydrone and Glass electrodes. Concentration cells- Electrolytic concentration cell & its applications, numerical problems.

Introduction to Corrosion, causes and effects of corrosion. Theories of corrosion- Chemical and Electrochemical corrosion with mechanism.Types of corrosion-Galvanic,Waterline & Granular corrosion. Factors affecting rate of corrosion (i)Nature of metal – galvanic series & nature of corrosion product (ii) Nature of environment – effect of temperature, P^H, Humidity.Corrosion control methods – Cathodic protection- Sacrificial anode & Impressed current cathodic methods, Metallic coatings- Hot dipping-Galvanisation,Tinning, Metal Cladding & Cementation. **(16 hrs)**

UNIT - II

WATERTECHNOLOGY: Introduction, Hardness- Causes, units & types of hardness. Estimation of temporary & permanent hardness of water by EDTA method, numerical problems. Boiler Troubles- Scales& Sludge formation, Priming & Foaming, Caustic embrittlement,, Boiler Corrosion .Softening of water -Internal treatment & External treatment – Lime soda process, Zeolites, Ion exchange process,numerical problems. Specifications & Treatment of potable water. **(12hrs)**

UNIT-III

POLYMERS: Introduction , Types of polymerization, Mechanism (Chain growth- Free radical mechanism & step growth). Plastics-Thermoplastic resins & Thermoset resins, Compounding & Fabrication of plastics. Preparation, properties and engineering applications of PVC, Teflon, Bakelite & Nylon. Conducting polymers: conduction and its applications of Polyacetylene, Polyaniline. Rubber: Natural rubber- Processing & Vulcanization . Elastomers-Buna-S & Thiokol rubber. Bio degradable polymers-example and uses, Fibers- Polyester and Polyacrylonitile and their applications. **(10 hrs)**

UNIT-IV

ENERGY SOURCES: Introduction**,** Chemical Fuels-classification, solid fuels-coal,analysis of coal– proximate and ultimate analysis. Liquid fuels-petroleum, refining of petroleum. Cracking-Thermal & Catalytic cracking , Synthetic petrol-Bergius & Fischer Tropsech's process, Knocking- Octane & Cetane number. Gaseous fuels – Natural gas, Calorific value of fuel-HCV, LCV, Dulong formula. Determination of calorific value by Junker's calorimeter, Combustion problems. Analysis of flue gas by Orsat's method. **(13 hrs)**

UNIT-V

MATERIAL CHEMISTRY: Introduction , Cement: Composition of Portland cement , Setting and Hardening of cement (reactions). Lubricants-mechanism of lubrication, Properties of lubricants- Viscosity & its determination by Red wood viscometer, Flash and Fire point& its determination by Pensky-Marten's apparatus, Cloud point & pour point. Refractories- Introduction , Classification & properties-refractoriness & RUL test, Ceramics-Porcelain.

BATTERIES: Primary cells: zinc-carbon , Secondary cells: Lead-acid storage cell & Ni-Cd cell. Fuel cell: Hydrogen – Oxygen fuel cell. **(9 hrs)**

TEXT BOOKS:

1. A text book of Engineering Chemistry – Dr. Y. Bharathi Kumari & Dr.Ch. Jyotsna Cherukuri.
2. Engineering chemistry by P.C.Jain &Mounica Jain,Dhanpatrai publishing company(2008).
3. Text book of Engineering chemistry- Shashi chawla,Dhanpatrai publishing company,NewDelhi(2008)

REFERENCE BOOKS:

1. Text book of Engineering chemistry by C.P.Murthy, C.V.Agarawal, A.Naidu B.S.Publications, Hyd(2006).

2. Text of Engineering chemistry by S.S.Dara and Mukkanti, S.Chand and Co, New Delhi(2006)
3. Engineering chemistry by B.Shivashankar,Mc.Graw Hill publishing company limited, NewDelhi(2006).
4. Engineering chemistry J.C.Kuriacase & J.Rajaram, TataMc GrawHills co., NewDelhi(2004)
5. Chemistry of Engineering materials by R.P.Mani and K.N.Mishra, CENGAGE learning.
6. Applied chemistry-a text for Engineering and technology-Springar (2005)
7. Engineering chemistry–R.Gopalan, D.Venkatappayya, D.V.Sulochana Nagarajan- Vikas publishers(2008).
8. Elements of Physical chemistry by B.R.Puri, L.R .Sharma and M.S. Pathania-2nd edition, vishal publishing co.

DATA STRUCTURES

I Year - II Sem.	L	T/P/D	C
	4	1/-/-	4

UNIT - I

Searching: Linear and binary search methods.

Sorting: Bubble sort, selection sort, Insertion sort, Quick sort, Merge sort, Heap sort, Shell sort, Radix sort. Time complexities.

UNIT - II

Stacks, Queues, Circular queues, Dequeues working and representation using arrays, Applications of stacks :infix to post fix conversion, postfix expression evaluation.

UNIT - III

Linked list: Singly linked list, Doubly linked list, Circular linked list working and representation using pointers. Implementation of stacks and queues using pointers.

UNIT - IV

Trees: Terminology, sequential and linked representation, tree traversals. Binary trees, Binary search trees.

UNIT - V

Graphs: Terminology, sequential and linked representation, graph traversals : Depth First Search & Breadth First Search implementation. Spanning trees, Prims and Kruskals method.

TEXT BOOKS:

1. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.
2. Data Structures Using C– A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson education.

REFERENCES :

1. C Programming & Data structures – E. Balaguru Swami, TMH
2. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/ Pearson Education
3. C Programming with problem solving, J.A. Jones & K. Harrow, dreamtech Press
4. Let us C – Yeswanth Kanithkar.

ENGINEERING CHEMISTRY LAB

I Year - II Sem.	L	T/P/D	C
	0	-/3/-	2

List of Experiments

Any 10 Experiments of the Following:

1. Estimation of Ferrous ion by dichrometry by using Mohr's salt
2. Estimation of hardness of water by EDTA method
3. Estimation of manganese dioxide in pyrolusite
4. Determination of surface tension of lubricants
5. Titration of strong acid VS strong base by conductometric method
6. Titration of strong acid VS strong base by potentiometric method
7. Estimation of Copper by Colorimetric method
8. Estimation of Iron in Cement by Colorimetric method
9. Conductometric titration of mixture of acids Vs strong base
10. Determination of viscosity of sample oil by Ostwald's viscometer
11. Determination of dissociation constant of weak acid by Conductometric method.
12. Preparation of Thiokol rubber

TEXT BOOKS:

1. Laboratory Manual of Engineering Chemistry by Dr. Y. Bharathi Kumari & Ch. Jyotsna V.G.S Book links.
2. Practical Engineering Chemistry by K.Mukkanti, etal, B.S. Publications, Hyderabad
3. Inorganic quantitative analysis, Vogel

REFERENCE BOOKS:

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

ELECTRICAL CIRCUITS LAB

I Year - II Sem.	L	T/P/D	C
	0	0/3/0	2

Any Ten experiments have to be conducted from the following list:

1) Thevenin's, Norton's
2) Maximum Power Transfer theorems .
3) Superposition theorem
4) RMS value of complex wave
5) Verification of Compensation Theorem.
6) Reciprocity , Millmann's Theorems.
7) Locus Diagrams of RL and RC Series Circuits
8) Series and Parallel Resonance
9) Determination of Self, Mutual Inductances and Coefficient of coupling
10) Measurement of Active Power for Star and Delta connected balanced loads
11) Measurement of Reactive Power for Star and Delta connected balanced loads
12) Measurement of 3-phase Power by two Wattmeter Method for unbalanced loads

DATA STRUCTURES LAB

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

Week 1

Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:

i) Linear search ii) Binary search

Week 2

Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:

i) Bubble sort ii) Selection sort

Week 3

Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:

i) Insertion sort ii) Quick Sort

Week 4

Write C programs that implement stack (its operations) using

i) Arrays ii) Pointers

Week 5

Write C programs that implement Queue (its operations) using

i) Arrays ii) Pointers

Week6

Write a program to convert the given infix expression to post-fix expression.

Week7

Write a program to evaluate a post-fix expression.

Week8

Write C programs to implement the following using arrays

i) Circular queue ii) Dequeue

Week 9

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

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

Week 10

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

i) Creation ii) Insertion iii) Deletion iv) Traversal in both ways

Week11

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

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

Week 12

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

i) Creating a Binary Tree of integers

ii) Traversing the above binary tree in preorder, in order and post order.

TEXT BOOKS

1. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.
2. Programming in C, P.Dey & M. Ghosh, Oxford Univ.Press.
3. C and Data Structures, E Balaguruswamy, TMH publications.

MATHEMATICS – IV

II YEAR B.Tech EEE I-Sem

L	T/P/D	C
4	1/0/0	4

OBJECTIVE: The objective of this course is to study the special functions, analytic functions and to solve the problems in complex variable theory.

UNIT- I

SPECIAL FUNCTIONS I : Gamma and Beta Functions – Their properties – Evaluation of improper integrals. Bessel functions – properties – Recurrence relations – Orthogonality.

Legendre's polynomials - Properties – Rodrigue's formula – Recurrence relations – Orthogonality.

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's method. Elementary functions - Logarithmic & Power functions

UNIT-III

COMPLEX INTEGRATION & POWER SERIES : Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula. Radius of convergence – Expansion in Taylor'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 – Cauchy 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, z^n (n positive integer),

Sin 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. Advanced Engineering Mathematics by **Dr. S.R.K. Iyengar & Others**, Narosa Publications.
2. Advanced Engineering Mathematics by **Kreyszig**, Wiley Publications.
3. Higher Engineering Mathematics by **B.S. Grewal**, Khanna Publications.

REFERENCES:

1. Higher Engineering Mathematics by B. V. Ramana, Tata McGraw Hill Publications.
2. Engineering Mathematics Vol-III by T.K.V.Iyengar, B.Krishna Gandhi, S.Ranganatham and MVSSN Prasad, S.Chand Publications.
3. Special Functions & Complex Variables by Dr. Shahnaz Bathul, PHI learning Pvt. Ltd.

FLUID MECHANICS AND HYDRAULIC MACHINERY

II YEAR B.Tech EEE I-Sem	L	T/P/D	C
	3	1/0/0	3

OBJECTIVES:

1. The purpose of this course is to learn the Fluid properties and fundamentals of Fluid statics and fluid flow. Now a days the principles of Fluid mechanics find wide applications in many situations directly or indirectly.
2. To introduce the concepts of flow measurements and flow through pipes.
3. To further extended to cover the application of fluid mechanics by the inclusion of fluid machinery especially water turbine and water pumps.
4. To impart of fluid machinery, turbines, pumps in general and in power stations in getting as accelerated fill up. Thus there is a great relevance for this curse for Electrical and Electronic Engineering.

UNIT - 1

Fluid Statics, Kinematics and Dynamics : **Fluid Statics:** Dimensions and units: physical properties of fluids– density, specific gravity, viscosity and surface tension- vapor pressure and their influence on fluid motion- atmospheric gauge pressure and vacuum pressure, measurement of pressure – Piezometer, U-tube and Differential manometers.

Fluid kinematics : Stream line, path line, streak lines and stream tube, classification of flows – steady, unsteady, uniform, non uniform, laminar, turbulent, rotational and irrotational flows- Equation of continuity for one dimensional flow.

Fluid dynamics : Surface and body forces-Euler and Bernoulli's equations for flow along a stream line, momentum equation and its application on force on pipe bend.

UNIT - 2

Closed conduit flows : Reynolds experiment- Darcy -Weisbach equation- Minor losses in pipes- pipes in series and pipes in parallel, total energy line and hydraulic gradient line. Measurement of flows: pitot tube, venturimeter, Orifice meter and flow nozzle.

UNIT - 3

Basics of turbo machinery : Elements of hydroelectric power station and concept of pumped storage plants and storage plants, Mass curve (explanation only).

Hydro dynamic force of jets on stationary and moving flat , inclined and

curved vanes, Jet striking centrally and at tip, velocity diagrams, work done and efficiency, flow over radial vanes.

UNIT - 4

Hydraulic Turbines : Classification of hydraulic turbines-working principle of – Pelton wheel, Francis and Kaplan turbines, velocity triangles and work done by water on runner-hydraulic design - draft tube theory, functions and efficiency. Geometric similarity, units and specific quantities, governing of turbines, Characteristic curves, selection of type of turbine, cavitation, surge tank and water hammer.

UNIT - 5

Centrifugal pumps : Classification, working principle of centrifugal pump, work done- manometric head-losses and efficiencies- specific speed of pump and pumps in series and parallel- performance characteristic curves, NPSH.

TEXT BOOKS:

1. Hydraulics and Fluid Mechanics Including Hydraulic Machines- P.N.MODI and S.M.SETH.
2. Fluid Mechanics and Hydraulic Machines – RAJPUT.
3. Fluid Mechanics and Hydraulic Machines – R.K.BANSAL
4. Fluid Mechanics and Hydraulic Machines – RAMJEE

REFERENCE BOOKS:

1. Fluid Mechanics and Fluid Power Engineering by D.S.Kumar, Kotaria & Sons
2. Fluid Mechanics and Machinery by D.Rama Durgaiah, New Age International
3. Hydraulic Machines by Banga & Sharma, Khanna Publishers.
4. Introduction to Fluid Mechanics by James A. Fay

ELECTRONIC DEVICES AND CIRCUITS
(Common to ECE, EEE, CSE, ICE, IT, ETM)

II YEAR B.Tech EEE I-Sem	L	T/P/D	C
	4	1/0/0	4

OBJECTIVES : This course aims to give the detailed knowledge of basic devices used in Electronic Circuits and Systems. Mainly emphasizes on construction, working, principle of operation, symbols, equivalent circuits, characteristics, applications of devices like p-n Junction diode, Zener diode, BJT, FET, MOSFET, Tunnel diode, Varactor diode, Schottky Barrier Diode, Semiconductor Photo Diode, Photo Transistor, LED, PIN Diode, UJT, SCR and small signal modeling of BJTs and FETs.

UNIT - I

P-N JUNCTION DIODE, RECTIFIERS AND FILTERS : Qualitative Theory of p-n Junction , p-n Junction as a Diode, Diode Equation, Volt-Ampere characteristics, Temperature dependence of V-I characteristics, Ideal versus practical -Resistance levels(Static &Dynamic), Transition and Diffusion Capacitances, Diode Equivalent circuits, Hall effect, Load Line Analysis, Breakdown Mechanism in Semiconductor Diodes, Zener Diode Characteristics.

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, “-Section filters, Comparison of Filters, Voltage Regulation using Zener Diode.

UNIT - II

BIPOLAR JUNCTION TRANSISTOR, TRANSISTOR BIASING AND STABILIZATION : The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation, BJT Specifications.

Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector-Emitter Feedback bias, Voltage Divider Bias, Bias Stability ,Stabilization Factors, Stabilization against variations in VBE and ², Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability.

UNIT - III

SMALL SIGNAL LOW FREQUENCY BJT MODELS : BJT Hybrid Model, Determination of h-parameters from Transistor Characteristics, Analysis of Transistor Amplifier using h-Parameters, Comparison of CB,CE and CC Amplifier Configurations.

UNIT - IV

FIELD EFFECT TRANSISTOR AND FET AMPLIFIERS : The Junction Field Effect Transistor (Construction, principle of operation, symbol), Pinch-off Voltage, Volt-Ampere characteristics, Differences between JFET & MOSFET, MOSFET (Construction, principle of operation, symbol), MOSEFT Characteristics in Enhancement & Depletion modes, differences between EMOSFET & DMOSFET.

FET Biasing (Fixed bias, Self Bias, Voltage Divider Bias & Feedback Bias), JFET Small Signal Model, Analysis of Common Source Amplifier, Common Drain amplifier, Generalized FET amplifier, FET as Voltage Variable Resistor, Comparison of BJT & FET.

UNIT- V

SPECIAL PURPOSE ELECTRONIC DEVICES : Principle of Operation and Characteristics of Tunnel Diode (with help of Energy Band Diagram) and Varactor Diode, Principle of Operation of Schottky Barrier Diode, Semiconductor Photo Diode, Photo Transistor, LED, PIN Diode, UJT, SCR.

OUTCOMES : The completion of the course enables to understand construction, working, symbols, principle of operation, characteristics, modeling and applications of most important electronic devices of Electronic circuits and Systems.

TEXT BOOKS

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

REFERENCES

1. Integrated Electronics - J.Milliman and Christors C.Halkias,1991, ed 2008, TMH
2. Electronic Devices and Circuits-Klal Kishore, 2 ed, 2005, BSP.
3. Electronic Devices and Circuits –Anil K.Maini, Varsha Agrawl,1 ed, 2009, Wiley India Pvt. Ltd
4. Electronic Devices and Circuits - S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 ed., 2008, TMH.
5. Electronic Devices and Circuits- A.P.Godse, U.A.Bakshi, Technical

NETWORK THEORY

II YEAR B.Tech EEE I-Sem	L	T/P/D	C
	3	1/0/0	3

OBJECTIVE : This course introduces the basic concepts of Network Theory which is the foundation for all the subjects of the Electrical Engineering discipline. The emphasis in this course is laid on the three phase circuits , Analysis of Transients and two port networks , filters and Fourier analysis.

UNIT - I

THREE PHASE CIRCUITS : Three phase circuits: Phase sequence- Star and delta connection-Relation between line and phase voltages and currents in balanced systems-Analysis of balanced three phase circuits- Three Phase 3 wire and 4 wire unbalanced loads - Displacement neutral method - Measurement of Active and Reactive power in balanced & unbalanced three phase systems. – Two Wattmeter Method of measurement of three phase power.

UNIT - II

TRANSIENT ANALYSIS : Transient response of R-L, R-C, R-L-C series circuits for D.C excitation-Initial conditions-solution method using differential equation and laplace transforms,

Transient response of R-L, R-C, R-L-C series circuits for sinusoidal excitations-Initial conditions-Solution method using differential equations and laplace transforms - Response of R-L & R-C & R-L-C networks to pulse excitation.

UNIT - III

TWO PORT PARAMETERS : Two port network parameters – Z, Y, ABCD and hybrid parameters and their relationships – Conditions for symmetricity & reciprocity - Transform networks, Interconnection of two port networks - series, parallel, series parallel & Cascaded connections of two port networks. Image parameters, T, À and lattice networks.

UNIT - IV

FILTERS : Symmetrical networks – Characteristic impedance – Attenuation constant, phase constant & propagation constant - Low pass, High pass, Band pass, Band elimination Filters - Prototype (constant K) filters, Limitations of Prototype filters - m-derived filters - Composite filters.

UNIT - V

FOURIER ANALYSIS AND NETWORK FUNCTIONS : Fourier theorem, consideration of symmetry, line spectra and phase angle spectra. Fourier Integrals and Fourier Transforms – properties of Fourier Transforms . complex frequency, network functions, significance of poles and zeros. Time domain response from pole- zero plot.

TEXT BOOKS:

1. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley,Mc Graw Hill Company, 6th edition

REFERENCE BOOKS:

1. Network Theory by A. Sudhakar and Shyammohan S Palli, Tata McGraw-Hill Publications, first edition
2. Network Analysis by N.C.Jagan, C.Lakshmi Narayana,BS Publications,2nd edition
3. Network Analysis and synthesis by Somanathan Nair and S.R.Deepa, Elsvier Publications.

ELECTRICAL MEASUREMENTS

II YEAR B.Tech EEE I-Sem	L	T/P/D	C
	3	1/0/0	3

OBJECTIVE : Electrical measurements course introduces the basic principles of all measuring instruments. It also deals with the measurement of RLC parameters voltage, current Power factor, power, energy and magnetic measurements.

UNIT - I

MEASURING INSTRUMENTS : Classification – deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, moving iron type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of range using shunts and series resistance. Electrostatic Voltmeters-electrometer type and attracted disc type.

UNIT –II

INSTRUMENT TRANSFORMERS AND POTENTIOMETERS : CT and PT – Ratio and phase angle errors – design considerations Type of P.F. Meters – dynamometer and moving iron type – 1-ph and 3-ph meters – Frequency meters – resonance type and Weston type

Principle and operation of D.C. Crompton's potentiometer – standardization – Measurement of unknown resistance, current, voltage.

A.C. Potentiometers: polar and coordinate types standardization – applications.

UNIT –III

MEASUREMENT OF POWER AND ENERGY : Single phase dynamometer wattmeter, LPF and UPF, Double element and three element dynamometer wattmeter, expression for deflecting and control torques – Extension of range of wattmeter using instrument transformers – Measurement of active and reactive powers in balanced.

Single phase induction type energy meter – driving and braking torques – errors and compensations – testing by phantom loading using R.S.S. meter. Three phase energy meter – Measurement of volt-amp hours , trivector meter, maximum demand meters.

UNIT – IV

MEASUREMENT OF RESISTANCE AND IMPEDANCE USING BRIDGES: Method of measuring low, medium and high resistance – wheatstone bridge - sensitivity of Wheatstone's bridge – limitations of wheatstone's bridge – kelvin's double bridge -Carey Foster's bridge, measurement of high resistance – loss of charge method.

Measurement of self inductance, Quality Factor - Maxwell's bridge, Hay's bridge, Anderson's bridge, Owen's bridge. Measurement of Mutual Inductance - Campbell's bridge and Heaviside bridge . Measurement of capacitance and loss angle - Desauty bridge , Schering Bridge. Measurement of frequency - Wien's bridge .

UNIT – V

MAGNETIC MEASUREMENTS : Ballistic galvanometer – equation of motion – calibration -flux meter – constructional details, comparison with ballistic galvanometer. Determination of B-H Loop methods of reversals six point method – A.C. testing – Iron loss of bar samples Lloyd fisher magnetic square– core loss measurements by bridges and potentiometers.

TEXT BOOK :

1. Electrical Measurements and measuring Instruments – by E.W. Golding and F.C. Widdis, fifth Edition, Wheeler Publishing.
2. Electrical & Electronic Measurement & Instruments by A.K.Sawhney Dhanpat Rai & Co. Publications.

REFERENCE BOOKS:

1. Electrical Measurements – by Buckingham and Price, Prentice – Hall
2. Electrical Measurements by Harris.
3. Electrical Measurements: Fundamentals, Concepts, Applications – by Reissland, M.U, New Age International (P) Limited, Publishers

ELECTRICAL MACHINES – I

II YEAR B.Tech EEE I-Sem	L	T/P/D	C
	4	1/0/0	4

UNIT – I

BASIC CONCEPTS OF DC MACHINES : Energy balance in Electromechanical energy conversion systems, force and torque in a single excited magnetic system. Constructional features of DC machines, Lap and wave windings, induced emf, torque expression , Electrical and mechanical power, generator and motor operation, magnetization characteristic, numericals.

UNIT – II

DC GENERATORS : Commutation and armature reaction, cross – magnetizing and demagnetizing , mmf calculations . Separate and self excitation of DC generators, critical field resistance and critical speed of DC shunt generator.

UNIT – III

Characteristics of DC generators, Parallel Operation : Load characteristics of separately excited, shunt, series and compound generators. Parallel operation of DC separately excited generators, series generator as booster, Numericals.

UNIT – IV

DC MOTORS : Significance of back EMF, Speed torque charateristics of DC shunt, series and compound motors. Speed control by field & armature voltage control, Starting of DC motors, 3- point starter and 4- point starter, starting resistance calculations, numericals.

UNIT - V

TESTING OF DC MACHINES : Losses in a DC machine, condition for maximum efficiency. Swinburne's test, Hopkinson test, retardation test, separation of losses,fields test. Brake test on motors, Load tests on generators, numericals.

TEXT BOOKS:

1. "Electrical Machiness" by I.J. Nagrath and D.P Kothari, Tata mc Graw Hill, 3rd edition 2004.

REFERENCE BOOKS:

1. " Electrical machines" by P.S Bimbhra, Khanna Publishers.
2. A Electrical machinery by A.E Fitzgerald, C.Kingsley & S.Umans Mc.Graw hill , 5th edition.
3. Electromechanical Energy conversion vicent Del toro.
4. Electric Drives Chillikin.

FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

II YEAR B.Tech EEE I-Sem	**L**	**T/P/D**	**C**
	0	**0/3/0**	**2**

OBJECTIVES:

1. The purpose of this laboratory is to reinforce and enhance the understanding of fundamental principles, concepts and significance of various experiments as per existing laboratory experimental practice and evaluation procedure in the subject "Fluid mechanics and Fluid machinery".

   The experiments here are so designed to demonstrate the applications of the basic ûuid mechanics principles and to provide a more intuitive and physical understanding of the theory.

LIST OF EXPERIMENTS:

1. Impact of Jets on Vanes
2. Performance Test on Pelton Wheel (Pelton Turbine).
3. Performance Test on Francis Turbine.
4. Performance Test on Kaplan Turbine.
5. Performance Test on Single Stage Centrifugal pump.
6. Performance Test on Multi Stage Centrifugal pump.
7. Calibration of Venturimeter.
8. Calibration of Orifice meter.
9. Determination of friction factor for a given pipe line.
10. Determination of loss of head due to sudden contraction in a pipeline.

ELECTRONIC DEVICES & CIRCUTIS LAB

II YEAR B.Tech EEE I-Sem	**L**	**T/P/D**	**C**
	0	**0/3/0**	**2**

OBJECTIVES: To give the students introduction about Discrete components (linear and nonlinear), Breadboards, CRO's, Multimeters, Signal generators etc. and make them to identify the different components.Students are trained to design different circuits using Diodes, BJT, FETS etc. for various applications.

PART A: (Only for Viva-voce Examination)

ELECTRONIC WORKSHOP PRACTICE (in 3 lab sessions):

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

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

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

PART C:

Equipment required for Laboratories:

1.	Regulated Power supplies (RPS)	-	0-30V
2.	CRO's	-	0-20MHZ
3.	Function Generators	-	0-1 MHz.
4.	Multimeters5. Decade Resistance Boxes/Rheostats		
6.	Decade Capacitance Boxes		
7.	Ammeters (Analog or Digital)	-	0-20uA,0-50uA,0-100uA, 0-200|iA, 0-10 mA.
8.	Voltmeters (Analog or Digital)	-	0-50V,0-100V,0-250V
9.	Electronic Components	-	Resistors, Capacitors, LCDs, BJTs pnp & npn, SCRs, UJTs, FETs, MOSFETs, diodes- Ge & Si

OUTCOMES : Students can identify different components and can operate them properly and also can design different circuits using different components and devices for various applications.

ENIVIRONMENTAL SCIENCE

II YEAR B.Tech EEE II-Sem.

L	T/P/D	C
3	0/0/0	3

OBJECTIVES:

1. To fulfill the requirement of UGC as per the direction of Supreme Court of India.
2. To create awareness & sensitize the young minds about the environmental issues & their impacts on various environmental components
3. To motivate the students about the conservation of resources and protection of Environment from over exploitation.
4. To bring awareness regarding various Environmental Policy of India.

UNIT – I

ECO-SYSTEMS : Definition, Scope and Importance of ecosystem. Classification, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT - II

ENVIRONMENTAL POLLUTION AND CONTROL TECHNOLOGIES: Environmental Pollution & control: Classification of pollution, causes, effects and control technologies. **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Pollution from Power projects**, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary, Air: Overview of air pollution control technologies, Concepts of bioremediation. Field visit. **Global Environmental Problems and Global Efforts: C**limate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

UNIT – III

NATURAL RESOURCES: CLASSIFICATION OF RESOURCES: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral**

resources: use and exploitation, environmental effects of extracting and using mineral resources, **Land resources: Forest resources, Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies..

UNIT - IV

BIODIVERSITY & BIOTIC RESOURCES : Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act

UNIT - V

ENVIRONMENTAL POLICY, LEGISLATION & EIA : Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards SUSTAINABLE FUTURE :** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

SUGGESTED TEXT BOOKS:

1. Text book of Environmental Science and Technology by M.Anji Reddy 2007, BS Publications.
2. Environmental studies by Erach Bharucha 2013, 2nd Ed. University Grants Commission, University Press.

REFERENCE BOOKS:

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.
3. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.

POWER SYSTEMS-I

II YEAR B.Tech EEE II-Sem.	**L**	**T/P/D**	**C**
	4	**1/0/0**	**4**

OBJECTIVE : Electrical Power plays significant role in day to day life of entire mankind. This course concerns the generation and distribution of power

UNIT-I :

THERMAL & NUCLEAR POWER STATIONS : Thermal Power Stations(TPS): Line diagram showing paths of coal, steam, water, air, ash and flue gasses.- Brief description of TPS components: Economizers, Boilers, Super heaters, Turbines, Condensers, Chimney and Cooling towers.

Nuclear Power Stations: Nuclear Fission and Chain reaction.- Nuclear fuels.- Principle of operation of Nuclear reactor.-Reactor Components: Moderators, Control rods, Reflectors and Coolants.- Radiation hazards: Shielding and Safety precautions.- Types of Nuclear reactors and brief description of PWR, BWR and FBR.

Gas Power Stations: Principle of Operation and Components (Block Diagram Approach Only)

UNIT-II

GENERAL ASPECTS OF DISTRIBUTION SYSTEMS, D.C & A.C. DISTRIBUTION SYSTEMS : Classification of Distribution Systems, Comparison of DC & AC distribution Systems, Under-Ground & Over Head Distribution Systems-Requirements and Design features of Distribution Systems, Voltage Drop Calculations in D.C Distributors Radial D.C Distributor and Ring Main Distributor.

A.C. Distributors:Voltage Drop Calculations in A.C. Distributors – effect of Power Factor, Numericals

UNIT-III:

SUBSTATIONS: Classification of substations: Air insulated substations(AIS)-Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment. Bus bar arrangements in the Sub-Stations: Simple arrangements like single bus bar, sectionalized single bus bar, main and transfer bus bar system with relevant diagrams.

Gas insulated substations (GIS) – Advantages of Gas insulated substations, different types of gas insulated substations, single line diagram of gas insulated substations, bus bar, construction aspects of GIS, Installation and maintenance of GIS, Comparison of Air insulated substations and Gas insulated substations.

UNIT-IV:

POWER FACTOR AND VOLTAGE CONTROL : Causes of low p.f -Methods of Improving p.f -Phase advancing and generation of reactive KVAR using static Capacitors-Most economical p.f. for constant KW load and constant KVA type loads.

Dependency of Voltage on Reactive Power flow.- Methods of Voltage Control: Shunt Capacitors, Series Capacitors, Synchronous Capacitors, Tap changing and Booster Transformers Numericals

UNIT-V

ECONOMIC ASPECTS OF GENERATION & TARIFFS : Load curve , load duration and integrated load duration curves-load factor, demand factor, diversity factor , capacity factor, utilization factor and plant use factor.

Base Load, Peak Load on Power station-Selection of Generating units ,

TARIFFS: Costs of Generation and their division into Fixed, Semi-fixed and Running Costs, cost of depriciation . Desirable Characteristics of a Tariff Method,Tariff Methods: Flat Rate, Block-Rate, two-part, three –part, and power factor tariff methods and Numericals

TEXT BOOKS :

1. "Power System Engineering" by M.L.Soni, P.V.Gupta, U.S.Bhatnagar and A.Chakraborti, DhanpatRai& Co. Pvt. Ltd., 1999.
2. Generation distribution …. By C.L.Wadhawa
3. Principles of Power Systems by V.K Mehta and Rohit Mehta S.CHAND& COMPANY LTD., New Delhi 2004.

REFERENCE BOOKS :

1. Elements of Power Station design and practice by M.V. Deshpande, Wheeler Publishing.
2. Electrical Power Systems by C.L.Wadhawa New age International (P) Limited, Publishers 1997.
3. Electrical Power Generation, Transmission and Distribution by S.N.Singh., PHI, 2003.
4. Gas turbine performance, by PP Wals, P.Fletcher, Blackwell Publisher, 2004.

ELECTRONIC CIRCUITS

II YEAR B.Tech EEE II-Sem.	**L**	**T/P/D**	**C**
	3	**1/0/0**	**3**

COURSE OBJECTIVES:

1. To familiarize the student with the analysis and design of basic transistor amplifier circuits
2. To apply the frequency response concepts to BJT and FETs
3. To understand the concepts of feedback and oscillator circuits
4. To familiarize the student with the analysis and design of clipper and clamper circuits, wave shaping circuits and multivibrator circuits

UNIT - I

SINGLE STAGE AMPLIFIERS DESIGN AND ANALYSIS : Review of CE, CB, CC& CS amplifiers-Classification of Amplifiers, Distortion in amplifiers-Approximate analysis, CE, CB, CC amplifiers comparison**.**

BJT & FET FREQUENCY RESPONSE : Logarithms-Decibels-General frequency consideration-Low frequency analysis-Low frequency response of BJT amplifiers-Low frequency response of FET amplifier-Miller effect capacitance-High frequency response of BJT amplifier-Square wave testing

UNIT - II

FEEDBACK AMPLIFIERS : Concept of feedback, Classification of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on Amplifier characteristics-Voltage series-Voltage shunt, Current series and Current shunt Feedback configurations-Simple problems**.**

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

UNIT - III

LARGE SIGNAL AMPLIFIERS : Class –A Power Amplifier, Maximum Value of Efficiency of Class-A Amplifier, Transformer coupled amplifier- Push Pull Amplifier-Complimentary Symmetry Circuits (Transformer Less Class B Power Amplifier)-Phase Inverters, Transistor Power Dissipation, Thermal Runway, Heat sinks.

LINEAR WAVESHAPING : High pass, low pass RC circuits, their response for sinusoidal, step, pulse and square wave inputs**.**

UNIT - IV

CLIPPERS AND CLAMPERS : Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled

clipper, Comparators, applications of voltage comparators, clamping operation, clamping circuits using diode with different inputs, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, Transfer characteristics of clampers.

SWITCHING CHARACTERISTICS OF DEVICES : Diode as a switch, piecewise linear diode characteristics, Transistor as a switch, Break down voltage consideration of transistor, Breakdown voltage with base not open, latching in transistor, saturation parameters of Transistor and their variation with temperature, Design of transistor switch, transistor-switching times.

UNIT - V

MULTIVIBRATORS : Multivibrators (using BJT's): The Bistable multivibrator: Fixed bias and self bias transistor binary stable state voltages and currents, commutating capacitors, symmetrical and unsymmetrical triggering, Analysis and design of Schmitt trigger circuit, monostable multivibrator (collector coupled only), analysis and design of astable multivibretor (collector coupled only) and applications of multivibrator.

TEXT BOOKS:

1. Electronic Devices and Circuit Theory, Robert L.Boylestad, Louis Nasheisky, 9th Edition 2007, Pearson Education
2. Electronic Devices and Circuits by S. Salivahanan, N. Suresh Kumar and A. Vallavaraj, 2nd edition 2008, Tata McGraw Hill Companies.
3. Solid State Pulse Circuits by David A. Bell, 4th Edition, Prentice Hall of India

REFERENCE BOOKS:

1. Introductory Electronic Devices and Circuits (Conventional flow version) – Robert T. Paynter, 7th Edition, 2009, PEI.
2. Electronic Devices and Circutits, Anil K. Maini, Varsha Agrawal, 1st Edition, WILEY.
3. Pulse, Digital & Switching Waveforms by Jacob Milliman, Harbert Taub and Mothiki S Prakash rao, 2nd edition 2008, Tata McGraw Hill Companies.

SWITCHING THEORY AND LOGIC DESIGN (STLD)
(Common to ECE, EEE,ETM, ICE)

II YEAR B.Tech EEE II-Sem.	L	T/P/D	C
	4	1/0/0	4

OBJECTIVES : To strengthen the students on Number systems and Codes, Boolean algebra and Switching Functions, Karnaugh Map, Logic Gates, Minimization of Switching Functions using Tabular Method, Combinational logic design using conventional logic gates, Encoder, Decoder , Mux and Demux ,Realization of Hazard free circuits, Programmable Logic devices ,Sequential circuits classification ,Flip flops, Finite state machines and Algorithmic state machines.

UNIT - I

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

BOOLEAN ALGEBRA, SWITCHING FUNCTIONS : Fundamental postulates of Boolean algebra, Basic theorems and properties, Algebraic simplification - switching functions–Canonical and Minimal SOP and POS forms.

UNIT - II

MINIMIZATION OF SWITCHING FUNCTIONS : Karnaugh Map (K-Map) method, Implicants, Prime implicants, Essential Prime implicants, don't care combinations- Tabular Method, Prime –Implicant chart, simplification rules.

COMBINATIONAL CIRCUITS-I : Digital logic gates, properties of XOR gates –universal gates-Realization of logic gates using universal logic gates-Realization of Multilevel NAND/NOR realizations-Design of Half Adder, Full Adder ,Half Subtractor , Full Subtractor ,magnitude comparator, 4-bit parallel adder, Carry look ahead adder using conventional logic gates.

UNIT - III

COMBINATIONAL CIRCUITS-II : Encoder, Decoder, Multiplexer, De-Multiplexer, Modular design using IC chips**,** MUX Realization of switching functions, Parity bit generator, Code-converters, Hazards and hazard free realizations.

PROGRAMMABLE LOGIC DEVICES : Basic PLD's-ROM, PROM, PLA, PAL, and Realization of Switching functions using PLD's.

UNIT - IV

SEQUENTIAL CIRCUITS - I : Combinational versus sequential circuits, Classification of sequential circuits: Synchronous, Asynchronous, Pulse mode, Level mode with examples. Basic flip-flops (SR, JK, T, D) -Triggering

and excitation tables of flip-flops, conversion among different flip-flops. Steps in synchronous sequential circuit design. Classification of Counters (Synchronous and Asynchronous counters), Design of modulo-N synchronous binary, gray, BCD, excess-3, Shift register counters(Ring and Johnson counters) Serial binary adder, sequence detector.

UNIT - V

SEQUENTIAL CIRCUITS - II : Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods-concept of minimal cover table.

ALGOROTHIMIC STATE MACHINES: Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

TEXTBOOKS:

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

REFERENCES:

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

ELECTRICAL MACHINES – II

II YEAR B.Tech EEE II-Sem.	L	T/P/D	C
	4	1/0/0	4

UNIT -I

SINGLE PHASE TRANSFORMERS : Single phase transformers-types - constructional details-minimization of hystersis and eddy current losses-emf equation - operation on no load and on load - phasor diagrams

Equivalent circuit - losses and efficiency-regulation. All day efficiency - effect of variations of frequency & supply voltage on iron losses.

Auto transformers-equivalent circuit - comparison with two winding transformers

UNIT –II

TESTING OF TRANSFORMERS : OC and SC tests – Sumpner's test - predetermination of efficiency and regulation-separation of losses test-parallel operation with equal and unequal voltage ratios.

UNIT - III

THREE PHASE TRANSFORMER : Three phase transformers – Star – Delta connections -open Ä connection , voltage harmonics in three winding transformers, determination of Z_p, Z_s and Z_t, off load and on load tap changing; Scott connection.

UNIT -IV

THREE PHASE INDUCTION MOTORS : Three phase induction motors-construction details of cage and wound rotor machines-production of rotating magnetic field - principle of operation - rotor emf and rotor frequency - rotor reactance, rotor current and pf at standstill and during operation.

CHARACTERISTICS OF INDUCTION MOTORS : Rotor power input, rotor copper loss and mechanical power developed and their inter relation-torque equation-expressions for maximum torque and starting torque - torque slip characteristic - double cage and deep bar rotors - equivalent circuit - phasor diagram - crawling and cogging

UNIT - V

SPEED CONTROL OF INDUCTION MOTORS : Circle diagram-no load and blocked rotor tests-predetermination of performance-methods of starting and starting current and torque calculations

Speed control-change of frequency; change of poles and methods of consequent poles; cascade connection. injection of an emf into rotor circuit (qualitative treatment only)-induction generator-principle of operation.

TEXT BOOKS:

1. Electrical machines-PS Bhimbra, Khanna Publishers
2. Electric machinery - A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw Hill Companies, 5th edition

REFERENCE BOOKS:

1. Performance and Design of AC Machines by MG.Say, BPB Publishers.
2. Theory of Alternating Current Machinery- by Langsdorf, Tata McGraw-Hill Companies, 2nd edition.
3. Electric Machines by I.J.Nagrath & D.P.Kothari,Tata Mc Graw Hill, 7th Edition.2005

ELECTROMAGNETIC FIELDS

II YEAR B.Tech EEE II-Sem.	L	T/P/D	C
	3	1/0/0	3

UNIT – I

ELECTROSTATICS : Rectangular, Cylindrical and spherical coordinate systems, Coulomb's law, electric field , determination of electrical field intensity due to point charges, Finite and infinite line charges, surface charge, volume charge with uniform charge density. Guass's law in integral and differential form in terms of 'E' , Electrical field due to infinite line , infinite plane and spherical surface of uniform charge distribution, commentson use of guass's law on find 'E'. curl of E, electrical potential difference and potential, calculation of electric potential due to different charge distributions. Energy of point and continous charge distributions, energy density in static electric fields.

UNIT –II

CONDUCTORS AND DIELECTRICS : Properties of conductors in static electric fields, induced charges, capacitance, capacitance of a parallel plate capacitor. Poissons and Laplace equation, solution of Laplace equations in one dimension,capacitance of a co-axial cable, method of images. Electrical dipoles, torque on a dipole situated in an external electric field. Atomic polarization 'P', Field due to polarized dielectric, bound surface and volume charge densities, the displacement vector 'D', Guass's law in the presence of dielectrics, linear dielectrics, relative permittivity, parallel plate capacitor with composite dielectrics.

UNIT –III

MAGNETOSTATICS : Steady line, surface and volume currents, continuity equation, Biot –savart's law in terms of 'B' and superposition, determination of 'B' due to stedy currents of the following types: i) Finite and infinite straight line, polyon, circle, solenoid. Divergence and curl of 'B'. Ampere's law in point form, strokes theorem and integral form in terms of 'B', determination of 'B' for steady currents of following types: infinite line, infinite plane, and infinite solenoid.Vector magnetic potential 'A', Magnetic field from vector magnetic potential . Energy stored and enrgy density in a steady magnetic field. Lorentz's force law, force on steady currents of the following types: i) Long straight conductor in an external magnetic field . ii) two long, straight, parallel conductors.

UNIT- IV

MAGNETIC MATERIALS : Magnetics dipole, magnetic dipole moment, torque on a square current loop in a uniform external magnetic field. Diamagents, paramagentics, ferromagnetic 'M', bound suface and volume currens, the

vector'H', Ampere's law in the presence of magnetic materials, linear magnetic materials , relative permeablilty.

UNIT –V

TIME VARYING FIELDS ,MAXWELL'S EQUATIONS AND PALNE WAVE PROPOGATION : Faraday's law, lenz's law, statically and dynamically in duced emfs, Ohm's law; self inductance of a solenoid, mutual inductance, example of a long straight wire and square loop of wire in the same plane. Modification of Maxwell's equations for time varying fields , displacement current, differentical and integral form. Plane wave propogation in free space.

TEXT BOOKS :

Engineering Electromagnetics : W.H. Hayt & John. A. Buck

REFERENCE BOOKS :

"Introduction of Electro dynamics" D.J. Griffits.

ELECTRICAL MACHINES LAB - I

II YEAR B.Tech EEE II-Sem.	**L**	**T/P/D**	**C**
	0	**0/3/0**	**2**

The following experiments are required to be conducted compulsory experiments

1. Magnetization characteristics of DC machine.
2. Load test on DC shunt generator.
3. Load test on DC series generator.
4. Load test on DC compound generator.
5. Hopkinson's test on DC shunt machines.
6. Fields test on DC series machines.
7. Swinburne's test and speed control of DC shunt motor.
8. Brake test on DC compound motor.

   In additional to the above eight Experiments, any two of the experiments from the following list are required to be conducted:
9. Brake test on DC shunt motor.
10. Retardation test on DC shunt motor.
11. Separation of losses in DC shunt motor.

ELECTRICAL MEASUREMENTS LAB

II YEAR B.Tech EEE II-Sem.	**L**	**T/P/D**	**C**
	0	**0/3/0**	**2**

The following experiments are required to be conducted as compulsory experiments:

1. Calibration and Testing of single phase energy Meter
2. Calibration of dynamometer power factor meter
3. Crompton D.C. Potentiometer - Calibration of PMMC ammeter and PMMC voltmeter
4. Kelvin's double Bridge - Measurement of resistance – Determination of Tolerance.
5. Dielectric oil testing using H.T. testing Kit
6. Schering bridge & Anderson bridge.
7. Measurement of 3 phase reactive power with single-phase wattmeter.
8. Measurement of parameters of a choke coil using 3 voltmeter and 3 ammeter methods.

   In addition to the above eight experiments, atleast any two of the experiments from the following list are required to be conducted:
9. Calibration LPF wattmeter - by Phantom testing
10. Measurement of 3 phase power with single watt meter and 2 No's of C.T.
11. C.T. testing using mutual Inductor - Measurement of % ratio error and phase angle of given C.T. by Null method.
12. P.T. testing by comparison - V.G as Null detector - Measurement of % ratio error and phase angle of the given P.T.
13. LVDT and capacitance pickup - characteristics and Calibration
14. Resistance strain gauge - strain measurements and Calibration
15. Transformer turns ratio measurement using A.C. bridge
16. Measurement of % ratio error and phase angle of given C.T. by comparison.

MANGERAL ECONOMICS & FINANCIAL ANALYSIS

III YEAR B.Tech EEE I-Sem.	L	T/P/D	C
	3	0/0/0	3

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

UNIT - I

INTRODUCTION TO BUSINESS & MANAGERIAL ECONOMICS : Characteristic features of Business, Features and evaluation of Sole proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types. Definition, Nature and Scope of Managerial Economics, Features & Relationship with other sciences – Managerial Economics Concepts – Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

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

UNIT - II

THEORY OF PRODUCTION : Production Function – Law of diminishing returns, Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

COST ANALYSIS : Cost Concepts, Opportunity cost, Fixed vs. Variable costs, Explicit costs Vs.Implicit Costs, Out of pocket costs vs. Imputed costs. Cost analysis in Short-run & Long-run. Break-even Analysis (BEA) – Determination of Break-Even points (Simple problems) – Managerial Significance and limitations of BEA.

UNIT - III

INTRODUCTION TO MARKET PRICING METHODS : MARKET STRUCTURES: Types of competition, Features of Markets based on competition, Price-Output determination in case of perfect competition and monopolistic 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, Bundling Pricing, Peak Load Pricing, Cross Subsidization.

UNIT - IV

FINANCIAL ACCOUNTING & ANALYSIS : Accounting – Definition, Accounting Concepts & Conventions, Importance of Accountancy, Difference between Book-keeping & Accountancy, Double-Entry Book Keeping - Advantages, Types of Accounts and its rules, Accounting Cycle - Journal, Ledger, Trial Balance .

FINAL ACCOUNTS : Introduction to Final Accounts (Trading, Profit & Loss Account and Balance Sheet) Adjustments with Simple Problems. Introduction to Ratio Analysis, Need & Importance of Ratios (Theory only)

UNIT - V

CAPITAL AND CAPITAL BUDGETING : Introduction to Sources of raising finance Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of capital Budgeting, Payback Method, Accounting Rate of Return (ARR) and Net Present Value NPV , Profitability Index(PI), Internal Rate of Return (IRR),(Simple Problems)

TEXT BOOKS:

1. Managerial Economics and Financial Analysis – A R Aryasri

REFERENCES:

1. Managerial Economics Analysis, Problems & Cases – P.L.Mehta.
2. Managerial Economics – Varshney & Maheshwari
3. Financial Management Text and problems – Khan & Jain
4. Financial Management – I.M.Pandey
5. Double Entry Book Keeping – T.S. Grewal
6. Managerial Economics & Financial Analysis – S.A Siddiqui & A.S Siddiqui
7. Managerial Economics & Financial Analysis – Raghunatha Reddy & Narasimhachary
8. Financial Accounting – S.N. Maheswari & S.K Maheswari

POWER SYSTEMS - II

III YEAR B.Tech EEE I-Sem.	L	T/P/D	C
	3	1/0/0	3

OBJECTIVE : Power Systems- II course is one of the core course of Electrical discipline. In this course different types of transmission line parameters, performance of short ,medium & Long transmission lines, and power system transients , over heads line insulators and underground cables will be studied.

UNIT-I

TRANSMISSION LINE PARAMETERS : Types of conductors - calculation of resistance for solid conductors - Calculation of inductance for single phase and three phase, single and double circuit lines, concept of GMR & GMD, symmetrical and asymmetrical conductor configuration with and without transposition, Numerical Numericals.

Calculation of capacitance for 2 wire and 3 wire systems, effect of ground on capacitance, capacitance calculations for symmetrical and asymmetrical single and three phase, single and double circuit lines, Numerical Numericals.

UNIT-II

PERFORMANCE OF SHORT, MEDIUM AND LONG TRANSMISSION LINES : Classification of Transmission Lines - Short, medium and long line and their model representations -Rigorous Solution - Nominal-T, Nominal-Pie and A, B, C, D Constants for symmetrical & Asymmetrical Networks. Interpretation of the Long Line Equations, Representation of Long Lines Equivalent-T and Equivalent Pie network models.

Mathematical Solutions to estimate regulation and efficiency of all types of lines - Numericals.

UNIT-III

UNDERGROUND CABLES : Types of Cables, Construction, Types of Insulating materials, Calculations of Insulation resistance and stress in insulation

Capacitance of Single and 3-Core belted cables. Grading of Cables - Capacitance grading, Description of Inter-sheath grading. HV cables, Numericals.

UNIT – IV

OVER VOLTAGES AND VOLTAGE CONTROL : Over voltages in transmission lines - Travelling or Propagation of Surges - Attenuation, Distortion, Reflection and Refraction Coefficients - Termination of lines with different types of conditions - Open Circuited Line, Short Circuited Line, T-Junction, Lumped Reactive Junctions. Bewley's Lattice Diagrams.

Skin and Proximity effects - Description and effect on Resistance of Solid Conductors - Ferranti effect - Charging Current - Regulation of the Transmission Line, voltage control of transmission lines.

UNIT-V

OVERHEAD LINE INSULATORS , SAG CALCULATIONS : Types of Insulators, String efficiency and Methods for improvement, - voltage distribution, calculation of string efficiency, Capacitance grading and Static Shielding . Arcing horn and grading ring.

Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference, advantages and disadvantages of corona, methods of reducing corona effects.

Sag calculations with equal and unequal heights of towers, Effect of Wind and Ice on weight of Conductor, Numericals - Stringing chart and sag template and its applications. Vibrations and dampers.

TEXT BOOKS:

1. Electrical power systems - by C.L.Wadhwa, New Age International (P) Limited, Publishers,1998.
2. Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A.Chakrabarthy, Dhanpat Rai & Co Pvt. Ltd.

REFERENCE BOOKS:

1. Power system Analysis-by John J Grainger William D Stevenson, TMC Companies,4th edition.
2. Principles of power systems -by V.K. Mehta & Rohit Mehta, S. Chand and company Ltd publishers.
3. power System Analysis and Design by B.R.Gupta, Wheeler Publishing.
4. Power System Analysis by Hadi Saadat – TMH Edition.
5. Modern Power System Analysis by I.J.Nagarath and D.P.Kothari, Tata McGraw Hill, 2nd Edition.

IC APPLICATIONS
(COMMON TO ECE, EEE, ETM, ICE)

III YEAR B.Tech EEE I-Sem.	L	T/P/D	C
	3	1/0/0	3

OBJECTIVES : To strengthen the basic concepts in IC's design and its applications, to introduce basic building blocks of analog and digital integrated circuits, to familiarize linear and non-linear applications of op-amp, to study about functioning of IC 555 timer, PLL , ADC and DAC converters and their applications and to introduce the analysis and design of digital IC's of 74 series which form core part of digital electronics.

UNIT -

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

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

UNIT - II

ACTIVE FILTERS & OSCILLATORS : Introduction, First Order and Second Order Low Pass, High Pass and Band Pass Filters, Active Band Reject and All Pass Filters.

Principle of Operation and Types of Oscillators - RC, Wien Bridge and quadrature type.Waveform Generators - Triangular, Saw Tooth. Square Wave.

TIMERS : Introduction to 555 Timer, Functional Diagram, Monostable and Astable Operations and Applications, Schmitt Trigger.

UNIT - III

PHASE LOCKED LOOPS : PLL- Introduction, Block Schematic, Principles and Description of Individual Blocks of 565, VCO.

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

UNIT - IV

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

UNIT - V

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

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

TEXT BOOKS:

1. Linear Integrated Circuits -D. Roy Chowdhary, New Age International (p)Ltd, 3rd Ed.,2008.
2. Digital Fundamentals - Floyd and Jain, Pearson Education,8th Edition, 2005.
3. Op-Amps and Linear Integrated Circuits - Concepts and Applications by James M.Fiore, Cengage / Jaico, 2/e, 2009.

REFERENCES:

1. Modern Digital Electronics - RP Jain- 4/e-TMH, 2010.
2. Op-Amps & Linear ICs-Ramakanth A. Gayakwad, PHI, 1987.
3. Operational Amplifiers and Liner Integrated Circuits by K.Lai Kishore - Pearson, 2008.
4. Operational Amplifiers with Linear Integrated Circuits, 4/e William D.stanley, Pearson Education India, 2009.

POWER ELECTRONICS

III YEAR B.Tech EEE I-Sem.

L	T/P/D	C
4	1/0/0	4

OBJECTIVE : With the advent of semiconductor devices, revolution is taking place in the power transmission distribution and utilization. This course introduces the basic concepts of power semiconductor devices, converters and choppers and their analysis.

UNIT – I

POWER SEMI CONDUCTOR DEVICES : Thyristors – Silicon Controlled Rectifiers (SCR's) – BJT – Power MOSFET – Power IGBT and their V-I characteristics, Turn on methods of SCR- Dynamic characteristics of SCR - Turn on and Turn off times -IGCT and GTO static V-I charecteristics.

Gate Triggering Circuits– Series and parallel connections of SCR's – Snubber circuit details – Line Commutation and Forced Commutation circuits - numericals

UNIT – II

SINGLE PHASE CONTROLLED CONVERTERS : Classification of single Phase Converters- half and full wave converters – Mid point and Bridge connections – Half controlled converters with R, RL and RLE loads– Derivation of average load voltage and current -Active and Reactive power inputs to the converters without and with Freewheeling Diode –Three phase converters – Three pulse and six pulse converters –three phase half controlled converters- average load voltage and current equations With R and RL loads – Effect of Source inductance–Dual converters (both single phase and three phase) - Waveforms –Numericals.

UNIT – III

AC VOLTAGE CONTROLLERS & CYCLO CONVERTERS : AC voltage controllers – Single phase two SCR's in anti parallel – With R and RL loads – modes of operation of Triac – Triac with R and RL loads – Derivation of RMS load voltage, current and power factor -wave forms – Cyclo converters – Single phase midpoint cyclo converters with Resistive and inductive loads– Bridge configuration of single phase cyclo converter – Waveforms - numericals

UNIT – IV

CHOPPERS : Choppers – Time ratio control and Current limit control strategies – Step down choppers Derivation of load voltage and currents with R, RL and RLE loads- Step up Chopper – load voltage expression – types of choppers-first quadrant-second quadrant-four quadrant choppers –voltage and current commutated choppers- Numericals.

UNIT – V

INVERTERS : Inverters – Single phase inverter – Basic series inverter – Basic parallel Capacitor inverter bridge inverter – Waveforms –Basic three phase bridge inverter-Operation with 180^0 conduction mode and 120^0 conduction mode-Voltage control techniques for inverters -Pulse width modulation techniques –single pulse width, multiple pulse width and sinusoidal pulse width modulation , voltage sources inverters(VSI)- numericals.

TEXT BOOKS :

1. Power Electronics- by Dr.P.S.Bimbra,Khanna publishers
2. Power Electronics : Circuits, Devices and Applications – by M. H. Rashid, Prentice Hall of India, 2nd edition, 1998

REFERENCE BOOKS :

1. Power electronics by Ned Mohan ….
2. Power Electronics – by M. D. Singh & K. B. Kanchandhani, Tata Mc Graw – Hill Publishing company, 1998.
3. Power Electronics – by Vedam Subramanyam, New Age International (P) Limited,
4. Power Electronics - by V.R.Murthy , 1st edition -2005, OXFORD University Press
5. Power Electronics-by P.C.Sen,Tata Mc Graw-Hill Publishing.
6. Thyristorised Power Controllers – by G. K. Dubey, S. R. Doradra, A. Joshi and R. M. K. Sinha, New Age International (P) Limited Publishers, 1996.

COMPUTER METHODS IN POWER SYSTEMS

III YEAR B.Tech EEE I-Sem.	L	T/P/D	C
	4	1/0/0	4

OBJECTIVE : This course introduces formation of Y bus & Z bus of power systems and power flow studies by various methods. It also deals with short circuit analysis and analysis of power system for steady state and transient stability.

UNIT -I

PRELIMINARIES & FORMATION OF NETWORK MATRICES : Per-Unit System of Representation: Per-Unit equivalent reactance network of three phase power systems.

GRAPH THEORY & FORMATION OF Y BUS: Definitions, Primitive Matrices, Bus Incidence Matrix.

Y bus formation by Direct and Singular Transformation Methods.

Formation of ZbuS: Partial network, Algorithm for addition of a branch, Algorithm for addition of a link, Modification of ZBus for the changes in network. Numericals.

UNIT-II

POWER FLOW STUDIES-1 : Necessity of Power Flow Studies, Data for Power Flow Studies, Derivation of load flow equations.

LOAD FLOW SOLUTIONS USING GAUSS SEIDEL METHOD: Load flow solution with and without PV buses. Algorithm and Flowchart, Acceleration Factor, Numerical Load flow Solution for Simple Power Systems, Calculation of Line Flows & Losses.

UNIT-III

POWER FLOW STUDIES-2 : **NEWTON RAPHSON METHOD IN RECTANGULAR AND POLAR CO-ORDINATES FORMS:** Load Flow Solution with or without PV Buses- Derivation of Jacobian Elements, Algorithm and Flowchart. Decoupled and Fast Decoupled Load Flow Methods

Comparison of different methods - DC load Flow.

UNIT-IV

SHORT CIRCUIT ANALYSIS : **SYMMETRICAL FAULT ANALYSIS :** Short Circuit Current and MVA Calculations, Fault levels, Application of Series Reactors, Numerical Numericals.

UNSYMMETRICAL FAULT ANALYSIS : Symmetrical Component Theory: Symmetrical Component Transformation, Positive, Negative and Zero sequence components: Voltages, Currents and Impedances.

Sequence Networks; Positive, Negative and Zero sequence Networks, Numerical Numericals.

LG, LL, LLG faults with and without fault impedance. Numerical numericals.

UNIT-V

POWER SYSTEM STABILITY : Elementary concepts of steady State, dynamic and transient Stabilities.

STEADY STATE STABILITY: Description of Steady State Stability Power Limit, Transfer Reactance, Synchronizing Power Coefficient, Power Angle Curve and Determination of Steady State Stability Limits, Methods to improve steady state stability.

TRANSIENT STABILITY: Derivation of swing equation. Determination of transient stability by equal area criterion, Application of equal area criterion, Critical clearing angle calculations. Solution of swing equations: Point-by-Point Method. Methods to improve transient stability.

TEXTBOOKS:

1. Computer Methods in Power System Analysis, G.W. Stagg & A.H. El-Abiad, Mc Graw Hill
2. Power System Analysis by Hadi Saadat - TMH Edition.
3. Modern Power system Analysis - by I.J.Nagrath & D.P.Kothari: Tata McGraw-Hill, 2nd edition.

REFERENCE BOOKS:

1. Computer Techniques in Power System Analysis by M.A.Pai, TMH Publications
2. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.
3. Computer techniques and models in power systems, By K.Uma rao, I.K.Inter national
4. Power system Analysis Operation and control, Abhijit Chakrabarthi, Sunita Haldar, 3 ed, PHI,2010
5. Electric Power Systems, B.M. Weedy & B.J. Cory, 4th Edition, John Wiley,1999.

ELECTRICAL MACHINES -III

III YEAR B.Tech EEE I-Sem.	L	T/P/D	C
	4	1/0/0	4

OBJECTIVE : Electrical machines - III course is a core of Electrical discipline. In this emphasis will be on construction , principle of operation, characteristics , regulation, parallel operation of synchronous generator, principle of operation and starting of synchronous motor, single phase motors and special motors will be studied.

UNIT - I

SYNCHRONOUS GENERATORS : Constructional Features of round rotor and salient pole machines – Armature windings –Integral slot and fractional slot windings; Distributed and concentrated windings – distribution, pitch and winding factors – E.M.F Equation.

Harmonics in generated e.m.f. – suppression of harmonics – armature reaction - leakage reactance – synchronous reactance and impedance – experimental determination - phasor diagram – load characteristics.

UNIT - II

REGULATION OF SYNCHRONOUS GENERATOR : Regulation by synchronous impedance method, M.M.F. method, Z.P.F. method and A.S.A. methods – salient pole alternators – two reaction analysis – experimental determination of X_d and X_q (Slip test) Phasor diagrams – Regulation of salient pole alternators.

UNIT - III

PARALLEL OPERATION OF SYNCHRONOUS GENERATORS : Synchronizing alternators with infinite bus bars – synchronizing power torque – parallel operation and load sharing - Effect of change of excitation and mechanical power input. Analysis of short circuit current wave form – determination of sub-transient, transient and steady state reactances.

UNIT - IV

SYNCHRONOUS MOTORS : Theory of operation– phasor diagram – Variation of current and power factor with excitation –synchronous condenser – Mathematical analysis for power developed .

Excitation and power circles – hunting and its suppression – Methods of starting – synchronous induction motor.

UNIT - V

SINGLE PHASE MOTORS : Single phase Motors: Single phase induction motor – Constructional features-Double revolving field theory – Elementary idea of cross-field theory – split-phase motors – shaded pole motor.

SPECIAL MOTORS : Principle & performance of A.C. Series motor-Universal motor – Principle of permanent magnet and reluctance motors, stepper motors(elementary treatment only) .

TEXT BOOKS:

1. Electrical Machines – by I.J.Nagrath & D.P.Kothari, Tata Mc Graw-Hill Publishers, 7th Edition 2005.
2. Electrical Machines – by P.S. Bimbra, Khanna Publishers.

REFERENCE BOOKS:

1. The Performance and Design of A.C.Machines – by M.G.Say, ELBS and Ptiman & Sons.

   Electric Machinery – by A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw-Hill Companies, 5th edition, 1990
2. Theory of Alternating Current Machinery by Langsdorf, Tata Mc Graw - Hill, 2nd edition
3. Electro mechanic's-III (Synchronous and single phase machines), S.Kamakashiah, Right Publishers.

ADVANCED ENGLISH COMMUNICATIONS LAB

III YEAR B.Tech EEE I-Sem.	**L**	**T/P/D**	**C**
	0	**0/3/0**	**2**

The Advanced English Communication Skills lab focuses on the career planning, professional skills and interpersonal communication skills in the globalised context.

OBJECTIVES : To improve the students' fluency in English, through 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 and to enable the professional students to communicate their ideas relevantly and coherently both in writing and speaking.

SYLLABUS

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

1. Functional English – starting a conversation – responding appropriately and relevantly – using the right body language – role play in different situations.
2. Vocabulary Building – synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases.
3. Listening Skills – Purpose of listening – Types of listening – Barriers to listening – Sub Skills of listening – Tips for being a good listener
4. Reading Comprehension – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading.
5. Writing Skills – structure and presentation of different types of writing – Resume writing/e-correspondence/ Technical report writing/ Portfolio writing/Mind-mapping - planning for writing – research abilities/data collection/ organizing data/tools/analysis – improving one's writing.
6. Group Discussion – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
7. Presentation Skills – Oral presentation (individual and group) through JAM sessions/seminars and written presentations through posters/ projects/reports/PPTs/e-mails/mind maps/assignments etc.
8. Interview Skills – concept and process, pre-interview through tele and video-conferencing.

MINIMUM REQUIREMENT

THE ADVANCED ENGLISH COMMUNICATION SKILLS LAB SHALL HAVE INTEGRATED MULTIMEDIA RESOURCES: 20 Multimedia systems, with

movable chairs and audio-visual aids with a P.A System, a Multimedia Projector, a digital stereo –audio & video system and camcorder.

SYSTEM REQUIREMENT (HARDWARE COMPONENT)

Computer network with Lan with minimum 30 multimedia systems with the following specifications:

1. CPU Requirements
    1. Duel Core Processor
    2. Speed – 2.8 GHZ
    3. RAM – 1 GB Minimum
    4. Hard Disk – 80 GB Minimum
    5. DVD ROM Drive
2. Headphones of High quality

Suggested Software

1. *Oxford Advanced Learner's Compass*, 7th Edition.
2. *DELTA's key to the Next Generation TOEFL Test:* Advanced Skill Practice.
3. *English in Mind*, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge University Press.
4. *Job Hunting* by Colm Downes with CD, Cambridge University Press 2008.
5. *Business Vocabulary in Use* – Elementary to Intermediate with CDs, Cambridge University Press.

REFERENCES:

1. Soft Skills: Know Yourself and Know the World, Dr.K.Alex. S.Chand & Company Ltd.
2. *Group Discussion and Interview Skills* with VCD, Priyadarshi Patnaik, Foundation Books.
3. *Communication Skills for Engineers and Scientists*, Sangeeta Sharma & Binod Mishra, PHI Learning Private Limited.
4. **Critical Reasoning, Acedemic Writing and Presentation Skills,** Marilyn Anderson, Pramod K.Nayar and Madhucchanda Sen, Pearson Publishers.
5. Soft skills : Know yourself and know the world by *Dr. K. Alex*, S. Chand & Co., Ltd.

DISTRIBUTION AND WEIGHTAGE OF MARKS

Advanced English Language Laboratory Practical Paper:

1. The practical examinations for the English Language Laboratory shall be conducted as per the norms stipulated for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the semester for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with an external examiner from the other Universities or colleges.

ELECTRICAL MACHINES –II LAB

III YEAR B.Tech EEE I-Sem.	**L**	**T/P/D**	**C**
	0	**0/3/0**	**2**

List of Experiments:

1. O.C. & S.C. Tests on Single phase Transformer
2. Sumpner's test on a pair of single phase transformers
3. Scott connection of transformers
4. No-load & Blocked rotor tests on three phase Induction motor
5. Regulation of a three –phase alternator by synchronous impedance & m.m.f. methods
6. V and Inverted V curves of a three—phase synchronous motor.
7. Equivalent Circuit of a single phase induction motor
8. Determination of Xd and Xq of a salient pole synchronous machine

   In addition to above eight experiments, at least any two of the following experiments are required to be conducted from the following list.
9. Parallel operation of single phase transformers.
10. Separation of core losses of single phase transformer.
11. Regulation of three phase alternator by Z.P.F and A.S.A methods
12. Efficiency of three- phase alternator
13. Heat run test on a bank of 3 Nos. of single phase Delta connected transformers.
14. Measurement of sequence impedance of a three phase alternator.

MANGEMENT SCIENCE

III YEAR B.Tech EEE II-Sem.	L	T/P/D	C
	3	0/0/0	3

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

UNIT - 1

INTRODUCTION TO MANAGEMENT : Introduction to Management: Concepts of Management and organization – nature, importance and Functions of Management, Taylor's Scientific Management Theory. Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Corporate Social Responsibility.

UNIT - II

STRATEGY & ORGANISATION STRUCTURE : Strategic Management: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, SWOT Analysis.

Organisational Structures: Basic concepts related to Organisation – Departmentation and Decentralisation, Types of Mechanistic and organic structures of organisation (Line organization, Line and Staff organisation, functional organization, Committee organisation, Matrix organisation, Virtual Organisation, Cellular organisation, team structure, boundaryless organisation, Inverted Pyramid structure, Lean and Flat organisation structure) and their merits , demerits and suitability.

UNIT - III

HUMAN RESOURCE MANAGEMENT : Human Resources Management (HRM): Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs. PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Employee Engagement, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration. Job Evaluation and Merit Rating.

UNIT - IV

OPERATIONS MANAGEMENT : 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).

Materials Management: Objectives, Need for Inventory control, EOQ, ABC Analysis.

Project Management (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM) (Simple Problems).

Marketing: Functions of Marketing, Marketing Mix and Marketing Strategies based on Product Life Cycle, Channels of Distribution, Retailing & Branding.

UNIT - V

CONTEMPORARY MANAGEMENT PRACTICES : Contemporary Management Practices: Basic Concepts of Just-in-time (JIT) System, Capability Maturity Model (CMM) Levels, Value Chain Analysis, Enterprise Resource Planning (ERP), Performance Management, Business Process Outsourcing (BPO), Business Process Re-engineering, Supply Chain Management, Total Quality Management, Six Sigma, CRM, Bench Marking & Balanced Score Card.

TEXT BOOKS:

1. Management Science – A R Aryasri

REFERENCES:

1. Management - Stoner, Freemen & Gilberth
2. Industrial Engineering & Management Science – T.R. Banga & Sharma
3. Marketing Management – Kotler Philip & Keller Kevin
4. Human Resource Management – K. Aswathappa
5. Principles of Management – Koontz, Weihrich & Aryasri
6. PERT / CPM – L.S. Srinath
7. Management – VSP Rao & Gangadhar Rao
8. Production and Operations Management – SN Chary

POWER SEMICONDUCTOR DRIVES

III YEAR B.Tech EEE II-Sem.	L	T/P/D	C
	4	1/0/0	4

OBJECTIVE : This course is an extension of Power Electronics applications to AC and DC drives. Control of DC motor drives with single phase and three phase converters and choppers are given in detail. The control of AC motor drives with variable frequency converters and variable voltage are presented.

UNIT – I

DC DRIVES - I : Control of DC motors by Single & Three phase Converters

Introduction to Thyristor controlled Drives, Single Phase semi and Fully controlled converters connected to d.c separately excited and d.c series motors – continuous current operation – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque Characteristics- Numericals on Converter fed d.c motors.

Three phase semi and fully controlled converters connected to d.c separately excited and d.c series motors – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque characteristics – Numericals.

UNIT – II

DC DRIVES -II : Four Quadrant operation of DC Drives-Introduction to Four quadrant operation – Motoring operations, Electric Braking – Plugging, Dynamic and Regenerative Braking operations. Four quadrant operation of D.C motors by dual converters – Closed loop operation of DC motor (Block Diagram Only)

Single quadrant, Two –quadrant and four quadrant chopper fed dc separately excited and series excited motors – Continuous current operation – Output voltage and current wave forms – Speed torque expressions – speed torque characteristics – Numericals on Chopper fed d.c Motors – Closed Loop operation (Block Diagram Only)

UNIT – III

INDUCTION MOTOR DRIVES -I : Control of Induction Motor through Stator voltage & frequency

Variable voltage characteristics-Control of Induction Motor by Ac Voltage Controllers – Waveforms – speed torque characteristics.

Variable frequency characteristics-Variable frequency control of induction motor by Voltage source and current source inverter and cycloconverters-PWM control – Comparison of VSI and CSI operations – Speed torque

characteristics – numerical numericals on induction motor drives – Closed loop operation of induction motor drives (Block Diagram Only)

UNIT –IV

INDUCTION MOTOR DRIVES -II : Control of Induction motor of Rotor side Static rotor resistance control – Slip power recovery – Static Scherbius drive – Static Kramer Drive – their performance and speed torque characteristics – advantages applications – numerical

UNIT – V

SYNCHRONOUS MOTOR DRIVES : Separate control & self control of synchronous motors – Operation of self controlled synchronous motors by VSI and CSI cycloconverters. Load commutated CSI fed Synchronous Motor – Operation – Waveforms – speed torque characteristics – Applications – Advantages and Numerical Numericals – Closed Loop control operation of synchronous motor drives (Block Diagram Only), variable frequency control, Cycloconverter, PWM, VFI, CSI

TEXT BOOKS:

1. Fundamentals of Electric Drives – by G K Dubey Narosa Publications
2. Power Semiconductor Drives –Prof. P.V.Rao

REFERENCE BOOKS:

1. Power Electronics – MD Singh and K B Khanchandani, Tata – McGraw-Hill Publishing company,1998
2. Modern Power Electronics and AC Drives by B.K.Bose, PHI.
3. Thyristor Control of Electric drives – Vedam Subramanyam Tata McGraw Hill Publilcations.
4. A First course on Electrical Drives – S K Pillai New Age International(P) Ltd. 2nd Editon.
5. Power Electronic Circuits, Devices and applications by M.H.Rashid, PHI

CONTROL SYSTEMS

III YEAR B.Tech EEE II-Sem.	L	T/P/D	C
	4	1/0/0	4

OBJECTIVES:

1. To enable the students to learn the concepts of control systems.
2. To make the students to learn time and frequency domain analysis and also basic concepts of state space analysis.

UNIT – I

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

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

UNIT - II

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

UNIT - III

TIME RESPONSE ANALYSIS & STABILITY 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.

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

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.
2. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.
3. Control Systems Engg. by NISE 3rd Edition – John wiley
4. "Modelling & Control Of Dynamic Systems" by Narciso F. Macia George J. Thaler, Thomson Publishers..

MICROPROCESSORS & MICROCONTROLLERS
(Common to ECE, ETM, EEE, ICE)

III YEAR B.Tech EEE II-Sem.	L	T/P/D	C
	4	1/0/0	4

OBJECTIVES : To provide the students the concepts of Intel 8086 microprocessors and their architectures. To enable the students to write efficient programs in assembly level language of 8086 family of microprocessors. To train the students on the techniques of interfacing between the 8086 processor and peripheral devices, so that they can design and develop a complete microprocessor-based system. To provide the students the fundamentals of different serial communication standards. To prepare students to learn hardware architecture of 8051 microcontroller and to do programming on it. To provide the students an introduction to RISC micro controllers.

UNIT -I

8086 ARCHITECTURE : An overview of 8085,8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical memory organization, Signal descriptions of 8086- common function signals, Minimum and Maximum mode signals, Timing diagrams.

UNIT -II

INSTRUCTION SET AND ASSEMBLY LANGUAGE PROGRAMMING OF 8086 : Instruction formats, addressing modes, instruction set, assembler directives, macros, simple programs involving logical, branch and call instructions, sorting, evaluating arithmetic expressions, string manipulations.

UNIT -III

I/O AND MEMORY INTERFACING : 8255 PPI, various modes of operation and interfacing to 8086, interfacing keyboard, display, stepper motor interfacing, D/A and A/D converter, Memory interfacing to 8086.

INTERRUPTS: Interrupt structure of 8086, Vector interrupt table, Interrupt service routine, Introduction to DOS and BIOS interrupts, Interfacing Interrupt Controller 8259, Interfacing of DMA Controller 8257.

COMMUNICATION INTERFACE : Serial communication standards, Serial data transfer schemes, 8251 USART architecture and interfacing, Basics of RS-232.

UNIT - IV

INTRODUCTION TO MICROCONTROLLERS : Overview of 8051 microcontroller, Architecture, I/O Ports, Memory organization, addressing modes and instruction set of 8051, simple programs.

8051 REAL TIME CONTROL : Timer/Counter, programming 8051 timers and counters; Interrupts, programming Timer Interrupts, programming external hardware interrupts; Serial communication, programming the serial communication interrupts.

UNIT - V

THE RISC MICROCONTROLLER ARCHITECTURE : Introduction to RISC Microcontroller,SPI,I2C,TWI Serial Bus, Memory – Flash memory, EEPROM, SRAM, USART, Basics of USB.

OUTCOMES : Students will be able to understand the principle of operation of Intel 8086 microprocessor. Students will be able to write assembly language programs on Intel 8086 including ascending order and descending order of data, string operations. Students will be able to interface Intel 8086 processor with 8255, DMA controller, Intel 8259, USART to develop the microprocessor based system. Students will develop and run program of Intel 8051 microcontroller. Students will learn architecture and interrupt structure of RISC microcontrollers.

TEXT BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandi, Tata-McGraw Hill, 2nd edition 2006.
2. D. V. Hall, Micro processors and Interfacing, Tata-McGraw Hill, 2nd edition 2006.
3. Kenneth. J. Ayala, The 8051 microcontroller , 3rd edition, Cengage learning, 2010.
4. Microprocessors and Microcontrollers, Lyla. B.Das, 1st edition, Pearson, 2012.

REFERENCES:

1. The 8051Microcontrollers, Architecture and programming and Applications - K. Uma Rao, Andhe Pallavi, Pearson, 2009.
2. The 8051 Microcontroller and Embedded Systems Using Assembly and C, Second Edition
3. Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. McKinlay, Prentice Hall.
4. Micro Computer System 8086/8088 Family Architecture, Programming and Design - Liu and GA Gibson, Prentice-Hall India, 2nd Ed.,
5. Microcontrollers and application, Ajay. V. Deshmukh, Tata-McGraw Hill, 2005
6. The 8085 Microprocessor: Architecture, programming and Interfacing – K. Uday Kumar, B.S. Umashankar, 2008, Pearson.

RENEWABLE ENERGY SOURCES
(OPEN ELECTIVE)

III YEAR B.Tech EEE II-Sem.	L	T/P/D	C
	3	1/0/0	3

OBJECTIVE : This course introduces renewable energy sources which includes solar, wind, Geo thermal , Bio Mass , Ocean.

UNIT - I

PRINCIPLES OF SOLAR RADIATION : Renewable energy – sources and features - Role and potential - Distributed energy systems and dispersed generation (DG) - The solar energy option, Environmental impact of solar power.

Solar radiation spectrum - Extraterrestrial and terrestrial solar radiation - Radiation measurement - Instruments for measuring solar radiation and Sun shine, Solar radiation data, Solar constant, Solar radiation on tilted surface, Solar radiation patterns in India.

UNIT - II

SOLAR ENERGY COLLECTION, STORAGE AND APPLICATIONS : Energy Collection: Flat plate and Concentrating collectors, Their Orientation and thermal analysis, Classification of Concentrating collectors, Advanced collectors.

Energy Storage : Sensible heat, Latent heat, Stratified storage - Solar ponds.

Applications : Heating techniques, Cooling techniques, Solar Distillation and Drying, Power Generation, Photovoltaic energy conversion – Operating principle, Photovoltaic cell concepts, Cell, module, array, Series and parallel connections, Potential of India in Solar energy utilization.

UNIT - III

WIND ENERGY AND BIOMASS : Wind energy: Power in Wind, Betz criteria, Wind patterns and wind data, Site selection, Types of wind mills, Characteristics of wind generators, Potential of India in Wind Energy utilization.

Bio-mass: Principles of Bio-Conversion, Anaerobic, Aerobic digestion, Types of Bio-gas digesters, Operating principle, Combustion and fermentation, Wood gassifier, Pyrolysis, Applications - Bio gas, Wood stoves, Bio diesel, I.C.Engine operation and Economic aspects.

UNIT - IV

GEOTHERMAL ENERGY AND OCEAN ENERGY : Geothermal energy: Resources, Types of wells, Methods of harnessing the energy - Introduction to Thermo dynamic Cycles- Rankine, Bray ton Cycles and their advantages

and limitations, Potential of India in Geothermal energy options.

Ocean energy: OTEC - Principle of utilization, Setting up of OTEC plants, Thermodynamic cycles involved in OTEC. Tidal and wave energy - Potential and conversion techniques, Mini-hydel power plants and their economics in India.

UNIT - V

DIRECT ENERGY CONVERSION : Direct Energy Conversion (DEC), Need for DEC, Types of DEC - Fuel Cells, Magneto Hydro Dynamic Energy Conversion (MHD), Thermo Electric and Thermo Ionic Conversion (elementary treatment only), Working Principle, Advantages and Disadvantages. Combined cycle and Co-generation.

TEXT BOOKS:

1. Non-Conventional Energy Sources /G.D. Rai, Khanna Publishers
2. Renewable Energy Resources – Twidell & Wier, CRC Press(Taylor & Francis)

REFERENCE BOOKS:

1. Renewable energy resources/ Tiwari and Ghosal/ Narosa.
2. Renewable Energy Technologies /Ramesh & Kumar /Narosa
3. Non-Conventional Energy Systems / K Mittal /Wheeler
4. Renewable energy sources and emerging technologies by D.P.Kothari,K.C.Singhal, P.H.I.
5. Solar Energy : Principles of Thermal Collection and Storage/ Sukhatme.S.P/Tata MGHill.

INTELLECTUAL PROPERTY RIGHTS (OPEN ELECTIVE)

III YEAR B.Tech EEE II-Sem.	L	T/P/D	C
	3	1/0/0	3

OBJECTIVE : Intellectual property rights are the legal rights given to persons over the creations of their minds.They usually give the creator an exculsive right over the use of his creation for certain period of time.

UNIT-I

INTRODUCTION TO INTELLECTUAL PROPERTY: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

TRADE MARKS: Purpose and function of trademarks, acquisition of trade mark, rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT-II

LAW OF COPY RIGHTS : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

LAW RELATING TO PATENTS: Overview-historical developments-concepts-novelty-utility-inventiveness/Non-obviousness.

UNIT-III

Procedure for obtaining of patents - contents of patent application-specification-disclosure aspects-claims-examination of application-opposition of application-sealing of patents.

TRADE SECRETS: Trade secrete law, determination of trade secrete status,

Liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

UNIT- IV

UNFAIR COMPETITION: Misappropriation right of publicity, False advertising.

New development of intellectual property: new developments in trademark law ; copy right law, patent law, intellectual property audits.

UNIT-V

International overview on intellectual property, international - trade mark law, copy right law, and international patent law. international development in trade secrets law.

REFERENCES & TEXT BOOKS :

1. Intellectual property right, Deborah. E. Bouchoux, cengage learing.
2. Intellectual property right - nleashmy the knowledge economy, prabuddha ganguli, Tata Mc Graw Hill Publishing company ltd..
3. W.R.Cornish ,Intellectual property, Sweet & Maxwell, London(2000).
4. Brain c.Reid, A pratical guide to patent law,Second edition.1993.

NANOTECHNOLOGY (OPEN ELECTIVE)

III YEAR B.Tech EEE II-Sem.	L	T/P/D	C
	3	1/0/0	3

UNIT-I

INTRODUCTION TO NANOTECHNOLOGY : Importance of nanoscale, Nanostructure types, electronic, magnetic, optical Properties of Nanomaterials, top-down and bottom- up approach to nanostructures. Nanomaterials: Amorphous, crystalline, microcrystalline, quasi-crystalline and nano-crystalline materials. Historical development of nanomaterials-Issues in fabrication and characterization of nanomaterials.

UNIT-II

QUANTUM MECHANICAL PHENOMENON IN NANOSTRUCTURES: Quantum confinement of electrons in semiconductor Nano structures, one dimensional confinement (Quantum wires), two dimensional confinements (Quantum Wells), three dimensional confinements (Quantum dots).

CARBON NANO STRUCTURES: Carbon nanotubes (CNTs), Fullerenes, C60, C80 and C240 Nanostructures, Properties (mechanical, optical and electrical) and applications**.**

UNIT-III

FABRICATION OF NANOMATERIALS : Physical Methods: Inert gas condensation. Arc discharge, RFplasma. Plasma arc technique, Ion sputtering, Laser ablation. Laser pyrolysis, Molecular beam epitaxy. Chemical vapour deposition method.Nano scale characterization techniques:Scanning probe techniques (AFM. MFM. STM, SEM, TEM), XRD.

UNIT-IV

NANODEVICES AND NANOMEDICINE : Lab on chip for bioanalysis. Core/ shell Nano particles in drug delivery systems (site specific and targeted drug delivery), cancer treatment, and bone ! issue treatment.

NANO AND MOLECULAR ELECTRONICS: Resonant-Tunneling structures, single electron tunneling, Single Electron transistors, coulomb blockade, giant magneto resistance, tunneling magneto resistance.

UNIT-V

NANOLITHOGRAPHY AND NANO MANIPULATION : E-beam lithography and SEM based nano lithography and nanomanipulation. Ion beam lithography, oxidation and metallization. Mask and its application. Deep UV lithography(X-ray based lithography. Applications of nanomaterials:

Applications in Mechanical, Electronics engineering industries - Use of nanomaterials in automobiles, aerospace, defense and medical applications

Metallic, polymeric, organic and ceramic nanomaterials.

TEXT BOOKS:

1. Charles,p.pode. Introduction to nanotechnology, springer publications
2. Springer Handbook of Nanotechnology - Bharat Bhusan
3. Phani kumar, principles of nanotechnology, sciteeh publications
4. A.K. Bandyopadhyay, " Nano Materials", New Age International Publishers, New Delhi, 2007
5. Bharat Bhushan, "Handbook of Nanotechnology", Springer, Germany, 2004.

REFERENCES BOOKS:

1. David Ferry 'Transport in Nano structures" Cambridge University press 2000 Z Nano biotechnology; ed. C.M.Niemeyer, C.A. Mirkin.
2. Nano fabrication towards biomedical application: Techniques, tools,Application and impact- Ed. Challa S.,S. R. Kumar, J. H. Carola.
3. Encyclopedia of Nanotechnology- Hari Singh Nalwa
4. Carbon Nanotubes: Properties and Applications- Michael J. O'Connell.
5. S. Dutta "Electron Transport in Mesoscoptc systems" Cambridge University press
6. H. Grabert and M. Devoret "Single charge Tunneling" Plenum press 1992
7. Mark Ratner and Daniel Ratner, "Nano Technology", Pearson Education, NewDelhi, 2003.
8. Gregory Timp, "Nanotechnology", Springer, India, 2005
9. Ahmed Busnaina, "Nanomanufacturing Handbook", CRC Press, London, 2006

OOPS THROUGH JAVA

III YEAR B.Tech EEE II-Sem.	L	T/P/D	C
	3	1/0/0	3

COURSE OBJECTIVES:

- The objective of this course is to provide object oriented concepts through which robust, secured and reusable software can be developed.
- To understand object oriented principles like abstraction, encapsulation, inheritance, polymorphism and also fundamentals of object-oriented programming in Java, including objects, classes, and interfaces.
- To provide the Knowledge in Packages, Exception handling, Multithreading.
- To Explore AWT and Applets to create GUI applications.
- To give the students the ability to use the potential benefits of object-oriented programming for solving complex problems efficiently.

UNIT - I

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

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, String handling

UNIT - II

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

PACKAGES AND INTERFACES : Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces, package java.io – File, Byte Streams, Character Streams, Stream I/O.

UNIT - III

EXCEPTION HANDLING : Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Package java.util- Collections Framework: Collection Interface: Queue, Collection class:LinkedList,Stack class, StringTokenizer, Date, Random, Scanner.

MULTI THREADING : Differences between multi threading and multitasking, tread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication, thread groups, daemon threads.

UNIT - IV

Enumerations, auto boxing Generics –A simple generics example.

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 – scrollpane, dialogs, menubar.

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

SWING : Introduction, limitations of AWT, MVC architecture, components, containers.

TEXT BOOKS:

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

REFERENCES:

1. Thinking in Java 4th Edition, Bruce Eckel
2. Introduction to Java programming, Y. Daniel Liang, pearson education.
3. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, eighth Edition, Pearson Education.

POWER ELECTRONICS LAB

III YEAR B.Tech EEE II-Sem.	**L**	**T/P/D**	**C**
	0	**0/3/0**	**2**

The following experiments are required to be conducted compulsory experiments

1. Study of Characteristics of SCR, MOSFET & IGBT
2. Gate firing circuits for SCR's
3. Single Phase AC Voltage Controller with R and RL Loads
4. Single Phase fully controlled bridge converter with R and RL loads
5. Forced Commutation circuits (Class A, Class B, Class C, Class D & Class E)
6. Four quadrant chopper with R and RL Loads
7. Single Phase Half controlled converter with R load
8. Single Phase Cycloconverter with R and RL loads

   Any two of the following experiments are required to be conducted
9. Three Phase half controlled bridge converter with R-load
10. Single Phase Parallel, inverter with R and RL loads
11. Single Phase series inverter with R and RL loads
12. Single Phase Bridge inverter with R and RL loads
13. Single Phase dual converter with RL load

MICROPROCESSORS AND MICROCONTROLLERS LAB

III YEAR B.Tech EEE II-Sem.	**L**	**T/P/D**	**C**
	0	**0/3/0**	**2**

The following programs are to be written for assembler and execute the same with 8086 and 8051 kits

1. Programs for 16 bit arithmetic operations for 8086 (using various addressing modes)
2. Program for sorting an array for 8086.
3. Program for searching for a number or character in a string for 8086.
4. Program for string manipulations for 8086.
5. Program for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessor kits using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051.
11. Program and verify timer/counter in 8051.
12. Program and verify interrupt handling in 8051.
13. UART operation in 8051.
14. Communication between 8051 kit and PC.
15. Interfacing LCD to 8051.
16. Interfacing Matrix/keyboard to 8051.

Note: *Minimum of 10 experiments to be conducted.*

SWITCH GEAR & PROTECTION

IV YEAR B.Tech EEE I-Sem	L	T/P/D	C
	4	1/0/0	4

OBJECTIVE : This course introduces all varieties of Circuit Breakers and Relays for protection of Generators, Transformers and feeder bus bars from over voltages and other hazards. It emphasis on Neutral grounding for overall protection.

UNIT-I

CIRCUIT BREAKERS : Circuit Breakers: Elementary principles of arc interruption, Recovery, Restriking Voltage and Recovery voltages.- Restriking Phenomenon, Average and Max. RRRV,

Current Chopping and Resistance Switching - CB ratings and Specifications : Types and. - Auto reclosures.

Description and Operation of types of circuit breakers: Minimum Oil Circuit breakers, Air Blast Circuit Breakers, Vacuum and SF6 circuit breakers, Testing of circuit breakers. Numericals

UNIT - II

ELECTROMAGNETIC AND STATIC RELAYS : Principle of Operation and Construction of Attracted armature, Balanced Beam, induction Disc and Induction Cup relays. Relays Classification: Instantaneous, IDMT andinverse characterisitcs . Application of relays: Over current/ Under voltage relays, Directional relays, Differential Relays and Percentage Differential Relays. Universal torque equation, Distance relays: Impedance, Reactance and Mho and Off-Set Mho relays, Characteristics of Distance Relays and Comparison.

Static Relays, comparators ,realization of various charaterisitcs using static relays

UNIT - III

FEEDER AND BUS-BAR PROTECTION : Protection of Lines: Over Current, Carrier Current and Three-zone distance relay protection using Impedance relays. Translay Relay. Protection of Bus bars - Differential protection.

UNIT - IV

GENERATOR & TRANSFORMER PROTECTION : Protection of generators against Stator faults, Rotor faults, and Abnormal Conditions. Restricted Earth fault and Inter-turn fault Protection. Numericals on % Winding Unprotected.

Protection of transformers: Percentage Differential Protection, Numerical Problem on Design of CT s Ratio, Buchholtz relay Protection.

UNIT - V

PROTECTION AGAINST OVER VOLTAGES & NEUTRAL GROUNDING : Generation of Over Voltages in Power Systems.-Protection against Lightning Over Voltages - Valve type and Zinc-Oxide Lighting Arresters - Insulation Coordination -BIL, Impulse Ratio, Standard Impulse Test Wave, Volt-Time Characteristics.

Grounded and Ungrounded Neutral Systems.- Effects of Ungrounded Neutral on system performance. Methods of Neutral Grounding; Solid, Resistance, Reactance - Arcing Grounds and Grounding Practices.

TEXTBOOKS:

1. Power System Protection **and** Switchgear by Badari Ram , D.N Viswakarma, TMH Publications.
2. Switchgear and Protection - by Sunil S Rao, Khanna Publishers

REFERENCE BOOKS:

1. Transmission network Protection by **Y.G** Paithankar /Taylor **and** Francis,2009.
2. Power system protection and switch gear by Bhuvanesh Oza, TMH, 2010.
3. Electrical Power Systems - by C.L.Wadhwa, New Age international (P) Limited, Publishers.
4. Principles of power systems -by V.K. Mehta & Rohit Mehta, S. Chand and company Ltd publishers

UTILIZATION OF ELECTRICAL ENERGY

IV YEAR B.Tech EEE I-Sem	L	T/P/D	C
	4	1/0/0	4

OBJECTIVE : This course introduces the various ways of utilization of Electrical Energy which emphasis more on types of Electric drives, Electric heating, illumination and Electric traction.

UNIT - I

ELECTRIC HEATING & ELECTRIC WELDING : Advantages and methods of electric heating, resistance heating induction heating and dielectric heating.

Electric welding, resistance and arc welding, electric welding equipment, comparison between A.C. and D.C. Welding.

UNIT - II

ILLUMINATION FUNDAMENTALS & VARIOUS ILLUMINATION METHODS: Introduction, terms used in illumination, laws of illumination, polar curves, photometry, integrating sphere, sources of light. Filament lamps,Arc Lamps, Discharge lamps, Stroboscopic effect,MV and SV lamps comparison between tungsten filament lamps and fluorescent tubes, Types of Light fittings,Basic principles of light control, Types and design of lighting and flood lighting.

UNIT - III

SELECTION OF ELECTRIC DRIVES : Type of electric drives, choice of motor, starting and running characteristics, speed control, temperature rise, particular applications of electric drives, types of industrial loads, continuous, intermittent and variable loads, load equalization.

UNIT - IV

ELECTRIC TRACTION – I : System of electric traction and track electrification. Review of existing electric traction systems in India. Special features of traction motor, methods of electric braking-plugging rheostatic braking and regenerative braking. Mechanics of train movement. Speed-time curves for different services- trapezoidal and quadrilateral speed time curves.

UNIT - V

ELECTRIC TRACTION-II : Calculations of tractive effort, power, specific energy consumption for given run, effect of varying acceleration and braking retardation, adhesive weight and braking retardation adhesive weight and coefficient of adhesion.

TEXT BOOKS:

1. Utilization of Electric Energy – by E. Openshaw Taylor, Orient Longman.
2. Art & Science of Utilization of electrical Energy – by Partab, Dhanpat Rai & Sons.

REFERENCE BOOKS:

1. Utilization of Electrical Power including Electric drives and Electric traction – by N.V.Suryanarayana, New Age International (P) Limited, Publishers, 1996.
2. Generation, Distribution and Utilization of electrical Energy – by C.L. Wadhwa, New Age International (P) Limited, Publishers, 1997.
3) A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar and A.Chakraborti, DhanpatRai& Co. Pvt. Ltd., 1999.

POWER SYSTEM OPERATION & CONTROL

IV YEAR B.Tech EEE I-Sem	L	T/P/D	C
	4	1/0/0	4

OBJECTIVE : This course introduces Economic operation of power systems, Hydro Thermal scheduling, Modeling of Turbine Generator and Automatic controllers,

Load-Frequency controllers and Reactive Power Control in power systems.

UNIT - I

ECONOMIC OPERATION OF POWER SYSTEMS : Optimal operation of Generators in Thermal Power Stations, - heat rate Curve-Fuel Cost Curve – Incremental fuel and Production costs, input-output characteristics, Optimum generation allocation with line losses neglected.

Solution Methods : Lamda Iteration, Gradient, Newton's & Dynamic Programing Methods, Optimum generation allocation including the effect of transmission line losses – Loss Coefficients, General transmission line loss formula.

UNIT - II

HYDROTHERMAL SCHEDULING : Optimal scheduling of Hydrothermal System: Hydroelectric power plant models, Scheduling numericals-Short term Hydrothermal scheduling problem.

SOLUTION METHODS: Gradient and Dynamic Programing Methods.

UNIT - III

MODELLING OF TURBINE, GOVERNOR : MODELLING OF TURBINE : First order Turbine model, Block Diagram representation of Steam Turbines and Approximate Linear Models.

MODELLING OF GOVERNOR: Mathematical Modelling of Speed Governing System – Derivation of small signal transfer function.

MODELLING OF INTEGRATED PRIME-MOVER-GENERATOR-LOAD SYSTEM : Generator Model, Load Model, Tie-Line Model.

UNIT - IV

SINGLE AREA AND TWO AREA LOAD FREQUENCY CONTROL : Necessity of keeping frequency constant. Definitions of Control area – Single area control – Block diagram representation of an isolated power system – Steady state analysis – Dynamic response – Uncontrolled case.

Load frequency control of Two-Area system: uncontrolled and controlled cases, Tie-line bias control. Proportional plus Integral control of single area and two area systems, block diagram representation, steady state and transient response simulation.

UNIT - V

REACTIVE POWER COMPENSATION AND CONTROL : Modelling of Excitation Systems: Fundamental Characteristics of an Excitation system, Ttransfer function, Block Diagram Representation of IEEE Type-1 Model.

Overview of Reactive Power control – Reactive Power compensation in transmission systems, Advantages and disadvantages of series and shunt types of compensation for transmission systems; load compensation – Specifications of load compensator.

TEXT BOOKS:

1. Power Generation, Operation and Control by A.J. Wood & B.F. Wollenberg,Second Edison,1996, John Wiley & Sons, A Wiley-Interscience Publication.
2. Electrical Power Systems by C.L.Wadhwa, Newage International-3rd Edition
3. Modern Power System Analysis – by I.J.Nagrath & D.P.Kothari Tata McGraw – Hill Publishing Company Ltd, 2nd edition.

REFERENCE BOOKS:

1. Power System Analysis and Design by J.Duncan Glover and M.S.Sarma., Thomson Publishers, 3rd Edition.
2. Electric Energy systems Theory – by O.I.Elgerd, Tata Mc Graw-hill Publishing Company Ltd., Second edition.
3. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.
4. Power System Analysis by Hadi Saadat – TMH Edition.

HIGH VOLTAGE ENGINEERING
(Elective- I)

IV YEAR B.Tech EEE I-Sem	L	T/P/D	C
	3	1/0/0	3

OBJECTIVE : In this course the more emphasis on Introduction to High Voltage Technology,The break down gaseous , liquid, and solid Dielectrics, Generation, measurement & testing of high voltages and High Currents.

UNIT - I

HIGH VOLTAGE TECHNOLOGY AND APPLICATIONS : Electric Field Stresses, Gas / Vaccum as Insulator, Liquid Dielectrics, Solids and Composites, Estimation and Control of Electric Stress, Numerical methods for electric field computation, Surge voltages, their distribution and control,

Applications of insulating materials in transformers, rotating machines, circuit breakers, cable power capacitors and bushings.

UNIT - II

BREAK DOWN IN GASEOUS, LIQUID AND SOLID DIELECTRICS : Gases as insulating media, collision process, Ionization process, Townsend's criteria of breakdown in gases, **streamer theory,** Paschen's law.

Liquid as Insulator, pure and commercial liquids, breakdown in pure and commercial liquids.

Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice

UNIT - III

GENERATION OF HIGH VOLTAGES AND CURRENTS

Generation of High Direct Current Voltages, Generation of High alternating voltages, Generation of Impulse Voltages, Generation of Impulse currents, Tripping and control of impulse generators.

UNIT - IV

MEASUREMENT OF HIGH VOLTAGES AND CURRENTS : Measurement of High Direct Current voltages, Measurement of High Voltages alternating and impulse, Measurement of High Currents-direct, alternating and Impulse, Oscilloscope for impulse voltage and current measurements.

Measurement of D.C Resistivity, Measurement of Dielectric Constant and loss factor, Partial discharge measurements.

UNIT - V

HIGH VOLTAGE TESTING AND INSULATION CO-ORDINATION : Testing of Insulators and bushings, Testing of Isolators and circuit breakers, Testing of cables, Testing of Transformers, Testing of Surge Arresters, Radio Interference measurements.

Principles of Insulation Coordination on High voltage and Extra High Voltage power systems.

TEXT BOOKS:

1. High Voltage Engineering by M.S.Naidu and V. Kamaraju – TMH Publications, 3rd Edition
2. High Voltage Engineering: Fundamentals by E.Kuffel, W.S.Zaengl, J.Kuffel by Elsevier, 2nd Edition.

REFERENCE BOOKS:

1. High Voltage Engineering by C.L.Wadhwa, New Age Internationals (P) Limited, 1997.
2. High Voltage Insulation Engineering by Ravindra Arora, Wolfgang Mosch, New Age International (P) Limited, 1995.

DIGITAL SIGNAL PROCESSING
(ELECTIVE-I)

IV YEAR B.Tech EEE I-Sem	L	T/P/D	C
	3	1/0/0	3

UNIT - I

SIGNAL ANALYSIS AND LTI SYSTEMS : Anology between vectors and signals, Classification of signals with examples, classification of systems with examples

FOURIER SERIES: Trigonometric Fourier series. Exponential Fourier series, Line spectrum. Properties of Fourier series, Dirchlet's conditions, Numericals. Fourier Transform: Fourier transform and relation between Fourier series and Fourier transform (F.T), Properties of Fourier Transform, Conditions for existence of F.T, Inverse Fourier Transform, Significance of energy density and power density spectrums, Evalution of convolution Integral, Numericals.

Linear system. Impulse response. Response of a linear system. Linear time invariant (LTI) system, Transfer function of a LTI system, Filter characteristics of linear systems, Distortion less transmission through a system, Physical Realizability of LTI systems, Ideal LPF, HPF and BPF characteristics, Relation between rise time and band width of a system, Relation between input and output Power Spectral Densities, Sampling Theorem and Signal Reconstruction. Aliasing, Numericals

UNIT - II

LAPLACE AND Z- TRANSFORMS : Laplace Transform (L.Tj: Concept of L.T, properties of Laplace Transform, Region of Convergence, Solution to differential equations, Inverse Laplace Transform, Numericals.

***Z*-TRANSFORMS (Z.T) :** Concept of Z.T. properties of Z- Transform, Region of convergence. Inverse Z-Transform, Solution to difference equations. Relation between FT,L.T and Z.T, Numericals.

UNIT - III

INTRODUCTION TO DSP AND DISCRETE FOURIER SERIES: Discrete Time (DT) signals and sequences, Properties of DT LTI system -

Linearity, Time invariance, Stability, Causality, memoryless, linear Constant Coefficient Difference Equations and its solution, Concept of Discrete Time Fourier Transform (DTFT), Frequency domain representation of discrete time signals and systems. Properties of DTFT. Numericals.

Discrete Fourier series (DFS): DFS representation of periodic sequences, Properties, Numericals

UNIT - IV

DISCRETE FOURIER AND FAST FOURIER TRANSFORMS: Discrete Fourier Transform (DFT): Discrete Fourier Transform, Properties of DFT, Linear

convolution of sequence using DFT, Computation of DFT, Relation between DTFT, DFS, Z.T and DFT, Numericals

Fast fourier transforms(FFT) - Radix -2 Decimation - in- time (DIT) and Decimation - in- frequency (DIF) FFT Algorithms, Comparison of DIT FFT and DIF FFT, Inverse FFT, and FFT for composite N, numericals

UNIT - V

IIR AND FIR DIGITAL FILTERS :

IIR Filters: Analog filter approximations - Butterworth and Chebyshev, Design of IIR Digital filter from Analog filter- Step Invariance, impulse invariance and bilinear transformation techniques, design examples, realization of IIR filters - direct, canonic, cascade, and parallel forms.

FIR Filters: Characteristics of FIR digilal filters, frequency response, design of FIR digital filters-fourier method, window techniques, frequency sampling technique, comparison of IIR and FIR filters, realization of FIR filters - direct, canonic, cascade, and parallel forms.

TEXTBOOKS:

1. Signals, systems and communications B.P. lathi B.S. publications 2009
2. Digital Time Signal Processing -A.V.Oppenheim and R.W. Schaffer, and JR Buck pearson education 2009.
3. Fundamentals of Digital Signal Processing- Loney ludeman, John wiiey2010

DIGITAL CONTROL SYSTEMS
(Elective – I)

IV YEAR B.Tech EEE I-Sem	L	T/P/D	C
	3	1/0/0	3

OBJECTIVE : To give the students insight knowledge about the digital design methodologies in control systems and the stability analysis of digital control systems in order to enable the students to deal with real-time applications.

UNIT - I

SAMPLING AND RECONSTRUCTION : Introduction, Examples of Data control systems – Digital to Analog conversion and Analog to Digital conversion, sample and hold operations**.**

Z – TRANSFORMS: Introduction, Linear difference equations, pulse response, Z – transforms, Theorems of Z – Transforms, the inverse Z – transforms, Modified Z transforms.

UNIT-II

Z-PLANE ANALYSIS OF DISCRETE-TIME CONTROL SYSTEM : Z-Transform method for solving difference equations; Pulse transforms function, block diagram analysis of sampled – data systems, Mapping between the S-Plane and the Z-Plane – Primary strips and Complementary Strips – Constant frequency loci, Constant damping ratio loci.

UNIT - III

STATE SPACE ANALYSIS : State Space Representation of discrete time systems, Pulse Transfer Function Matrix solving discrete time state space equations, State transition matrix and it's Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state – space equations.

Concepts of Controllability and Observability, Tests for controllability and Observability. Duality between Controllability and Observability, Controllability and Observability conditions for Pulse Transfer Function

UNIT - IV

STABILITY ANALYSIS : Stability Analysis of closed loop systems in the Z-Plane. Jury stablility test – Stability Analysis by use of the Bilinear Transformation and Routh Stability criterion, Root locus techniques for discrete systems.

Design of control systems by conventional method:Transient and steady – State response Analysis – Design based on the frequency response method – Bilinear Transformation and Design procedure in the w-plane, Lead, Lag and Lead-Lag compensators and digital PID controllers**.**

UNIT – V

STATE FEEDBACK CONTROLLERS AND OBSERVERS : Design of state feedback controller through pole placement – Necessary and sufficient conditions, Ackerman's formula.

State Observers – Full order and Reduced order observers.

TEXT BOOK:

1. Discrete -Time Control Systems –k.Ogata, pearson education /PHI.2nd edition.

REFERENCE BOOKS

1. Digital Control Sytems , Kuo, Oxfored university Press, 2nd edition 2003.
2. Digital Control and state variable Methods by M.Gopal, TMH.

OPTIMIZATION TECHNIQUES
(ELECTIVE-II)

IV YEAR B.Tech EEE I-Sem	L	T/P/D	C
	3	1/0/0	3

OBJECTIVES : Principles of optimization are essential to all disciplines of Engineering students. Optimization Techniques are very much helpful in design of Electrical Machines like motors , transformers and other equipments. This is an introductory course which imparts the students knowledge in optimization principles of Linear Programming and Non-Linear programming methods.

UNIT-I

INTRODUCTION AND CLASSICAL OPTIMIZATION TECHNIQUES : Statement of an Optimization problem- design vector -design constraints -constraint surface - objective function - objective function surfaces - classification of Optimization numericals. Single variable Optimization-multi variable Optimization without constraints - necessary and sufficient conditions for minimum/maximum - multi variable Optimization with equality constraints. Solution by method of Lagrange multipliers - multi variable Optimization with inequality constraints - Kuhn - Tucker conditions.

UNIT-II

LINEAR PROGRAMMING : Standard form of a linear programming problem - geometry of linear programming numericals - definitions and theorems - solution of a system of linear simultaneous equations - pivotal reduction of a general system of equations - motivation to the simplex method - simplex algorithm.

UNIT -III

TRANSPORTATION PROBLEM: Finding initial basic feasible solution by north - west corner rule, least cost method and Vogel's approximation method - testing for optimality of balanced transportation numericals and Un-balanced transportation numericals. Application of Transportation models to Production-Inventory-distribution systems.

UNIT - IV

UNCONSTRAINED AND CONSTRAINED NONLINEAR PROGRAMMING : One - dimensional minimization methods: Classification, Fibonacci method and Quadratic interpolation method, Univariate method, Powell's method and steepest descent method.

UNIT - V

Dynamic Programming : Dynamic programming multistage decision processes - types - concept of sub optimization and the principle of optimally

- computational procedure in dynamic programming - examples illustrating the calculus method of solution - examples illustrating the tabular method of solution.

TEXTBOOKS:

1. "Engineering optimization: Theory and practice"-by S. S.Rao. New Age International *(p)* Limited. 3rd edition, 1998.
2. "Introductory Operations Research" by H.S. Kasehe & K.D. Kumar, Springer (India), Pvt .Ltd.

REFERENCE BOOKS:

1. "Optimization Methods in Operations Research and systems Analysis" - by K.V. Mittal and C. Mohan. New Age International (P) Limited, Publishers. 3"1 edition. 1996.
1. Operations Research - by Dr. S.D.Sharma.
2. ''Operations Research : An Introduction"- by H.A.Taha.PearsoriPvt.Ltd.
3. Linear Programming - by G. Had ley

ELECTRICAL DISTRIBUTION SYSTEMS (ELECTIVE-II)

IV YEAR B.Tech EEE I-Sem	L	T/P/D	C
	3	1/0/0	3

OBJECTIVE : This course introduces the general concepts of Electrical Distribution system, feeders , substations, coordination of protective devices, Compensation for power factor improvement and voltage control, Distributed Generation & their impacts on distribution systems.

UNIT -I

MODELLING AND CHARACTERISTICS OF LOADS : Introduction to distribution systems, Load modelling and characteristics. Coincidence factor, contribution factor, loss factor - Relationship between the load factor and loss factor. Classification of loads (Residential, commercial Agricultural and Industrial) and their characteristics.

UNIT -II

SUBSTATIONS AND DISTRIBUTION FEEDERS : Location of Substations: Rating of distribution substation, service area within primary feeders. Benefits derived through optimal location of substations.

Design Considerations of Distribution Feeders: Radial and loop types of primary feeders, voltage levels, feeder loading, basic design practice of the secondary distribution systems.

UNIT-III

DISTRIBUTED GENERATION & SYSTEM ANALYSIS : Introduction of distributed generation sources like Solar PV, Small Wind & Hydro, Biomass/ Bio-Diesel based generators into distribution systems, Their basic models and interfacing arrangements with low and medium voltage grids, Voltage drop and power-loss calculations on distribution systems with and without distributed generators (DG's).

UNIT-IV

PROTECTION AND PROTECTIVE DEVICES COORDINATION : Objectives of distribution system protection, types of common faults and procedure for fault calculations. Protective Devices: Principle of operation of Fuses, Circuit Reclosers, line sectionalizers and circuit breakers.

Coordination of Protective Devices, Coordination Procedure with & without DG's.

UNIT-V

POWER FACTOR IMPROVEMENT AND VOLTAGE CONTROL : Capacitive compensation for power-factor control. Different types of power capacitors,

shunt and series capacitors, effect of shunt capacitors (Fixed and switched). Power factor correction, capacitor allocation - Economic justification - Procedure to determine the best capacitor

Voltage Control: Equipment for voltage control, effect of series capacitors, effect of AVB/AVR, line drop compensation.

TEXTBOOKS:

1. Electric Power Distribution system's, Engineering" - by Turan Gonen, CRC Press.
2. Electrical Power Distribution Systems by V.Kamaraju , TMH, 2/e, 2010

REFERENCE BOOKS:

1. Electrical Power Distribution hand book by g.Ram murthy, 2nd, University press
2. Electric Power Distribution - by A.S. Pabla, Tata Mc Graw-Hill Publishing company, 5th Edition, 1997.

VLSI
(ELECTIVE-II)
(Common to ECE, ETM, EEE, ICE, IT)

IV YEAR B.Tech EEE I-Sem	L	T/P/D	C
	3	1/0/0	3

OBJECTIVES : The goal of the course is to introduce design concepts and Architecture underlying modern complex VLSI and system-on-chip. The course is build upon student's prior knowledge of digital circuits, digital logic and Computer Architecture. The concepts teach how complex chip-scale systems can be designed. The course is designed to give the student an understanding of different design steps required to carry out a complete digital VLSI design in silicon and to apply CMOS Technology specific layout rules in the placement and routing of transistors and interconnect, and to verify the functionality, timing, power and parasitic effects. The course main objective is to introduce the fundamental principles of VLSI Circuit design and layout and to cover the basic building blocks of large scale CMOS digital Integrated circuits. It also describes the general steps required for processing of CMOS Integrated circuits and to design functional units.

UNIT - I

INTRODUCTION : Introduction to IC Technology -MOS, PMOS, NMOS, CMOS & BiCMOS fabrication

Technologies; fabrication processes: Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Etching, Planarization, Encapsulation, Integrated Resistors and Capacitors, CMOS Nanotechnology.

UNIT - II

BASIC ELECTRICAL PROPERTIES : Basic Electrical Properties of MOS and BiCMOS Circuits: Ids-Vds relationships, MOS transistor threshold Voltage Vt, gm, gds, Figure of merit Éo; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter - analysis and design, BiCMOS Inverters.

VLSI CIRCUIT DESIGN PROCESSES : VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2 ¼m CMOS Design rules for wires, contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits.

UNIT - III

GATE LEVEL DESIGN : Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Time delays, Driving large capacitive loads, Wiring capacitance, Fan–in, Fan–out, Choice of layers.

DATA PATH SUBSYSTEMS : Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters.

UNIT - IV

ARRAY SUBSYSTEMS : SRAM, DRAM, ROM, Serial Access Memories, Content Addressable Memory.

SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN : PLAs, Programmable Array Logic, FPGAs, CPLDs, Standard Cells, Design Approach, Introduction to low power design.

UNIT - V

CMOS TESTING : CMOS Testing, Need for testing, Test Principles, Wafer-level, package-level testing, System-level Test Techniques, Layout Design for improved Testability, Principles of Design for testability (DFT).

TEXT BOOKS :

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Douglas A. Pucknell, Sholeh Eshraghian, PHI, 2005 Edition
2. VLSI Designing- K .Lal Kishore, V. S. V. Prabhakar, I.K International, 2009.
3. CMOS VLSI Design – A circuits and systems perspective, Neil H. E Weste, David Harris, Ayan Banerjee, Pearson, 2009.

REFERENCES:

1. CMOS logic circuit Design - John .P. Uyemura, Springer, 2007.
2. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.
3. VLSI Design – A. Albert Raj, Latha, PHI, 2008
4. Introduction to VLSI – Mead & Convey, BS Publications, 2010
5. VLSI Design – M. Micheal Vai, CRC Press, 2009.

INSTRUMENTATION

IV YEAR B.Tech EEE I-Sem	L	T/P/D	C
	3	0/0/0	3

OBJECTIVE : Instrumentation is an art and science of measurement and control of process variables within a production or manufacturing area. This course deals with Measurement systems, characteristics, errors and deals with special measuring instruments like voltmeters CRO's and signal analyzers. This course introduces basic Transducers and fundamental principles to sense electrical and Non-electrical quantities.

UNIT-I

MEASUREMENT SYSTEMS : Introduction to Measurement Systems and signals, Performance Characteristics: Static characteristics - Dynamic Characteristics; Errors in Measurement: Gross Errors - Systematic Errors - Statistical Analysis of Random Errors.

UNIT-II

VOLTMETERS : Peak and Average responding voltmeters; True RMS voltmeter; Vector impedance meter; Q meter; Digital voltmeters: Ramp type – Integrating type – Potentiometric type - Successive approximation type - Continuous balance type; Digital frequency meter: frequency and time period measurements.

UNIT-III

CRO and SIGNAL ANALYZERS : Cathode Ray oscilloscope (CRO): Cathode ray tube-time base generator-horizontal and vertical amplifiers-CRO probes-applications; CRO Measurement: phase and frequency-lissajous patterns; Special CRO's: Sampling oscilloscope-analog and digital storage oscilloscopes. Wave Analyzers: Basic - Frequency selective – Heterodyne wave analyzers; Harmonic Distortion Analyzers; Spectrum analyzers.

UNIT-IV

TRANSDUCERS : Introduction to Transducers: Classification – Advantages - Characteristics; Resistive Transducers: Potentiometers - strain gauges-Thermometers – Thermistors; Thermocouples; Inductive Transducers: Inductive pickups-LVDT- RVDT; Capacitive Transducers: single and differential arrangements; Piezo electric and Hall effect transducers; Optoelectronic transducers: photovoltaic - photo conductive cells - photo diodes and transistors.

UNIT - V

MEASUREMENT OF NON-ELECTRICAL QUANTITIES : Displacement Transducers; Pressure Transducers; Temperature Transducers; Flow Transducers; Level Transducers; Force Transducers; Velocity/ speed Transducers; Acceleration Transducers.

TEXTBOOKS:

1. A course in Electrical and Electronic Measurements and Instrumentation - A.K. Sawhney, Dhanpatrai & Co.
2. Electronic Instrumentation- H. S. Kalsi, Tata McGraw-Hill.

REFERENCE BOOKS:

1. Modern Electronic Instrumentation and Measurement techniques - A.D Helfrick and W.D.Cooper, Pearson/Prentice Hall of India.
2. Transducers and Instrumentation - D.V.S Murthy, Prentice Hall of India.
3. Measurements Systems, Applications and Design - D O Doeblin, TMH Publications.
4. Principles of Measurement and Instrumentation - A.S Morris, Pearson /Prentice Hall of India

ELECTRICAL SIMULATION LAB

IV YEAR B.Tech EEE I-Sem	**L**	**T/P/D**	**C**
	0	**0/3/0**	**2**

OBJECTIVE : Students are expected to realize the design numericals they have studied in various subjects using the software simulations. Theoretical analysis and result are compared with practical values.

The following are the experiments that are compulsory:

1. Simulation of Transient Analysis of RLC Circuits to an
   a) (i) Pulse input (ii) Step input (iii) Sinusoidal input.
   b) Simulation of DC Circuit for determining Thevenin's Equivalent
2. Fault analysis of power systems.
3. Simulation of

1. Single Phase AC Voltage Controller using RL load.
2. Single Phase Full Converter using R,L and E loads.

3. Simulation of

1. Resonant Pulse Commutation Circuit.
2. Buck chopper.
3. Root locus and bode plot of a second order system.
4. Stability Analysis of Linear Time Invariant Systems.
5. Load flow analysis of 3 –bus system.
6. Simulation of Single phase Inverter with PWM control

Any Two from the following list are required to be conducted apart from the above list:

1. Modeling of Transformer and Simulation of lossless transmission line.
2. Simulation of Op-Amp based Integrator and Differentiator circuits.
3. Simulation of Dynamic Systems (Single area and two area Power Systems).
4. Simulation of Parametric Analysis of RLC Circuits to a step response

CONTROL SYSTEMS LAB

IV YEAR B.Tech EEE I-Sem	L	T/P/D	C
	0	0/3/0	2

The following are to be conducted as compulsory experiments

1. Time response of Second order system
2. Characteristics of Synchros.
3. Programmable logic controller - Study and verification of truth tables of logic gates, simple Boolean expression and application of speed control of motor.
4. Effect of feedback on DC servo motor
5. Effect of PD, PI, PID Controllers on a second order systems
6. Lag and lead compensation— Magnitude and phase plot
7. Characteristics of magnetic amplifiers
8. Characteristics of AC servo motor

Any two simulation experiments are to be conducted:-

1. Transfer function of DC motor
2. Temperature controller using PID
3. Transfer function of DC generator
4. Characteristics of DC servo motor

INDUSTRY ORIENTED MINI PROJECT

IV YEAR B.Tech EEE I-Sem	**L**	**T/P/D**	**C**
	-	**-/-/-**	**2**

There shall be an industry-oriented mini-Project, in collaborate with an industry of their specialization, to be taken up during the vacation after III year II Semester examination. The industry oriented mini project shall be submitted in report form and should be presented before the committee, which shall evaluate 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.

HVDC TRANSMISSION

IV YEAR B.Tech EEE II-Sem	L	T/P/D	C
	3	1/0/0	3

OBJECTIVE : This subject gives the knowledge of the Transmission using DC values and the design parameters to be considered for the same.

UNIT-I

HVDC TRANSMISSION: BASIC CONCEPTS : Historical development–Equipment required for HVDC systems- Comparison of AC and DC Transmission-Limitations of HVDC Transmission Lines- Reliability of HVDC Systems-Types of HVDC Links - Planning & Modern trends in D.C. Transmission- Standard rated voltages of HVDC and EHVAC systems.

UNIT-II

HVDC CONVERTERS : Analysis of HVDC Converters: Choice of Converter configuration using Pulse Number – Detailed Analysis of Graetz circuit – Analysis of Voltage waveforms with Overlap Angle(μ) – Voltage drop in Per Unit Quantities- Complete Characteristics of converter as Rectifier/Inverter-Characteristics of 12 Pulse converters.

CONTROL OF CONVERTERS : Principal of DC Link Control - Converters Control Characteristics – Hierarchy and basic philosophy - Firing angle control – Extinction angle control - Current control - Starting and stopping of DC link -Power Control.

UNIT-III

CONVERTER FAULTS & PROTECTION : Types of faults- Faults on AC side of Converter Stations-Converter faults – Faults on DC side of the System - Protection against over current and over voltage in converter station - Surge arresters - Smoothing reactors – Transient over voltages in DC line- DC breakers - Corona effects on DC lines - Radio interference.

UNIT-IV

HARMONICS AND HVDC FILTERS : Harmonics in HVDC: Generation of Harmonics - Characteristics harmonics - Calculation of AC Harmonics - Non-Characteristics harmonics - Adverse effects of harmonics - Calculation of voltage & Current harmonics - Effect of Pulse number on harmonics.

Filter configuration- Types of AC filters- Design of Single tuned filters – Minimum Cost of Tuned AC Filters- Design of high pass Filters.

Reactive Power Requirements in steady state-Conventional control strategies-Alternate control strategies-sources of reactive power-AC Filters - shunt capacitors-synchronous condensers.

UNIT- V

MULTITERMINAL DC SYSTEMS : Types of Multi terminal Systems – Control and Protection of MTDC Systems – Study of MTDC Systems- Potential applications of MTDC systems

TEXTBOOKS:

1. HVDC Power Transmission Systems: Technology and system Interactions - by K.R.Padiyar, New Age International *(P)* Limited, and Publishers.
2. EHVAC and HVDC Transmission Engineering and Practice - S.Rao.

REFERENCEBOOKS:

1. HVDC Transmission- J.Arrillaga.
2. Direct Current Transmission - by E.W.Kimbark, John Wiley & Sons.
3. Power Transmission by Direct Current-by E.Uhlmann. B.S. Publications.
4. HVDC Transmission – S.Kamakshaiah and V.Kamaraju.

NEURAL NETWORKS & FUZZY LOGIC
(ELECTIVE-III)

IV YEAR B.Tech EEE II-Sem	L	T/P/D	C
	3	1/0/0	3

OBJECTIVE: This course introduces basic concepts of artificial neural networks and fuzzy logic which are useful in applications of electrical and electronics engineering.

UNIT - I

INTRODUCTION TO NEURAL NETWORKS : Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Hodgkin-Huxley Neuron Model, Integrate-and-Fire Neuron Model, Spiking Neuron Model, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Potential Applications of ANN.

ESSENTIALS OF ARTIFICIAL NEURAL NETWORKS : Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Connectivity, Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules, Types of Application.

UNIT - II

SINGLE LAYER FEED FORWARD NEURAL NETWORKS : Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Perceptron Convergence theorem.

UNIT - III

MULTILAYER FEED FORWARD NEURAL NETWORKS : Credit Assignment Problem, Generalized Delta Rule, Derivation of Back Propagation (BP) Training, Summary of Back propagation Algorithm, Learning Difficulties and Improvements. **Associative Memories**

Paradigms of Associative Memory, General Concepts of Associative Memory, Bidirectional Associative Memory (BAM) Architecture, Architecture of Hopfield Network: Discrete and Continuous versions.

UNIT - IV

FUZZY LOGIC SYSTEM COMPONENTS : Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods and Fuzzy Control System.

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. Introduction to Artificial Neural Networks, Jacek, M. Zurada, West 1992.
2 Fuzzy Logic with Engineering Applications by Timothy J. Ross, Wiely Publications

REFERENCE BOOKS:

1. Neural Networks – Simon Hakins , Pearson Education
2. Neural Networks and Fuzzy Logic System by Bart Kosko, PHI Publications.
3. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by Rajasekharan and Rai – PHI Publication.
4. Introduction to Neural Networks using MATLAB 6.0 - S.N.Sivanandam, S.Sumathi, S.N.Deepa, TMH, 2006

LINEAR SYSTEM ANALYSIS
(ELECTIVE-III)

IV YEAR B.Tech EEE II-Sem	L	T/P/D	C
	3	1/0/0	3

OBJECTIVE : This course introduces application of Various mathematical tools to Electrical circuits. It also gives the detailed study of network synthesis. In addition discrete and continuous signal analysis are also discussed.

UNIT-I

STATE VARIABLE ANALYSIS : Choice of state variables in Electrical networks-Formulation of state equations for Electrical networks-Equivalent source method. Network topological method - Solution of "State equations-Analysis of simple networks with state variable approach .

UNIT-II

APPLICATIONS OF FOURIER SERIES AND FOURIER TRANSFORM REPRESENTATION : Introduction, Trigonometric form of Fourier series, Exponential form of Fourier series. Wave symmetry. Fourier integrals and transforms, Fourier transform of a periodic function, Properties of Fourier Transform. Parseval 's theorem , Fourier transform of some common signals. Fourier transform relationship with Laplace Transform. Effective value and average values of non sinusoidal periodic waves, currents , Power Factor Effects of harmonics. Application in Circuit Analysis, Circuit Analysis using Fourier Series. Fourier transform relationship with Laplace Transform.

UNIT-III

LAPLACE TRANSFORM APPLICATIONS : Application of Laplace transform Methods of Analysis - Response of RL, RC, RLC Networks to Step, Ramp, and impulse functions. Shifting Theorem - Convolution Integral-Applications. Fourier transform relationship with Laplace Transform.

UNIT-IV

TESTING OF POLYNOMIALS AND NETWORK SYNTHESIS : Elements of realisability-Hurwitz polynomials-positive real functions-Proper ties-Testing-Sturm's Test, examples .Network synthesis: Synthesis of one port LC networks-Foster and Cauer methods-Synthesis of RL and RC one port networks-Foster and Cauer methods

UNIT-V

SAMPLING AND Z-TRANSFORMS : Sampling theorem - Flat top Sampling, Reconstruction of signal, effect of under sampling -Aliasing, introduction to Band Pass sampling. Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum. Power density

spectrum. Relation between; auto correlation function and Energy / Power spectral density function. Continuous and discrete time signals, discrete time complex, exponential and sinusoidal signals, periodicity of discrete time complex exponential, concept of Z-Transform. Region of convergence. Constraints on ROC for various classes of signals, Inverse Z-Transform properties of Z-Transforms. Distinction between Laplace, Fourier and Z-Transforms.

TEXTBOOKS:

1. Network and Systems - D Roy Chowdhary, New Age International
2. Network Analysis and Synthesis - Umesh Sinha- Satya Prakashan Publications

REFERENCE BOOKS:

1. Linear System Analysis-AN Tripathi, New Age International
2. Engineering Network Analysis and Filter Desgin- Gopal G Bhisk & Umesh
3. Linear system analysis by A.Cheng, Oxford publishers.

RELIABILITY ENGINEERING AND APPLICATIONS TO POWER SYSTEMS (ELECTIVE-III)

IV YEAR B.Tech EEE II-Sem	L	T/P/D	C
	3	1/0/0	3

OBJECTIVE : This subject deals with the study, evaluation, and life-cycle management of reliability: the ability of a system or component to perform its required functions under stated conditions for a specified period of time.

UNIT-I

BASICS OF PROBABILITY THEORY & **DISTRIBUTION** : Basic probability theory - rules for combining probabilities of events - Bernoulli's trials - probabilities density and distribution functions -binomial distribution-expected value and standard deviation of binomial distribution.

UNIT - II

NETWORK MODELING & COMPOSITE SYSTEMS RELIABILITY ANALYSIS : Analysis of Series, Parallel, Series-Parallel networks -complex networks-decomposition method. - Reliability Indices - Weather Effects on Transmission Lines.

UNIT-III

RELIABILITY FUNCTIONS : Reliability functions f(t), F(t), R(t), h(t) and their relationships-exponential distribution - Expected value and standard deviation of exponential distribution- Bath tub curve-reliability analysis of series parallel networks using exponential distribution - reliability measures MTTF, MTTR, MTBF.

UNIT - IV

MARKOV MODELLING , FREQUENCY & DURATION TECHNIQUES: Markov chains - concept of stochastic transitional probability Matrix, Evaluation of limiting state Probabilities. - Markov processes one component repairable system - time dependent probability evaluation using Laplace transform approach - evaluation of limiting state probabilities using STPM - two component repairable models.

Frequency and duration concept - Evaluation of frequency of encountering state, mean cycletime, for one, two component repairable models - evaluation of cumulative probability and cumulative frequency of encountering of merged states.

UNIT-V

GENERATION & DISTRIBUTION SYSTEM RELIABILITY ANALYSIS : Reliability model of a generation system- recursive relation for unit addition and removal - load modeling - Merging of generation load model -evaluation of transition rates for merged state model - cumulative Probability, cumulative

frequency of failure evaluation -LOLP, LOLE.

Basic Concepts of Distribution system reliability-Evaluation of Basic and performance reliability indices of radial networks.

TEXT BOOKS:

1. Reliability Evaluation of Engg. System- R.Billinton, R.N.Allan, Plenum Press, New York, reprinted in India by B.S.Publications , 2007.
2. Reliability Evaluation of Power systems- R.Billinton, R.N.Allan, Pitman Advance Publishing Program, New York, reprinted in India by B.S.Publications,2007.

ADVANCED CONTROL SYSTEMS
(ELECTIVE-IV)

IV YEAR B.Tech EEE II-Sem	L	T/P/D	C
	3	1/0/0	3

OBJECTIVE:

5. To give the students insight knowledge about the nonlinear control systems.
6. To give the students methods of analysys of nonlinear systems such as describing function and phase plane etc.control systems
7. and the stability analysis of non linear control systems in order to enable the students to deal with real-time applications.

UNIT - I

STATE SPACE ANALYSIS, CONTROLLABILITY AND OBSERVABILITY : State Space Representation, Solution of State Equation, State Transition Matrix, Canonical Forms - Controllable Canonical Form, Observable Canonical Form, Jordan Canonical Form.

Tests for controllability and observability for continuous time systems -Time varying case, minimum energy control, time invariant case, Principle of Duality, Controllability and observability form Jordan canonical form and other canonical forms.

UNIT-II

DESCRIBING FUNCTION ANALYSIS : Introduction to nonlinear systems, Types of nonlinearities, describing .j&mctions, describing function analysis of nonlinear control systems.

PHASE-PLANE ANALYSIS : Introduction to phase-plane analysis. Method of Isoclines for Constructing Trajectories, singular points, phase-plane analysis of nonlinear control systems.

UNJT-III

STABILITY ANALYSIS : Stability in the sense of Lyapunov., Lyapunov's stability and Lypanov's instability theorems. Direct method of Lypanov for the Linear and Nonlinear continuous time autonomous systems.

UNIT -IV

MODEL CONTROL : Effect of state feedback on controllability and observability. Design of State Feedback Control through Pole placement . Full order observer and reduced order observer

UNTT-V

CALCULUS OF VARIATION & OPTIMAL CONTROL : Minimization of functional of single function, Constrained minimization. Minimum principle. Control variable inequality constraints. Control and state variable inequality constraints. Euler Lagrangine Equation

Formulation of optimal control problem. Minimum time, Minimum enerGy, minimum fuel numericals. State regulator problem. Output regulator problem. Tracking problem, Continuous-Time Linear Regulators.

TEXTBOOKS:

1. Modern Control System Theory- by M. Gopal, New Age International Publishers, 2nd edition, 1996
2. Modern Control Engineering - by K. Ogata, Prentice Hall of India, *3rd* edition, 1998

REFERENCE BOOKS:

1. Control Systems Engineering by I.J. Nagarath and M.Gopal, New Age International (P) Ltd.
2. Digital Control and State Variable Methods - by M. Gopal, Tata Mc Graw-Hill Companies, 1997.
3. Systems and Control by StainslawH. Zak, Oxford Press, 2003.
4. Modern control System - By Dorf, Pearson

EHV AC TRANSMISSION
(ELECTIVE-IV)

IV YEAR B.Tech EEE II-Sem	L	T/P/D	C
	3	1/0/0	3

OBJECTIVE: This course is an extension of power systems transmission. It deals with in depth inter related concepts of extra high voltage AC transmission. Also this course gives examples on travelling wave theory and voltage control.

UNIT-I

INTRODUCTION TO EHV AC : Necessity of EHV AC transmission - advantages and numericals- power. Handling capacity and line losses- mechanical considerations - resistance of conductors - Bundled conductors - bundle spacing and bundle radius-Examples.

Line inductance and capacitances - sequence inductances and capacitances. Modes of propagation - ground return - Examples

UNIT-II

VOLTAGE GRADIENTS OF CONDUCTORS : Electrostatics - field of sphere gap - field of line changes and properties -charge - potential relations for multi-conductors -surface voltage gradient on conductors - distribution: of voltage gradient on sub-conductors of bundle-Examples.

ELECTROSTATIC FIELD: calculation of electrostatic field of EHV/AC lines - effect on humans, animals and plants - electrostatic induction in unenergised circuit of double-circuit line -electromagnetic interference-Examples.

UNIT- III

TRAVELING WAVE THEORY : Traveling wave expression and solution- source of excitation- terminal conditions- reflection and refraction coefficients- Lumped parameters of distributed lines-generalized constants- No load voltage conditions and charging current.

UNIT-IV

CORONA EFFECTS : Power loss and audible noise (AN) -corona loss formulae-charge voltage diagram - generation, characteristics - limits and measurements of AN -relation between I-phase and 3-phase AN levels - Examples. Radio interference (RI) - corona pulses generation, properties, limits -frequency spectrum - modes of propagation - excitation function - measurement of RI, RIV and excitation functions-Examples.

UNIT-V:

VOLTAGE CONTROL : Power circle diagram and its use - voltage control using synchronous condensers - cascade connection of shunt and series compensation - sub synchronous resonance in series capacitor - compensated lines - static VAR compensating system.

TEXTBOOKS:

1. EHV AC Transmission Engineering by R. D. Begamudre, New Age International (p)Ltd.
2. HVAC and DC Transmission by S. Rao.

COMPUTER ORGANIZATION
(ELECTIVE-IV)
(COMMON TO CSE, IT,EEE)

IV YEAR B.Tech EEE II-Sem	L	T/P/D	C
	3	1/0/0	3

OBJECTIVES : To acquire the knowledge of the basic hardware and software issues of computer organization, to analyze the operational concepts of computers data representation, to about the architecture and the features of advanced processors, to learn Hierarchical memory system including cache memories and virtual memory and to acquire the knowledge about computer architecture, machine language, and low-level programming.

UNIT - I

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

UNIT - II

REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS : Register Transfer language. Register Transfer Bus and memory transfers, Arithmetic Micro-operations, logic micro operations, shift micro operations, Arithmetic logic shift unit. Instruction codes, Computer Registers, Computer instructions - Instruction cycle.

Memory - Reference Instructions, Input - Output and Interrupt, STACK organization, Instruction formats, Addressing modes, DATA Transfer and manipulation. Program control, Reduced Instruction set computer.

UNIT - III

MICRO PROGRAMMED CONTROL : Control memory, Address sequencing, micro program example, design of control unit, Hard wired control, Micro programmed control.

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

UNIT - IV

MEMORY ORGANIZATION : Memory hierarchy, Main memory, Auxiliary memory, Cache memory, Virtual memory, Introduction to RAID.

INPUT-OUTPUT ORGANIZATION : Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input- Output Processor (IOP), Serial communication; Introduction to peripheral component, Interconnect (PCI) bus. Introduction

to standard serial communication protocols like RS232, USB, and IEEE1394.

UNIT - V

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

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

TEXT BOOKS:

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

REFERENCES:

1. Computer Organization and Architecture - William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization - Andrew S. Tanenbaum, 4th Edition PHI/Pearson

SEMINAR
(Common to all branches)

IV YEAR B.Tech EEE II-Sem	L	T/P/D	C
	3	0/2/0	2

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.

MAJOR PROJECT

IV YEAR B.Tech EEE II-Sem	**L**	**T/P/D**	**C**
	3	**0/15/0**	**10**

Out of a total of 200 marks for the project work, 100 marks shall be for Internal Evaluation and 100 marks for the End Semester Examination. The End Semester Examination (viva voce) shall be conducted by committee consists of an external examiner, Head of the Dept. the supervisor of the major project and a senior faculty of the Dept. The topics for industry oriented mini project, seminar and major project work shall be different from each other. The evaluation of project work shall be conducted at the end of the IV year II Semester. Out of 100 Marks for Internal Evaluation, 50 Marks will be awarded by the Supervisor, and 50 Marks will be awarded by the committee constituted by Head of the Dept. shall be on the basis of two seminars given by each student on the topic of her project.

COMPREHENSIVE VIVA

IV YEAR B.Tech EEE II-Sem	**L**	**T/P/D**	**C**
	-	**-/-/-**	**2**

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 valued for 100 marks by the Committee. There are no internal marks for the Comprehensive viva-voce.