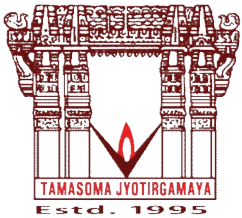
ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

Electrical and Electronics Engineering



B.TECH. FOUR YEAR DEGREE COURSE

(Applicable for the batches admitted from 2011-2012)

VNR VIGNANA JYOTHI
INSTITUTE OF ENGINEERING AND
TECHNOLOGY
(AFFILIATED TO JNTUH)
An Autonomous Institute under JNTUH

Bachupally, Nizampet (S.O),
Hyderabad – 500090
Andhra Pradesh, India

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

HYDERABAD

An Autonomous Institute under JNTUH

ACADEMIC REGULATIONS 2011 FOR B.TECH. DEGREE COURSE

(Applicable for Students admitted from the academic year 2011-2012)

1. Courses of study

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

Branch Code	Branch
01	Civil Engineering.
02	Electrical and Electronics Engineering
03	Mechanical Engineering
04	Electronics and Communication Engineering
05	Computer Science and Engineering.
10	Electronics and Instrumentation Engineering
12	Information Technology
24	Automobile Engineering

1.1 Eligibility Criteria for Admission

The eligibility criteria for admission into engineering programmes shall be as mentioned below:

The candidate shall be an Indian National.

The candidate should have completed 16 years of age as on 31st December of the academic year for which the admissions are being conducted.

The Candidate should have passed the qualifying examination (10+2) or equivalent as on the date of admission.

Seats in each programme in the Institution are classified into Category A and Category B as per the G.Os.

1.1.1 Category – A Seats

These seats will be filled through counseling as per the rank at the Common Entrance Test (EAMCET) conducted by the State Government and State Government GOs as per other admission criteria laid down in the G.Os.

1.1.2 Category - B Seats

These seats will be filled by the institute as per the G.Os. Issued by State Government from time to time.

1.1.3 Category: Lateral Entry

He candidates shall be admitted into the Third Semester, based on the rank secured by the candidate at Engineering Common Entrance Test (ECET(FDH)) by the Convener, ECET.

2. 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 subjects. In addition, an Industry oriented mini-project, Seminar, Comprehensive viva-voce, and Project Work shall be evaluated for 50, 50, 50 and 200 marks respectively.

ii. For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

For theory subjects, Two mid examinations will be conducted in each Semester as per the academic calendar. Each mid examination is evaluated for 25 marks. First mid examination should be conducted for 1 – 2 ½ Units of syllabus and the second mid examination shall be conducted for 2 ½ - 5 Units of syllabus. The mid descriptive type exam paper consists of Section-A and Section-B.
Section-A [compulsory] consists of 5 short answer questions and each carries one mark.

Section-B consists of 5 questions out of which 4 are to be answered and each question carries 5 marks. The time duration of each mid examination is 90 minutes.

Two assignments are to be given to students covering the syllabus of first mid and second Mid examinations and are evaluated for 5 marks each. .
The first assignment shall be submitted before first mid examinations and second Assignment should be submitted before second mid examination.
At the end of the Semester Internal Marks Maximum 30 for the respective subjects are allotted as follows:

(a) 25 marks for the better of the two mid term examinations
(b) 5 marks of the average of the two assignment marks

iii. For practical subjects there shall be a continuous evaluation during the Semester for 25 internal marks and 50 marks for end examination. Out of the 25 marks for internal, day-to-day work in the laboratory shall be evaluated for 10 marks, and 10 marks for internal examination (two internal practical examinations will be conducted and the better of the two examinations will be taken into account) and 5 marks for laboratory record.

NOTE: A student who is absent for any assignment/Mid term examination for any reason what so ever shall be deemed to have secured 'zero' marks in the test/examination and no makeup test/examination shall be conducted.

iv For the subjects having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing, Production Drawing Practice, and Estimation etc., the distribution shall be 30 marks for internal evaluation (15 marks for day-to-day work and 15 marks for internal tests (the better of the two examinations will be taken into account) and 70 marks for end examination. There shall be two internal tests in a Semester.

iv. 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. The mini project shall be evaluated during the IV year I Semester. The industry oriented mini project shall be submitted in report form and should be presented before a 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 assessment for industry oriented mini project.

vi. There shall be a Seminar presentation in IV year II Semester. For the Seminar, the student shall collect the information on a specialized topic other than the project topic and prepare a technical report, showing his understanding of the topic, and submit to the department, which shall be evaluated by a Departmental committee consisting of the 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.

vii. There shall be a Comprehensive Viva-Voce in IV year II Semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of the Head of the Department and three Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the student's understanding in various subjects studied during the B.Tech. course of study. The Comprehensive Viva-Voce is evaluated for 50 marks by the Committee. There will be no internal assessment for the Comprehensive viva-voce.

viii. The Project work shall be started by the student in the beginning of the IV year I Semester. Out of a total of 200 marks for the project work, 60 marks shall be for Internal Evaluation and 140 marks for the Semester end Examination. The Semester end Examination (viva-voce) shall be conducted by a committee comprising of an external examiner, Head of the Department and the project supervisor. The evaluation of project work shall be conducted at the end of the IV year II Semester. The Internal Evaluation shall be on the basis of three Seminars conducted during the IV year II Semester for 30 marks by the committee consisting of Head of the Department, project supervisor and senior faculty member of the Department and for 30 marks by the supervisor of the project.

3. Semester end Examination

(a) Theory Courses

Each course is evaluated for 70 marks. Examination is of 3 hours duration.
Question paper contains two sections [Section-A and Section-B]

Section-A: Carries 30 marks [Five questions of one mark each, five questions of two marks each and another five questions of three marks each] which is compulsory.

Section-B: carries 40 marks consisting of six essay type questions out of which four questions to be answered, each carrying 10 marks.

Drawing related subjects, question paper contains 8 questions (atleast one question from each unit), out of which the candidate has to answer any 5 questions, each carrying 14 marks.

(b) Practical Courses

Each lab course is evaluated for 50 marks. The examination shall be conducted by the laboratory teacher and another senior teacher concerned with the subject of the same/other department/Industry. The external examiner may be appointed by the Chief Superintendent in consultation with HOD as and when required.

(c) Supplementary Examinations

Supplementary examinations will be conducted along with regular Semester end examinations. (During even Semester regular examinations, supplementary examinations of odd Semester and during odd Semester regular examinations, supplementary examinations of even Semester will be conducted).

4. Attendance Requirements

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

ii. Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in a Semester may be granted by Institute Academic Committee.

iii. A student will not be permitted to write the end examination and hence not promoted to the next Semester unless he satisfies the attendance requirement of the present Semester, as applicable. They may seek re-admission for that Semester when offered next.

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

v. Students whose shortage of attendance is not condoned in any Semester are not eligible to take their end examination of that Semester.

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

5. Minimum Academic Requirements

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item No.4.

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% (25 out of 70 marks) of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together.

ii. A student shall be promoted from II to III year only if he fulfils the academic requirement of 37 credits from Two regular and one supplementary examinations of I year I Semester and One Regular and One Supplementary exam 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 III year to IV year only if he fulfils the academic requirements of total 62 credits from the following examinations, whether the candidate takes the examinations or not.

- Three regular and Two supplementary examinations of I B Tech I Semester.
- Two regular and two Supplementary examinations for I B Tech II Semester
- Two regular and one supplementary examinations up to the end of II year I Semester.
- One regular and one supplementary examinations of II year II Semester.
- One regular examination of III year I Semester.

iv. A student shall register and put up minimum academic requirement 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 get cancelled.

6. Course pattern

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

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

iii. When a student is detained due to shortage of attendance in any Semester, he may be re-admitted into that Semester when it is offered next, with the academic regulations of the batch into which he gets readmitted.

iv. When a student is detained due to lack of credits in any year, he may be eligible to be promoted or for promotion into the next year after fulfillment of the academic requirements, with the academic regulations of the batch into which he gets admitted

7. Award of B.Tech. Degree and Class

A student will be declared eligible for the award of the B. Tech. Degree if he/she 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.

NOTE: 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.

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

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

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

8. Withholding of Results

If the student has not paid dues to College, or if any case of indiscipline is pending against him, the result of the candidate may be withheld and he will not be allowed to go into the next higher Semester. The award or issue of the Degree may also be withheld in such cases.

9. Transitory Regulations

Students who have discontinued or have been detained for want of attendance or any other academic requirements, may be considered for readmission as and when they become eligible. They have to take up Equivalent subjects, as substitute subject in place of repetition of subjects as decided by the Institute Academic Committee.

10. Minimum Instruction Days

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

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

12. The decision of the Institute Academic Committee will be final in respect of equivalent subjects for those students who are transferred from other colleges. The procedure for permitting students to transfer from other colleges will be decided by the principal / Institute Academic Committee keeping the Government Rules concerned in view.

13. General

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

ii. The academic regulations 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 is final.

iv. In the case of any discrepancy/ambiguity/doubt arises in the above rules and regulations, the decision of the Principal shall be final.

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

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

(Applicable for students admitted from the academic year 2012-2013)

(i) A student shall register for all 150 credits and earn all the 150 credits. Marks obtained in all 150 credits shall be considered for the calculation of the class.

(ii) A student who fails to earn 150 credits as indicated in the course structure within six academic years from the year of their admission shall forfeit their seat in B.Tech. programme and their admission stands cancelled.

(iii) The same attendance regulations are adopted as that of B.Tech. Four year degree course.

(iv) A student shall be promoted from third year to fourth year only on fulfilling the academic requirements of securing 37 credits from the following examinations.

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

Irrespective of whether the candidate appears the Semester-End examination or not as per the normal course of study and in case of getting detained for want of credits the student may make up the credits through supplementary exams of the above exams before the date of commencement of class work for IV year I Semester.

(v) Award of B.Tech. Degree and Class

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

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

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

(vi) All other regulations as applicable to B.Tech. four year degree course will hold good for B.Tech. (Lateral Entry Scheme).

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH ELECTRICAL AND ELECTRONICS ENGINEERING

I YEAR I SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11MTH1101	Mathematics – I	3	1	3
R11MTH1102	Mathematics- II	3	1	3
R11PHY1101	Engineering Physics-I	3	0	3
R11HAS1101	English	3	0	3
R11CSE1101	Computer Programming	3	0	3
R11MED1105	Engineering Drawing	3	3	4
R11HAS1201	English Language Communication Skills Laboratory-I	0	3	2
R11CSE1201	Computer Programming Laboratory	0	3	2
R11MED1202	Workshop Practice	0	3	2
Total		18	14	25

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH ELECTRICAL AND ELECTRONICS ENGINEERING

I YEAR II SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11EEE1101	Circuit Theory	4	0	4
R11MTH1104	Numerical Analysis and Linear Programming	3	1	3
R11PHY1102	Engineering Physics-II	3	0	3
R11CHE1101	Engineering Chemistry	3	0	3
R11CSE1102	Data Structures	3	0	3
R11CED1109	Environmental Studies	3	0	3
R11CSE1202	Data Structures Laboratory	0	3	2
R11EPC1201	Engineering Physics and Engineering Chemistry Laboratory	0	3	2
R11HAS1202	English Language Communication Skills Laboratory-II	0	3	2
Total		19	10	25

* T/P/D: Tutorial/Practical/Drawing Practice

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH ELECTRICAL AND ELECTRONICS ENGINEERING

II YEAR I SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11MTH1103	Mathematics – III	3	1	3
R11MED1162	Fundamentals of Fluid Mechanics and Turbo Machinery	3	1	3
R11EEE1102	ElectroMagnetic Field Theory	3	1	3
R11EEE1103	Electrical Machines – I	4	1	4
R11ECE1102	Electronic Devices and Circuits	4	1	4
R11EEE1104	Network Analysis	4	1	4
R11EEE1201	Electrical Circuits and Simulation Laboratory	0	3	2
R11MED1212	Fluid Mechanics and Hydraulic Machinery Laboratory and Electronic Devices Laboratory	0	3	2
Total		21	12	25

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH ELECTRICAL AND ELECTRONICS ENGINEERING

II YEAR II SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11ECE1103	Switching Theory and Logic Design	4	0	4
R11EEE1106	Control Systems	3	1	3
R11HAS1102	Business Economics and Financial Analysis	4	0	4
R11EEE1107	Power Systems-I	3	1	3
R11ECE1131	Electronic Circuits	3	1	3
R11EEE1108	Electrical Machines – II	4	1	4
R11EEE1204	Electrical Machines – I Laboratory	0	3	2
R11ECE1209	Electronic Circuits Laboratory	0	3	2
Total		21	10	25

* T/P/D: Tutorial/Practical/Drawing Practice

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH ELECTRICAL AND ELECTRONICS ENGINEERING

III YEAR I SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11ECE1108	Microprocessors and Micro Controllers	4	0	4
R11EIE1106	Linear and Digital IC Applications	4	0	4
R11EEE1109	Power Systems-II	3	1	3
R11EEE1110	Power Electronics	4	0	4
R11EEE1111	Electrical Machines – III	4	1	4
R11ECE1204	Microprocessors and Microcontrollers Laboratory	0	3	2
R11EEE1205	Electrical Machines –II Laboratory	0	3	2
R11EEE1206	Control Systems and Simulation Laboratory	0	3	2
Total		19	11	25

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH ELECTRICAL AND ELECTRONICS ENGINEERING

III YEAR II SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11HAS1103	Management Science	4	0	4
R11EEE1112	Power Semi Conductor Drives	4	1	4
R11EEE1113	Electrical Measurements and Instrumentation	3	1	3
R11EEE1114	Power System Analysis	4	1	4
R11EEE1115	Switchgear and Protection	4	1	4
R11EEE1207	Electrical Measurements Laboratory	0	3	2
R11EEE1208	Power Electronics and Simulation Laboratory	0	3	2
R11HAS1204	Advanced English Language Communication Skills Laboratory	0	3	2
Total		19	13	25

* T/P/D: Tutorial/Practical/Drawing Practice

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH ELECTRICAL AND ELECTRONICS ENGINEERING

IV YEAR I SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11EEE1116	Power System Operation and control	3	1	3
R11ECE1109	Digital Signal Processing	4	1	4
Elective – I		4	0	4
R11EEE1117	Electrical Distribution Systems			
R11EEE1118	Reliability Engineering and Applications to Power Systems			
R11MED1163	Optimization Techniques			
R11EEE1119	Neural Networks and Fuzzy Logic			
Elective – II		4	0	4
R11EEE1120	Special Electrical Machines and Control			
R11ECE1110	VLSI Design			
R11EEE1121	Power Plant Instrumentation and Control			
R11EEE1122	High Voltage Engineering			
Elective – III		4	0	4
R11EEE1123	HVDC Transmission			
R11EEE1124	Linear System Analysis			
R11CSE1114	Object Oriented Programming			
R11CSE1110	Database Management Systems			
R11EEE1209	Power Systems and Simulation Laboratory	0	3	2
R11ECE1208	Digital Signal Processing Laboratory	0	3	2
R11EEE1301	Industry Oriented Mini Project	0	8	2
Total		19	16	25

* T/P/D: Tutorial/Practical/Drawing Practice

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH ELECTRICAL AND ELECTRONICS ENGINEERING

IV YEAR II SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11EEE1125	Utilization of Electrical Energy	3	1	3
Elective – IV		3	1	3
R11EEE1126	Advanced Control Systems			
R11EEE1133	Electrical Engineering Materials			
R11EEE1127	EHV AC Transmission			
R11EEE1128	Renewable Energy Sources			
Elective – V		3	1	3
R11EEE1129	Modern Power Electronics			
R11EEE1130	Flexible A.C. Transmission Systems			
R11EIE1124	Programmable Logic Controllers			
R11ECE1132	Embedded Systems			
R11EEE1302	Seminar	0	3	2
R11EEE1303	Comprehensive Viva Voce	0	0	2
R11EEE1304	Project Work	6	12	12
Total		15	18	25

* T/P/D: Tutorial/Practical/Drawing Practice

VNR Vignana Jyothi Institute of Engineering and Technology

I Year B.Tech ECE,EEE,EIE – I Sem	L	T/P/D	C
	3	1	3

(R11MTH1101) MATHEMATICS – I
(Advanced Calculus)

UNIT I

Elementary analysis

Sequences and series - convergence and divergence, ratio test, comparison test, integral test, Cauchy's root test, Raabe's test (statements only for the tests), and absolute and conditional convergence.

Mean value theorems (statements only) - Rolle's theorem, Lagrange's theorem, Cauchy's theorem, and generalized mean value theorem (Taylor's Theorem).

UNIT II

Functions of several variables

Partial differentiation; 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 envelopes.

UNIT III

Improper integrals and special functions

Improper Integrals; Beta, Gamma, and Error functions - Properties and simple applications.

UNIT IV

Curve tracing, applications of integration and multiple integrals

Curve tracing – Cartesian, polar, and parametric curves; Applications of integration to lengths, volumes and surface areas in cartesian and polar coordinates.

Multiple integrals - double and triple integrals, change of variables, and change of order of integration.

UNIT-V

Vector calculus

Introduction to vector and scalar functions; gradient, curl, divergence, and their related properties of sums and products; Laplacian and second order operators; Vector integration - line integral, work done, potential function; Area, surface, and volume integrals; Statements of Vector integral theorems and their verification (without proofs) - Green's theorem, Stoke's theorem, and Gauss divergence theorem.

TEXT BOOKS

1. Calculus and Analytic Geometry - Thomas and Finney, 9th edition, *Pearson Education*.

REFERENCES

1. Elementary Analysis: The Theory of Calculus - Kenneth Ross, *Springer.*
2. Principles of Mathematical Analysis - Walter Rudin, 3rd edition, *Paperbac,* 1976.
3. Advanced Engineering Mathematics - Erwin Kreyszig, 8th edition, *John Wiley*.
4. Calculus - Tom M. Apostol, Volume1 and Volume 2, 2nd edition, *John Wiley,* 2003.
5. Schaum's Outline of Vector Analysis - Murray R. Spiegel, 2nd edition, *Tata McGraw Hill* 2011.

I Year B.Tech ECE,EEE,EIE – I Sem	L	T/P/D	C
	3	1	3

(R11MTH1102) MATHEMATICS – II

(Linear Algebra and Ordinary Differential Equations)

LINEAR ALGEBRA

UNIT I

Solution of linear systems

Matrices and linear systems of equations - elementary row transformations, Rank Echelon form, and normal form; Solution of linear systems - direct methods - LU decomposition, LU decomposition from Gauss elimination, and solution of Tri-diagonal systems; Eigen values, eigen vectors, and their properties - Liner dependence and independence; Cayley-Hamilton theorem - inverse and powers of a matrix by Cayley-Hamilton theorem, diagonalization of a matrix, calculation of powers of a matrix; Modal and spectral matrices.

UNIT II

Linear transformations

Real matrices - symmetric, skew symmetric, and orthogonal linear transformation; Complex matrices - Hermitian, Skew-Hermitian and unitary matrices; Eigen values and eigen vectors of complex matrices and their properties; Quadratic forms - reduction of quadratic form to canonical form, rank, positive, negative definite, semi definite, index, signature, Sylvester law, and singular value decomposition.

ORDINARY DIFFERENTIAL EQUATIONS

UNIT III

Ordinary differential equations and their applications

Differential equations of first order and first degree - Linear, Bernoulli and exact differential equation; Applications of differential equations of first order and first degree - Newton's law of cooling, Law of natural growth and decay, Orthogonal trajectories, and basic circuits.

UNIT IV

Differential equations of higher order and their applications

Differential equations of higher order - homogeneous and non-homogenous type, differential equations of second order and higher order with constant coefficients with right hand side term of the type e^{ax}, sin (ax), cos (ax), polynomials in x, e^{ax} V(x), x V(x), and method of variation of parameters; Applications to bending of beams; Mechanical systems - Simple harmonic motion.

UNIT V

Linear differential equations and qualitative methods

Cauchy's linear differential equation; Legendre's differential equations; Simultaneous linear differential equations; The phase plane; Phase portraits and direction fields; Critical points and stability.

TEXT BOOKS

1. Advanced Engineering Mathematics - R.K Jain and S.R.K Iyengar, 3rd edition, Narosa Publications, 2011.
2. Differential Equations - Dennis G. Zill, Cengage learning, 2011.

REFERENCES

1. Advanced Engineering Mathematics - Erwin Kreyszig, 8th edition, *John Wiley*.
2. Advanced Engineering Mathematics - Peter V. O'Neil, 9th Edition, *Cengage Learning.*
3. Elementary Differential Equations and Boundary Value Problems - William E. Boyce and Richard C. Diprima ,*Wiley.*
4. Linear Algebra and its applications - David C Clay, *Pearson Education.*
5. Differential Equations, with Applications and Historical Notes - George F. Simmons and John S. Robertson, 2nd Edition, *Tata McGraw Hill,* 2008.
6. Advanced Engineering Mathematics - Dennis G. Zill, Warren S. Wright, and Michael R. Cullen, 4th edition, *Jones & Bartlett Learning*.

I Year B.Tech ECE,EEE,EIE – I Sem	L	T/P/D	C
	3	0	3

(R11PHY1101) ENGINEERING PHYSICS-I

UNIT –I

INTERFERENCE AND DIFFRACTION: Superposition principle, resultant amplitude, coherence, methods to obtain coherent sources, interference, Young's double slit experiment, interference in thin films by reflection, Newton's rings Experiment, Distinguish between Fraunhofer and Fresnel diffraction, diffraction at single slit (Qualitative and Quantitative(Phasors approach)), double slit, circular aperture, and multiple slits (grating)(Qualitative Approach). Resolution of spectral lines, Rayleigh criterion, resolving power of grating and telescope.

UNIT - II

POLARIZATION: Polarization phenomenon, Brewster's Law and Malus law, examples, types of polarization, double refraction, Nicol prism, Quarter and Half wave plates

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 – Carbon dioxide laser - Semiconductor Laser – Applications of lasers.

UNIT - III

FIBER OPTICS: Principle of optical fiber – Acceptance angle and acceptance cone – Numerical aperture – - Types of fibers and refractive index profiles – Qualitative analysis of attenuation in optical fibers –Application of optical fibers.

CRYSTAL STRUCTURES: Space lattice – Unit cell – Lattice parameter – Crystal systems – Bravais lattices Atomic radius – Co-ordination number - Structures and Packing fractions of Simple Cubic – Body Centered Cubic – Face Centered Cubic crystals – Hexagonal closed packed crystals - Structures of diamond, NaCl.

UNIT - IV

DIRECTIONS, PLANES AND X-RD: Miller Indices for Crystal planes and directions – Inter planar spacing of orthogonal crystal systems –Diffraction of X-rays by crystal planes and Bragg's law– Laue method – Powder method – Applications of X-ray diffraction

BONDING IN SOLIDS: Force and energy between two approaching atoms, primary and secondary bonds, binding energy and cohesive energy, Madelung constant, cohesive energy and Madelung constant for NaCl crystal.

DEFECTS IN SOLIDS: Imperfections in crystals – Point defects (Vacancies, Interstitial and Impurities) Schottky and Frenkel defects – (with mathematical treatment)- Line imperfections – Edge and Screw dislocation – Burger vector – Surface defects and volume defects (Qualitative Treatment).

UNIT - V

SURFACE PHYSICS: Surface Electronic structure(work function, thermionic emission, surface states, tangential surface transport), Electron Microscope, Scanning Tunneling Microscope.

SCIENCE and TECHNOLOGY OF NANOMATERIALS:Origin of nanotechnology – (Basic principles of Nanoscience and Technology) surface to volume ratio, quantum confinement – Fabrication of nano materials Bottom up fabrication: sol-gel and combustion methods – Top down fabrication: CVDand PVD methods– Characterization (XRD and TEM) - Applications of nanotechnology.

TEXT BOOKS:

(1) Introduction to Solid State Physics by Charles Kittel : John Wiley and Sons
(2) Physics vol.2, by Halliday, Resnick and Krane; John Wiley and Sons
(3) Applied Physics by P.K.Mittal, IK International Publishing House (P) Ltd.
(4) Optics by Ghatak and Thyagarajan, Tata Mc Graw

REFERENCE BOOKS:

(1) Engineering Physics by R.K.Gaur and S.L.Gupta; Dhanpat Rai and Sons
(2) Solid State Physics by S.O.Pillai
(3) Engineering Physics by M Chandra Shekar and P. Appala Naidu, VGS Book links.
(4) Solid State Physics by A.J.Dekker; Macmillan Publishers India Ltd.
(5) Solid State Physics by N.W.Ashcroft and N.David Merwin. Thomson Learning
(6) Engineering Physics by G Sahashra Buddhe; University Press
(7) Elements of Solid State Physics by J.P.Srivatsva, PHI Publishers
(8) Introduction to Optical Communication by G. Keiser
(9) Fundamentals of Molecular Spectroscopy by Banwell, Tata McGraw Hill

VNR Vignana Jyothi Institute of Engineering and Technology

I Year B.Tech ECE,EEE,EIE – I Sem	L	T/P/D	C
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(R11HAS1101) ENGLISH

Introduction

This is the age of information and communication technologies. Engineers and technical professionals need to convey technical information in English for various purposes.

Besides learning general English as an international language, engineering students need to be equipped with adequate writing ability so that they can communicate technical information clearly on at least a basic level. A good English writing proficiency can be a contributing factor to professional recognition and career prospects. This course teaches those writing strategies that scientists, engineers, and others will need in order to write successfully on the job. It initiates the students into Technical Writing. The purposes of technical writing are to inform and persuade. This program aims to train students in writing clear, concise and effective English.

This syllabus is therefore, a Pragmatic English Writing Program for engineering students with intermediate proficiency. The program covers a syllabus outline and instructional approaches on basic writing skills with particular reference to technical writing.

Objectives:

i) To equip the students with all the LSRW skills for advanced writing and speaking.

ii) To equip the students with basic grammar, infrastructural patterns and grammatical constructions required of in technical writing.

iii) To acquaint the students with the writing process, beginning with paragraph writing. This would prepare them for academic and workplace writing.

iv) Equip the students with Oral Communication Skills.

Methodology

A Task-based, process oriented methodology will be used by the teachers to give a practical orientation to the teaching of language. An inductive approach will be used to demonstrate the use of language in context. This should enable the students to internalize the language structures and vocabulary used in context. Students will be exposed to numerous examples and ample practice will be given in the contextual use of language structures.

Syllabus Outline

Unit I : Prose

1. Heaven's Gate by Pico Iyer
2. The Connoisseur by Nergis Dalal

Unit II : Basic Grammar

i) Common Errors
ii) Subject-Verb Agreement
iii) Adverbs
iv) Transitional elements
v) Use of Articles and Prepositions
vi) Conjunctions
vii) pronoun reference

Unit III Reading and Writing Skills

i) Reading Comprehension
ii) Paragraph Writing
iii) Letter Writing
iv) Memo Writing
v) Words often Confused
vi) Synonyms and Antonyms
vii) One Word Substitutes
viii) Prefixes and Suffixes
ix) Idioms and Phrases

Unit IV : Prose

1. The Cuddalore Experience by Anu George
2. The Odds Against Us by Satyajit Ray

Unit V : Technical Writing Component

A. Definition of a Technical Term
B. Description of a Mechanism
C. Description of a Technical Process
D. Classification
E. Cause and Effect
F. Comparison and Contrast
G. Analogy

Prescribed Text Books

1. Effective Technical Communication, Ashraf Rizvi
2. Technical Communication : Principles and Practices , M. Raman and S. Sharma, OUP, 2004. *(Indian Edition)*

References

1. Technical Writing Process and Product , Gerson Sharon J. and Steven Gerson :. 3rd edition, New Jersey: Prentice Hall 1999
2. Composition Practice ,Blanton, L.L. 1993;, Book 4 ,Second Edition, Heinle and Heinle Publishers, pp. 54
3. Course in Analytical Writing for Science and Technology Georges, T.M. 1996 A, http://www.mspiggy.etl.noaa.gov/write/
4. Oxford English for Electrical and Mechanical Engineering, Glendinning, E.H. and Glendinning, N. 1995; Oxford University Press, pp.28,68,83

5. Summary Writing and Sentence Structure in the Advanced ESL Classroom, The Internet TESL Journal, Greaney, G.L. 1997; Less is More: Vol.III, No.9 http://iteslj.org/Techniques/Greaney-Writing.html
6. Handbook for Technical Communication ,Neufeld, J.K. 1987; A, Prentice-Hall, Inc. pp.20,65-68
7. Principles of Course Design for Language Teaching, Yalden, J. 1987; Cambridge University Press
8. Guide to Writing as an Engineer, David F. Beer and David McMurrey, 2nd ed., Wiley, 2004, ISBN: 0471430749.
9. Applied Writing for Technicians, Dale Jungk, McGraw-Hill, 2005, ISBN 0-07-828357-4.
10. Pocket Style Manual, Diane Hacker,Bedford/St. Martin's, 2003, ISBN: 0312406843.

I Year B.Tech ECE,EEE,EIE – I Sem	L	T/P/D	C
	3	0	3

(R11CSE1101) COMPUTER PROGRAMMING

UNIT- I

Introduction to Computers – Computer Systems, Computing Environments (DOS/Linux), Computer languages, Linux commands , creating and running programs, Software Development Methods, Algorithms, Pseudo code, flow charts, applying the software development method.

UNIT - II

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

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

UNIT - III

Designing Structured Programs, Functions- basics, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, recursive functions, example C programs.

Arrays – Basic concepts, one-dimensional arrays, two – dimensional arrays, multidimensional arrays, arrays to functions, C program examples.

Strings – Basic concepts, String Input / Output functions, arrays of strings, string handling functions, strings to functions, C programme examples.

UNIT - IV

Derived types – Structures – Basic concepts, nested structures, arrays of structures, structures and functions, unions, typedef, bit fields, enumerated types, C programming examples.

Pointers – Basic concepts, pointers and functions, pointers and strings, pointers and arrays, pointers and structures, self referential structures , example C programs.

UNIT - V

File I/O – Basic concepts, text files and binary files, file input / output operations, file status functions (error handling), C program examples.

Preprocessor Directives, Dynamic Memory Allocation, Command-Line Arguments.

TEXT BOOKS

1. C programming A Problem-Solving Approach by Behrouz A.Forouzan,E.V.Prasad,Richard F.Gilberg
2. The C Programming Language by Brian W. Kernighan, Dennis M. Ritchie

REFERENCES

1. Let Us C Yashavant kanetkar BPB
2. C How to Program Paul Deitel and Harvey Deitel , PH
3. Absolute beginner's guide to C, Greg M. Perry, Edition 2,Publisher: Sams Pub., 1994

I Year B.Tech ECE,EEE,EIE – I Sem	L	T/P/D	C
	3	3	4

(R11MED1105) ENGINEERING DRAWING

UNIT – I

Introduction to engineering graphics – construction of ellipse, parabola and hyperbola – cycloidal curves.

UNIT – II

Orthographic projections of points, lines and planes – axis inclined to one planes and inclined to both the planes.

UNIT – III

Orthographic projections of solids:

Cylinder, cone, prism, pyramid and sphere positions and axis inclined to both the planes.

UNIT – IV

Isomeric projections of lines, planes and simple solids.

UNIT – V

Conversion of orthographic views into isometric views and vice-versa.

TEXT BOOKS :

1. Engineering drawings By N.D.Bhatt.
2 Engineering graphics By K.L. Narayana and P.Kannayya.

REFERENCES:

1. Engineering drawing and graphics: Venugopal/ New age
2. Engineering drawing : Johle / TMH

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

(R11HAS1201) ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY-I

The English language Communication Skills Laboratory aims to provide practice in all the four skills of LSRW, and provide ample practice in listening and speaking skills.

Syllabus for Laboratory Sessions

Unit 1

Multimedia Laboratory

1. Phonetics
2. Listening Comprehension
3. Vocabulary Lesson 1

Oral Communication Skills Laboratory: Self Introduction ; E-mail

Unit 2

Multimedia Laboratory

1. Grammar ---Nouns and Pronouns; The Present Tense
2. Vocabulary Lesson 2
3. Listening Skills

Oral Communication Skills Laboratory: Role Play/ Situational Dialogues

Unit 3

Multimedia Laboratory

1. Telephoning Skills
2. Grammar --- Articles; The Past Tense
3. Vocabulary Lesson 3

Oral Communication Skills Laboratory: JAM/ Short Talk

Unit 4

Multimedia Laboratory

1. Grammar ---- Concord; The Future Tense
2. Vocabulary Lesson 4
3. Listening Comprehension

Oral Communication Skills Laboratory: Information Transfer

Unit 5

Multimedia Laboratory

1. Grammar --- Adjectives, adverbs, conjunctions
2. Vocabulary -- Lesson 5

Oral Communication Skills Laboratory : Presentation Skills

Multimedia Laboratory Requirements

The English Language Laboratory shall have two parts:

i) The Computer aided Language Laboratory for 60 students with 60 systems, one master console,

LAN facility and English language software for self- study by learners.

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

System Requirement (Hardware component):

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

iv) P – IV Processor

a) Speed – 2.8 GHZ

b) RAM – 512 MB Minimum

c) Hard Disk – 80 GB

v) Headphones of High quality

5. Suggested Software:

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

Suggested Software:

- Clarity Pronunciation Power – part II
- Oxford Advanced Learner's Compass, 7th Edition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL and GRE (KAPLAN, AARCO and BARRONS, USA, Cracking GRE by CLIFFS)

Multimedia Laboratory Requirements

Minimum Requirement:

The English Language Laboratory shall have two parts:

i) The Computer aided Language Laboratory for 60 students with 60 systems, one master console,

LAN facility and English language software for self- study by learners.

ii) The Communication Skills Laboratory with movable chairs and audio-visual aids with a P.A

System, a T. V., a digital stereo –audio and video system and camcorder etc.

System Requirement (Hardware component):

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

iv) P – IV Processor

a) Speed – 2.8 GHZ
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Clarity Pronunciation Power – part II
Oxford Advanced Learner's Compass, 7th Edition
DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
Lingua TOEFL CBT Insider, by Dreamtech
TOEFL and GRE (KAPLAN, AARCO and BARRONS, USA, Cracking GRE by CLIFFS)

I Year B.Tech ECE,EEE,EIE – I Sem	L	T/P/ D	C
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(R11MED1202) WORKSHOP PRACTICE
(10 + 6 Weeks)

TRADES FOR EXCERCISES
At least two exercises from each trade:

1. Carpentry
2. Tin-Smithy
3. Fitting
4. Welding
5. Electrical Wiring

1. Computer Hardware: Identification of Parts, Assembling and disassembling Simple diagnostic exercises -
2. Installation of Operating System: Windows , Linux – Basic Commands Simple diagnostic exercises .

TEXT BOOKS

1. Work shop Manual - P.Kannaiah/ K.L.Narayana, Scitech Publishers.
2. Workshop Manual by Venkat Reddy.
3. Engineering Workshop Practice – V Ramesh Babu, VRB Publishers Pvt. Ltd.
4. IT Essentials PC Hardware and Software Companion Guide Third Edition by Davis Anfinson and Ken Quamme – CISCO Press, Pearson Education.
3. PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft)

I Year B.Tech ECE,EEE,EIE – I Sem	L	T/P/ D	C
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(R11CSE1201) COMPUTER PROGRAMMING LABORATORY

Week 1

1. WAP that reads three different integers from the keyboard and prints – sum, average, product, smallest, largest of the numbers.
2. WAP that reads two integers and prints – difference, quotient and remainder
3. WAP that reads two integers and determines whether the first is a multiple of the other

Week 2

1. Write a C program to find the sum of individual digits of a positive integer.
2. Write a program to generate Fibonacci sequence (1, 1 ,2, 3, 5, 8,…)
3. 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

1. Write a C program to calculate the following Sum: Sum=1-x2/2! +x4/4!-x6/6!+x8/8!-x10/10!
2. Write a C program to find the roots of a quadratic equation.

Week 4

1. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
2. Write a C program to generate Pascal's triangle.
3. Write a C program to construct a pyramids of numbers

Week 5

1 WAP to print a given number [0-1000] in words. For example, 123 as One Hundred and Twenty Three

2 WAP to check whether a given number is an Armstrong, Palindrome, Perfect, Prime, or a Fibonacci prime Number

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

Week 6

1. Implementation of functions categories.
2. 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.

Week 7

1. Write a C program to calculate
   i) Minimum and maximum of an 1-d array
   ii) Sorting and Searching of 1-D array
   iii) Addition and Multiplication of Two Matrices

Week 8

1. Programs on String handling functions-Copying, reverse, substring, concatenation.
2. Programs on structure and unions.

Week 9

Midterm exam

Week 10

Programs using pointers- pointer basic operations, pointers and functions

Week 11

Program on pointers and structures, Pointers and arrays, pointers and strings.

Week 12

Implementation of file operations and error handling.

Week 13

Implementation of Dynamic memory allocation

Week 14

Programs using command line arguments.

Week 15

Implementation of preprocessor directives

Week 16

Internal Laboratory Exam

I Year B.Tech ECE,EEE,EIE – II Sem	L	T/P/D	C
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(R11EEE1101) CIRCUIT THEORY

Objective:

This course introduces the basic concepts of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline. The emphasis of this course is laid on the basic analysis of circuits which includes Magnetic circuits, Single phase circuits, Resonance, Network topology and Theorems.

UNIT–I Introduction to Electrical Circuits

Circuit Concept – R-L-C parameters – Voltage and Current sources – Independent and dependent sources-Source transformation – Voltage – Current relationship for passive elements (for different input signals-square, ramp, saw tooth, triangular). Kirchhoff's laws – network reduction techniques – series, parallel, series parallel, star-to-delta or delta-to-star transformation.

UNIT–II Magnetic Circuits

Magnetic Circuits – Faraday's laws of electromagnetic induction – concept of self and mutual inductance – dot convention – coefficient of coupling – composite magnetic circuit - Analysis of series and parallel magnetic circuits

UNIT–III Single Phase A.C Circuits

R.M.S and Average values and form factor for different periodic wave forms, Steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation – Concept of Reactance, Impedance, Susceptance and Admittance – Phase and Phase difference – concept of power factor, Real and Reactive powers – J-notation, Complex and Polar forms of representation, Complex power.

UNIT-IV Locus diagrams and Resonance

Locus diagrams – series R-L, R-C, R-L-C and parallel combination with variation of various parameters – Resonance – series, parallel circuits, concept of band width and Q factor.

UNIT–V Network topology and Network theorems

Definitions – Graph – Tree, Basic cutset and Basic Tieset matrices for planar networks – Nodal analysis, Mesh analysis, Super Node and Super Mesh analysis of Networks with Independent and Dependent voltage and current sources - Duality and Dual networks.

Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Tellegen's, Millman's and Compensation theorems for d.c. and a.c. excitations.

TEXT BOOKS:

1. Engineering circuit analysis by William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6th edition.
2. Network Analysis by A. Sudhakar, Shyammohan Palli, Mc Graw Hill Company,
3. Circuit Theory by A. Chakrabarti, Dhanipat Rai and Co., 6th edition.

REFERENCES:

1. Network Analysis by M. E Van valkenburg, PHI.
2. Linear circuit analysis (time domain phasor, and Laplace transform approaches) by RAYMOND A.DECARLO and PEN-MIN-LIN, Oxford University Press. Second edition 2004.
3. Network Theory: - N.C. Jagan and C.Lakshminarayana, B.S Publications.
4. Electrical Circuit theory by K. Rajeswaran, Pearson Education 2004.
5. Basic Circuit analysis by D.R, Cunningham and J.A Stuller, Jaico Publications.

I Year B.Tech ECE,EEE,EIE – II Sem	L	T/P/D	C
	3	1	3

(R11MTH1104) NUMERICAL ANALYSIS AND LINEAR PROGRAMMING

NUMERICAL ANALYSIS

UNIT I

Solutions of non-linear systems

Introduction; Mathematical preliminaries; Solution of algebraic and transcendental equations – the bisection method, the method of false position, the iteration method, Newton - Raphson method, and order of convergence.

UNIT II

Interpolation

Introduction; Errors in polynomial interpolation; Finite differences; Forward differences; Backward differences; Central differences; Symbolic relations and separation of symbols; Differences of a polynomial; Newton's formulae for interpolation; Central difference interpolation formulae; Gauss's central difference formulae; Lagrange and Hermite interpolation formulae; Cubic spline interpolation.

UNIT III

Numerical differentiation and Integration

Introduction; Differentiation of equally and unequally spaced data, and finite difference approximations; Trapezoidal rule, Simpson's 1/3 rule, and Simpson's 3/8 rule.

Numerical solutions of ordinary differential equations

Solution of initial value problems by Taylor's series - Picard's method of successive approximations, Euler's method, and Runge - Kutta methods; Predictor Corrector methods – Adams-Bashforth-Moulton method.

UNIT IV

Numerical solutions of partial differential equations (PDE)

Introduction; Classification of second order PDE; finite difference approximations to derivatives; Solution of Laplace and Poisson equation - Jacobi's method, Gauss-Seidal method by Leibmann's, Solution of parabolic equations (heat equation) by explicit and Crank Nicolson implicit scheme method; Solution of hyperbolic equations (wave equation).

LINEAR PROGRAMMING

UNIT V

Linear programming

Basic concepts; formulation of linear programming problem; constrained optimization-linear programming - simplex method, dual simplex method, and transportation problems.

TEXT BOOKS

1. Introduction to Numerical Analysis - S.S.Sastry, *PHI , 2010.*
2. Operations Research - Prem Kumar Gupta and D.S.Hira, *S.Chand,* 2003.

REFERENCES

1. Advanced Engineering Mathematics - Erwin Kreyszig, 8th Edition, *John Wiley and Sons.*
2. Advanced Engineering Mathematics - Peter V. O'Neil, 9th Edition, *Cengage Learning.*
3. Elementary Numerical Analysis – an algorithmic approach - Samuel D. Conte and Carl De Boor ,3rd edition,*Tata McGraw Hill,* 2006.
4. *Numerical Analysis - R.L Burden and J.D Faires, , 7th ediation, Thomson, 2007.*

I Year B.Tech ECE,EEE,EIE – II Sem	L	T/P/D	C
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(R11PHY1102) ENGINEERING PHYSICS-II

UNIT- I

ELEMENTS OF STATISTICAL MECHANICS: Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics (non mathematical treatment) – Photon gas –Planck's law of black body radiation – Deduction of Wein's law and Rayleigh-Jeans law from Plank's law.

PRINCIPLES OF QUANTUM MECHANICS: Waves and particles – De Broglie hypothesis - Matter waves - Davisson and Germer experiment –Heisenberg's uncertainty principle - Schrodinger Wave Equation – Wave function and its Physical Significance - Particle in one dimensional potential box(wave functions, probability densities and energy states).

UNIT - II

FREE ELECTRON FERMI GAS: Energy levels in one dimension, Effect of temperature on the Fermi-Dirac distribution, Free electron gas in three dimensions, electrical conductivity and Ohm's law, Electrical Resistivity of Metals (Qulitaitve), thermal conductivity of metals.

BAND THEORY OF SOLIDS: Electron in a periodic potential – Bloch Theorem - Kronig-Penney model (non mathematical treatment) – Origin of energy band formation in solids – Classification of materials into conductors, semiconductors and Insulators - Concept of effective mass of an electron.

UNIT- III

SEMICONDUCTOR PHYSICS: Fermi level in Intrinsic and Extrinsic semiconductors - Intrinsic semiconductor and carrier concentration – Extrinsic semiconductor and carrier concentration – Equation of continuity – Direct and indirect band gap semiconductors - Hall effect.

PHYSICS OF SEMICONDUCTOR DEVICES: Formation of p-n junction – open circuit p-n junction – Energy diagram of diode – i/v characteristics of p-n junction diode – p-n diode as a rectifier – Diode equation – LED

UNIT- IV

MAGNETIC PROPERTIES :Permeability, Field intensity, magnetic field induction, Magnetization and Magnetic susceptibility – Origin of magnetic moment, Bohr magneton – Classification of magnetic materials (Dia, Para and Ferro)- Domain theory of ferromagnetism, Hysteresis curve – Soft and Hard magnetic materials – properties of Anti ferro and Ferri magnetic materials – Ferrites and their applications.

UNIT V

SUPERCONDUCTORS:Experimental survey and superconductivity phenomenon, – Meissner effect – Critical fields and Persistent currents, Type I and Type II superconductors - London

equations- flux quantization, BCS theory, Josephson effect – High temperature Superconductors, Applications of Superconductors.

DIELECTRIC PROPERTIES:Electric dipole, Dipole moment, Dielectric constant, Electronic, Ionic and Orientation Polarization – Calculation of Polarizibilities – Internal fields – Claussius – Mossotti equation –Piezo and Ferro electricity

TEXT BOOKS:

1. Introduction to Solid State Physics by Charles Kittel (Publishers: John Wiley and Sons) for units 2 to 5
2. Concepts of Modern physics by Arthur Beiser, McGraw Hill Inc.
3. Applied Physics by P.K.Mittal, IK International Publishing House (P) Ltd

References

1. Solid State Physics by S.O.Pillai, New Age Publishers
2. Solid State Physics by A.J.Dekker; Macmillan Publishers India Ltd.
3. Engineering Physics by Dr M Chandra Shekar and Dr P. Appala Naidu, VGS Book links.
4. Solid State Physics by N.W.Ashcroft and N.David Merwin. Thomson Learning
5. Engineering Physics by G Sahashra Buddhe; University Press
6. Elements of Solid State Physics by J.P.Srivatsva, PHI Publishers
7. Engineering Physics by M.R.Srinivasan, New Age Publishers

I Year B.Tech ECE,EEE,EIE – II Sem	L	T/P/D	C
	3	0	3

(R11CHE1101) ENGINEERING CHEMISTRY

UNIT- I

Electrochemical cells and Batteries:

Cell representation, Galvanic cells, Single electrode potential, standard electrode potential, Electrochemical series, Nernst equation, Concentration cells. Reference electrodes – (Hydrogen, Calomel, Quinhydrone electrode), Ion Selective Electrodes (Glass Electrode and Flouride Electrode), Numerical problems.

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

UNIT- II

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

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

UNIT- III

Polymers:

III a).Polymers: Introduction, Types of Polymerization, Plastics: Thermoplastic resins and Thermoset resins. Compounding and fabrication of plastics, preparation, properties, engineering applications of: polyethylene, PVC, PS, Teflon, Bakelite, Nylon.

III b).Rubber: Characteristics and uses Rubber –Natural rubber, vulcanization. Elastomers – Buna-s, Butyl rubber, Thiokol rubbers, Fibers – polyester, Fiber reinforced plastics (FRP), applications.

UNIT- IV

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

UNIT- V

Nano-materials: Introduction, preparation and applications of nanomaterials with special reference to Carbon nano tubes.

Insulators: Classification of insulators, characteristics of thermal and electrical insulators and applications of Superconductors (Nb-Sn alloy, $YBa_2 Cu_3 O_{7-x}$).

TEXT BOOKS

1. Text book of Engineering Chemistry by Y.Bharathi Kumari, Jyotsna Cherukuri, VGS Book Links, Vijayawada.
2. Engineering Chemistry by P.C.Jain and Monica Jain, Dhanpatrai Publishing Company.

REFERENCES

1. Text book of Engineering Chemistry by S.S. Dhara and Mukkanti, S.Chand and Co. New Delhi.
2. Text book of Engineering Chemistry by C.P.Murthy, C.V.Agrawal, A.Naidu, B.S.Publications,Hyderabad.
3. Text book of Engineering Chemistry by R.Gopalan,D.Venkappayya,Sulochana Nagarajan, Vikas Publishers.

I Year B.Tech ECE,EEE,EIE – II Sem	L	T/P /D	C
	3	0	3

(R11CSE1102) DATA STRUCTURES

UNIT-1

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, circular linked list implementation, Double linked list implementation, insertion, deletion and searching operations. Applications of linked lists.

UNIT – 2

Stacks-Operations, array and linked representations of stacks, stack application-infix to postfix conversion, postfix expression evaluation, recursion implementation.

UNIT-3

Queues-operations, array and linked representations. Circular Queue operations, Dequeues, applications of queue.

UNIT-4

Trees – Definitions, Binary tree representation, Binary search tree, binary tree traversals.
Graphs – Definitions, Graph representations, Graph traversals.

UNIT-5

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

TEXT BOOKS:

1. C Programming and Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Data Structures Using C (Paperback) by Aaron M. Tenenbaum

REFERENCES:

1. Cand Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI
3. C Programming and Data Structures, E. Balagurusamy, TMH.
4. C Programming and Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
5. Cand Data structures – E V Prasad and N B Venkateswarlu, S. ChandandCo.

I Year B.Tech ECE,EEE,EIE – II Sem	L	T/P/D	C
	3	0	3

(R11CED1109) ENVIRONMENTAL STUDIES

UNIT-I

Introduction, Definition, scope and Importance

Ecosystems: Introduction, types, Classification of Eco system, structure and functions of ecosystems.

Bio-diversity and its conservation, Value of bio-diversity Bio-geographical classification of India – India as a mega diversity habitat, Threats to bio-diversity –Hot-spots of Bio Diversity, Conservation of bio-diversity.

UNIT-II

Natural Resources: Classification of Resources, Land resources, Land degradation, Soil erosion and desertification, Food resources, Effects of modern agriculture, fertilizer pesticide problems, Food miles, organic farming, Forest resources, Use and over-exploitation, Water resources, Dams –benefits, Conflicts over Water, Energy resources-sustainable Development, and Energy Audit

UNIT III

Environmental pollution and its control : Classification of pollution and pollutants, Air pollution, causes ,Effects ,Control measures, ambient air quality standards, water pollution causes , Effects ,Control measures, water and waste water treatment methods, water quality standards, Noise pollution causes ,Effects ,Control measures, land pollution causes ,Effects ,Control measures, solid waste disposal methods ,characteristics of e-waste and management

UNIT IV

Global Environmental problems and global Efforts: Nuclear hazards, Global warming, Acid rain, hurricanes, Hazardous Waste, Overpopulation , ozone layer depletion, Clean development mechanism , Green computing ,Green Building ,carbon credits, carbon trading

International conventions/protocols: Earth summit, Kyoto protocol and Montreal protocol, Stockholm Declaration

UNIT V

Environmental Impact Assessment and Environmental Management plan: Definition of impact, Classification of Impacts, Prediction of Impacts and Impact assessment Methodologies, Environmental Impact Statement, Environmental Management plan: Technological Solutions

TEXT BOOKS

1. Introduction to Environmental Science by Y.Anjaneyulu, BS Publications
2. Text book of Environmental studies by Deeksha dave, Cengage publishers
3. Text book of Environmental studies by M.Anji Reddy, BS Publications

REFERENCES

1. Text book of Environmental studies by Anuba Kaushik & C P Kaushik, Newage International Pvt.Limited
2. Text book of Environmental studies by S V S Rana, Rastogi Publications
3. Text book of Environmental studies by Dr. K Raghavan Nambiar, Scitech Publishers

I Year B.Tech ECE,EEE,EIE – II Sem

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(R11CSE1202) DATA STRUCTURES LABORATORY

WEEK1:

1. Write a program for creation, Search and Traversal of Single Linked List
2. Write a program to perform insertion and deletion operations in Single Linked List
3. Write a program to merge two single linked lists

WEEK2:

1. Write a program for creation, Search and Traversal of Circular Linked List
2. Write a program to perform insertion and deletion operations in Circular Linked List

WEEK 3:

1. Write a program for creation, Search and Traversal of Double Linked List
2. Write a program to perform insertion and deletion operations in Double Linked List

WEEK 4:

1. Write a program to implement stack using Arrays
2. Write a program to implement stack using Linked List

WEEK 5:

1. Write a program to convert infix expression to postfix expression using stack
2. Write a program to evaluate postfix expression

WEEK 6:

1. Write a program to implement recursion
2. Write a program to convert infix expression to prefix expression using stack

WEEK 7:

1. Write a program to implement Linear queue using Array
2. Write a program to implement Linear queue using Linked List

WEEK 8:

1. Write a program to implement insertions and deletions in a circular Queue
2. Write a program to perform search and count operations in a circular queue

WEEK 9:

1. Write a program to implement insertions and deletions in a Dequeue

2. Write a program to perform search and count operations in Dequeue

WEEK 10: Midterm Exam

Week 11:

1. Write a program to implement Linear search
2. Write a program to implement Binary Search

Week 12:

1. Write a program to implement Selection sort
2. Write a program to implement Bubble sort
3. Write a program to implement Insertion sort

WEEK 13:

1. Write a program to implement Merge sort
2. Write a program to implement Quick sort

WEEK 14:

1. Implementation of a binary tree representation using Arrays
2. Write a program to search an element, to print right and left children of every node in a tree

Weeks 15:

1. Implementation of a Graph representation using Adjacency Matrix
2. Write a program to print all adjacent nodes of every node in a graph

WEEK 16: Final Internal Laboratory Exam

I Year B.Tech ECE,EEE,EIE – II Sem	L	T/P/D	C
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(R11EPC1201) ENGINEERING PHYSICS LABORATORY

Any Eight Experiments from the following:

1. Dispersive Power of the material of a Prism using Spectrometer
2. Diffraction Grating (both with Laser and non-laser source)
3. Single Slit with laser light
4. Newton's Rings
5. Finding thickness of a thin wire or sheet by forming a wedgeshaped film
6. Energy gap of a semiconductor material
7. Torsional Pendulum Expt. to determine the rigidity modulus of material of a wire
8. Melde's experiment
9. Sonometer Experiment
10. Numerical Aperture and Acceptance angle of an optical fiber cable
11. Stewart Gee's experiment
12. Characteristics of LED.
13. Photo cell/ Solar Cell

Book: Essential Practical Laboratory Manual of Physics: by P.Raghavendra Rao

I Year B.Tech ECE,EEE,EIE – II Sem	L	T/P/D	C
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ENGINEERING CHEMISTRY LABORATORY

LIST OF EXPERIMENTS:

1. Titrimetry
   a) Estimation of hardness of water by EDTA method.
2. Instrumental methods

(i) Conductometry
   a) Conductometric titration of strong acid Vs Strong base

(ii) Colorimetry
   a) Estimation of copper by colorimetric method

(iii) Potentiometry
   a) Titration of strong acid Vs Strong base by potentiometry

3. Physical properties
   a) Determination of viscosity of sample oil by Redwood viscometer.
4. Preparation of organic compounds
   a) Preparation of aspirin or Thiokol rubber

TEXT BOOKS:

1. LABORATORY Manual on Engineering Chemistry by S.K.Bhasin and Sudha Rani,Dhanpat Rai Publishing Company.
2. LABORATORY Manual on Engineering Chemistry by Y.Bharathi Kumari, Jyotsna Cherukuri, VGS Book Links, Vijayawada.

I Year B.Tech ECE,EEE,EIE – II Sem	L	T/P/D	C
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(R11HAS1202) ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY -II

In continuation with the first Year I semester syllabus, this course offers further practice in Listening, Speaking, and Grammar in preparation for the advanced speaking and writing skills offered in the III Year .

Unit I

Multimedia Laboratory :

1. Listening Comprehension
2. Grammar -- Voice
3. Vocabulary Lesson 6

Oral Communication Skills Laboratory : Self Introduction

Unit 2

Multimedia Laboratory :

1. Grammar - Conditionals and Prepositions
2. Listening Comprehension
3. Vocabulary Lesson 7

Oral Communication Skills Laboratory :

1. Description of Objects 2. Description of Processes

Unit 3

Multimedia Laboratory :

1. Grammar -- Use of Subordinate Clauses; Phrasal Verbs; Idioms
2. Vocabulary Lesson 8

Oral Communication Skills Laboratory : Presentation Skills

Unit 4

Multimedia Laboratory :

1. Grammar -- Use of Substitution, Reference and Ellipsis
2. Listening Comprehension
3. Vocabulary Lesson 9

Oral Communication Skills Laboratory : Debate

Unit 5

Multimedia Laboratory :

1. Grammar --- Parallelism, Repetition, Nominalization
2. Vocabulary Lesson 10

Oral Communication Skills Laboratory : Group Discussions

II Year B.Tech EEE – I Sem	L	T/P/D	C
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(R11MTH1103) MATHEMATICS – III
(Partial Differential Equations and Integral Transforms)

PARTIAL DIFFERENTIAL EQUATIONS

UNIT I

Partial differential equations

Introduction and formation of partial differential equations by elimination of arbitrary constants and arbitrary functions; Solutions of first order linear (Lagrange's) equation and non-linear (standard type) equations; Method of separation of variables for second order equations; Particular integrals; Monge's method for solving $Rr + Ss + Tt = V$

INTEGRAL TRANSFROMS

UNIT II

Laplace transform

Laplace transform of standard functions; Inverse transform-first shifting theorem; Dirac's delta function; Convolution theorem; Periodic function; Differentiation and integration of transforms; Application of Laplace transforms to ordinary differential equations.

UNIT III

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 series sine and cosine expansions; Fourier integral theorem (only statement); Fourier sine and cosine integrals; Fourier transforms; Fourier sine and cosine transforms; Properties; Inverse transforms-finite Fourier transforms.

UNIT IV

Application of transform (Laplace and Fourier)

Solutions of wave equation, heat equation and Laplace equation and their use in problems of vibrating string; one dimensional unsteady heat flow; Two dimensional steady heat flow.

UNIT V

Z-Transform

z-transform; Inverse z-transform; Properties, initial, and final value theorems; Convolution theorem; Difference equations; Solutions of difference equations using z-transform.

TEXT BOOKS

1. Advanced Engineering Mathematics - R.K Jain and S.R.K Iyengar, 3rd edition, Narosa Publications, 2011.
2. Elements of Partial Differential Equations - Ian Naismith Sneddon, *Dover Publications.*

REFERENCES

1. Advanced Engineering Mathematics - Erwin Kreyszig, 8th Edition, *John Wiley.*
2. Advanced Engineering Mathematics - Peter V. O'Neil, 9th Edition, *Cengage Learning.*
3. Advanced Engineering Mathematics - Dennis G. Zill and Warren S. Wright, 4th edition, *Jones and Bartlett Learning*.

II Year B.Tech EEE – I Sem	L	T/P/D	C
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(R11MED1162) FUNDAMENTALS OF FLUID MECHANICS AND TURBOMACHINERY

UNIT I

Properties of fluids

Fundamentals of fluid flow

Introduction; Velocity of fluid particles; Types of fluid flow; Description of the flow pattern; Basic principles of fluid flow; Continuity equation; Acceleration of a fluid particle; Rotational and irrotational motions;

Equations of motion and energy equation

Introduction; Forces acting on fluid in motion; Euler's equation of motion; Integration of Euler's equation; Bernoulli's equation derived from the principle of conservation of energy; Kinetic energy correction factor; Bernoulli's equation for a compressible fluid; Pressure velocity relationship; Applications of Bernoulli's equation;

UNIT II

Impact of free jets

Introduction; Force exerted by fluids jet on stationary and moving plates – Flat plate normal to the jet, and flat plate inclined at an angle θ to the jet; Force exerted by fluid jet on stationary and moving curved vanes – jet striking a symmetrical curved vane at the center, and jet striking an unsymmetrical curved vane tangentially at one of the tips

Torque exerted on a wheel with radial curved vane.

UNIT III

Hydraulic turbines

Introduction; Elements of hydroelectric power plants; Head and efficiencies of hydraulic turbines; Classification of turbines; Pelton wheel; Work done and efficiencies of pelton wheel; Working proportions of Pelton wheel; Design of Pelton turbine runner; Work done and efficiencies of Pelton wheel; Working proportions of Pelton wheel; Design of Pelton turbine runner; Multiple jet Pelton wheel; Radial flow impulse turbine; Reaction turbines; Francis turbines; Work done and efficiencies of Francis turbine; Working proportions of Francis turbine; Design of Francis turbines runner; Draft tube theory; New types of turbines; Governing of turbines; Runaway of turbines; Surge tanks.

UNIT IV

Performance of turbines

Introduction; Performance under unit head – unit quantities; Performance under specific conditions; Expressions for specific speeds in terms of known coefficients for different

turbines; Performance characteristic curves; Model testing of turbines; Cavitation in turbines; Selection of turbines.

UNIT V

Water power engineering

Introduction; Hydroelectric power development in India and the world; Comparison of thermal and hydroelectric power costs; Assessment of available power; Storage and pondage; Types of hydropower plants; Typical hydroelectric developments of India; Firm (primary) and secondary power; Load factor, utilization factor, and capacity factor; Components of hydropower plants.

Flow measurement and laboratory experiments

Introduction; Fluid flow measurements; Flow visualization techniques; Writing reports

TEXT BOOK

1. Hydraulics and Fluid Mechanics including Hydraulic Machines *by* P.N.Modi and S.M.Seth.

REFERENCES

1. Fluid Mechanics (First SI Metric Edition) *by* V.L. Streeter and E.B. Wylie, *Publisher: McGraw Hill*.
2. Fluid Mechanics (Third edition; International Student Edition) *by* V.L. Streeter; *Publisher: McGraw Hill and Kogakusha*.
3. Fluid Mechanics *by* White.

II Year B.Tech EEE – I Sem	L	T/P/D	C
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(R11EEE1102) ELECTROMAGNETIC FIELD THEORY

UNIT – I

Electrostatics

Electrostatic Fields – Coulomb's Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge – Work done in moving a point charge in an electrostatic field – Electric Potential – Properties of potential function – Potential gradient – Gauss's law – Application of Gauss's Law – Maxwell's first law, div (D)=ρv Laplace's and Poison's equations – Solution of Laplace's equation in one variable.

UNIT – II

Conductors ,Dipole, Dielectric and Capacitance

Electric dipole – Dipole moment – potential and EFI due to an electric dipole – Torque on an Electric dipole in an electric field – Behavior of conductors in an electric field – Conductors and Insulators.

Electric field inside a dielectric material – polarization – Dielectric – Conductor and Dielectric – Dielectric boundary conditions, Capacitance – Capacitance of parallel plate and spherical and co-axial capacitors with composite dielectrics – Energy stored and energy density in a static electric field – Current density – conduction and Convection current densities – Ohm's law in point form – Equation of continuity.

UNIT – III

Magneto Statics

Static magnetic fields – Biot-Savart's law – Oesterd's experiment - Magnetic field intensity (MFI) – MFI due to a straight current carrying filament – MFI due to circular, square and solenoid current – Carrying wire – Relation between magnetic flux, magnetic flux density and MFI – Maxwell's second Equation, div(B)=0. Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament – Point form of Ampere's circuital law – Maxwell's third equation, Curl (H)=Jc,

UNIT – IV

Force in Magnetic fields and Magnetic Potential

Magnetic force - Moving charges in a Magnetic field – Lorentz force equation – force on a current element in a magnetic field – Force on a straight and a long current carrying conductor in a magnetic field – Force between two straight long and parallel current carrying conductors – Magnetic dipole and dipole moment – a differential current loop as a magnetic dipole – Torque on a current loop placed in a magnetic field

Scalar Magnetic potential and its limitations – vector magnetic potential and its properties – vector magnetic potential due to simple configurations – vector Poisson's equations.

Self and Mutual inductance – Neumans's formulae – determination of self-inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane – energy stored and density in a magnetic field. Introduction to permanent magnets, their characteristics and applications.

UNIT – V

Time Varying Fields

Time varying fields – Faraday's laws of electromagnetic induction – Its integral and point forms – Maxwell's fourth equation, Curl (E)=-∂B/∂t – Statically and Dynamically induced EMFs – Simple problems -Modification of Maxwell's equations for time varying fields – Displacement current – Poynting Theorem and Poynting vector.

TEXT BOOKS

1. "Engineering Electromagnetics" by William H. Hayt and John. A. Buck Mc. Graw-Hill Companies, 7th Editon.2006.
2. "Electro magnetic Fields" by Sadiku, Oxford Publications

REFERENCES

1. "Introduction to Electro Dynamics" by D J Griffiths, Prentice-Hall of India Pvt.Ltd, 2nd editon
2. "Electromagnetics" by J P Tewari, TMH Publications.
3. "Electromagnetics" by J. D Kraus Mc Graw-Hill Inc. 4th edition 1992.
4. "Electromagnetic fields", by S. Kamakshaiah, Right Publishers, 2007.

II Year B.Tech EEE – I Sem	L	T/P/D	C
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(R11EEE1103) ELECTRICAL MACHINES-I

UNIT-I

Electromechanical energy Conversion

Law of energy conservation- Need of Electromechanical energy Conversion-Definition of Generator and Motor-Coupling medium-Role-Electromagnetic machines-Electrostatic machines concept-Energy balance equation of a motor and generator-Singly excited electromagnetic systems-Energy-Coenergy- force expression-Multi excited systems-Torque expression-Problems

UNIT-II

D.C Generators-I

D.C generator-principle-simple loop generator-Construction-Homo polar and Hetero polar machines-differences-DC Armature Windings-Lap and Wave windings-Development-Differences-Simplex, Duplex and Triplex windings-Emf equation-Classification of D.C. Generators -self excitation-open circuit characteristics-critical resistance and critical speed-problems.

UNIT-III

D.C.Genarators-II

Armature Reaction-Effects-Distribution of Field mmf and Armature mmf-Demagnetising and Cross magnetizing AT/pole-Compensating Windings-Problems-Commutation-Methods of Improving Commutation-Generator Characteristics-Power Stages- Losses-Efficiency-Parallel Operation-Problems

UNIT-IV

D.C.Motor-I

D.C.Motor-Principle-Function of Commutator-Types-Back emf-Voltage Equation-Mechanical Power developed-Condition for maximum mechanical power developed-Torque equation-Motor characteristics-Power stages- Efficiency-Condition for maximum efficiency-problems.

UNIT-V

DC Motor-II

Speed control-Field and Armature control methods-Ward leonard system-starting of D.C.Motors-3 point and 4 point starters-Design of starter steps-problems-Testing of D.C.Machines: Brake Test-Swin-Burne's Test-Hopkinson's test-Field's Test-Retardation Test-Problems-concept of Electrical Braking [Elementary Treatment only].

TEXT BOOKS

1.Electrical Machines- A.E Fitzgerald, C.kingsely and S.Umans, MGH, 5th edition

2. Electric Machines-P.S. Bimbra-Khanna publishers

REFERENCES

1. Performance and Design of D.C machines- Clayton and Hancock, BPB publishers
2. Electrical machines- I.J Nagrath and B.P kothari, TMH Publishers, 3rd edition
3. Fundamentals of Electrical machinery by Stephen Chapman, TMH Publishers

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R11ECE1102) ELECTRONIC DEVICES AND CIRCUITS

UNIT I

p-n Junction Diode and Applications : Review of Semi Conductor Materials, Theory of p-n Junction, p-n Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of V-I characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis.

The p-n Junction as a rectifier, Half wave Rectifier, Full wave rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor filters, Capacitor filters, L-Section Filters, Π- section filters, Comparison of Regulation Characteristics of different Filters, Breakdown Mechanisms in Semi Conductor Diodes, Zener Diode Characteristics, Shunt Voltage Regulation using Zener Diode. Principle of series voltage regulators.

UNIT II

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

Quiescent operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector-Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against variations in $V_{BE,}$ β_1 and I_{CO}. Bias Compensation using Diodes and Transistors, Thermal Runway, Thermal Stability.

UNIT III

Small signal low frequency BJT Amplifiers: Small signal low frequency transistor amplifier circuits: h-parameter representation of a transistor, Analysis of single stage transistor amplifiers CE, CC, CB configurations using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of CB, CE, CC configurations in terms of A_I, R_i, A_V, R_O.

UNIT IV

FET, Biasing and Amplifiers : The Junction Field Effect Transistor (Construction, Principle of operation) – Pinch-off Voltage-Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET (Construction, Principle of operation), MOSFET Characteristics in Enhancement and Depletion modes. FET Common Source Amplifier, Common Drain Amplifier, Generalized

FET Amplifier, Biasing FET, FET as Voltage Variable Resistor. Comparison of BJT and FET amplifiers.

UNIT V

Special Purpose Electronic Devices : Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram), Varactor Diode and schotky barrier diode. Principle of Operation and Characteristics of UJT, UJT Relaxation Oscillator. Principle of Operation of SCR, Diac and Triac. Principle of Operation of Semiconductor Photo Diode, PIN Diode ,Photo Transistor ,LED and LCD.

TEXT BOOKS

1. Electronic Devices and Circuits – J.Millman, C.C.Halkias, and Satyabratha Jit, Tata McGraw Hill, 2nd Edition, 2007.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 9th Edition, 2006.
3. Introduction to Electronic Devices and Circuits - Rober . T. Paynter, 7th Edition, PE, 2009.

REFERENCES

1. Integrated Electronics - J.Millman and Christos.C.Halkias, and Satyabratha, Jit Tata McGraw Hill, 2nd Edition, 2008.
2. Electronic Devices and Circuits – T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, 6th Edition, 2004.
3. Electronic Devices and Circuits- S. S Salivahanan, N. Sursh Kumar, A. Vallava Raju,2nd Edition., TMH, 2010.
4. Electronic Devices and Circuits – Dr. K. Lal Kishore, B.S. Publications, 2nd Edition, 2005.

II Year B.Tech EEE – I Sem	L	T/P/D	C
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(R11EEE1104) NETWORK ANAYSIS

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 and Unbalanced 3 phase circuits – Measurement of Active and Reactive Power- Different methods-Problems

UNIT–II

Transient Analysis

Transient response of R-L, R-C, R-L-C circuits (Series and parallel combinations) for d.c. and sinusoidal excitations – Initial conditions - Solution using differential equation approach and Laplace transforms.

UNIT–III

Network Functions

The Complex Frequency- concept -Physical interpretation - Transform Impedance and Transform Circuits, Series and parallel Combination of Elements, Terminal Pairs or Ports, Network Functions for One-port and Two-port, Poles and Zeros of Network Functions, Significance of poles and Zeros, Properties of Driving Point Functions, Properties of Transfer functions, Necessary Conditions for Transfer Functions, Time Domain Response from Pole Zero Plot.

UNIT–IV

Network Parameters

Impedance parameters, Admittance parameters, Hybrid parameters, Transmission (ABCD) parameters, conversion of Parameters from one form to other, Conditions for Reciprocity and Symmetry, Interconnection of Two Port networks in Series, Parallel and Cascaded configurations, Image Parameters, Illustrative problems.

UNIT–V

Fourier analysis of A. C. Circuits and Filters

The Fourier theorem, consideration of symmetry, exponential form of Fourier series, line spectra and phase angle spectra, Fourier integrals and Fourier transforms, properties of Fourier transforms, Application to Electrical Systems.

Low pass, High pass, Band pass, Band elimination, Prototype filter design

TEXT BOOKS

1. Engineering circuit analysis by William Hayt and Jack E. Kemmerly, Mc Graw Hill Publications, 6th edition.
2. Network Analysis by A. Sudhakar, Shyammohan Palli, Mc Graw Hill Publications.
3. Network Analysis by M. E Van valkenburg, PHI.

REFERENCES

1. Circuit Theory by A. Chakrabarti, Dhanipat Rai and Co., 6th edition.
2. Electric circuit analysis by B. Subrahmanyam, I. K international.
3. Electric circuit analysis by C. L. Wadhwa, New Age international.
4. Electrical Circuits by David A. Bell, Oxford University press.
5. Basic circuit analysis by D. R, Cunningham and J. A Stuller, Jaico Publications.
6. Electrical Circuit theory by K. Rajeswaran, Pearson Education 2004.
7. Network Theory and Filter Design by Vasudev K. Aatre, Eastern Wiley Publishers, 1993.
8. Schaum's Outline of Electric Circuits, Fifth Edition.

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(R11EEE1201) ELECTRICAL CIRCUITS AND SIMULATION LABORATORY

PART-A: ELECTRICAL CIRCUITS

1) Verification of Thevenin's, Norton's and Maximum Power Transfer Theorems
2) Verification of Superposition theorem and RMS value of complex wave
3) Verification of Compensation Theorem
4) Verification of Reciprocity and Millmann's Theorems
5) Locus Diagrams of RL and RC Series Circuits
6) Series and Parallel Resonance
7) Determination of Self, Mutual Inductances and Coefficient of coupling
8) Z and Y Parameters
9) Transmission and hybrid parameters
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

PART-B: PSPICE SIMULATION

1) Simulation of DC Circuits
2) DC Transient response
3) AC Transient response
4) Mesh Analysis
5) Nodal Analysis
6) Thevinen's Theorem verification
7) Measurement of active Power of three phase circuit for balanced and unbalanced load
8) Determination of Regulation of a Single Phase Transformer

NOTE:

- PSPICE Software Package is necessary.
- Eight experiments are to be conducted from PART-A and any Four from PART-B

VNR Vignana Jyothi Institute of Engineering and Technology

II Year B.Tech EEE – I Sem	L	T/P/D	C
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(R11MED1212) FLUID MECHANICS AND HYDRAULIC MACHINERY AND ELECTRONIC DEVICES LABORATORY

List of Experiments

FLUID MECHANICS AND HYDRAULIC MACHINERY LABORATORY

1. Verification of Bernoulli's Theorem
2. Calibration of Venturimeter and Orificemeter
3. Calculation of Frictional losses in a given pipe line
4. Performance test on Pelton Wheel
5. Performance Test on Francis Turbine
6. Performance Test on Centrifugal Pump
7. Performance Test on Kaplan Turbine
8. Performance Test on Reciprocating Pump

ELECTRONIC DEVICES LABORATORY

1. Forward and Reverse Bias characteristics on PN junction Diode.
2. Zener diode characteristics and Zener as voltage regulator.
3. Half Wave, Full wave and Bridge Rectifier with and without filters.
4. Characteristics of a BJT under CE configuration and calculation of h-parameters.
5. Characteristics of a BJT under CC configuration and calculation of h-parameters.
6. Characteristics of a BJT under CB configuration and calculation of h-parameters.
7. FET characteristics under CS configuration.
8. UJT characteristics and Relaxation Oscillator

Any 10 experiments Five experiments from each part are to be conducted

II Year B.Tech EEE – II Sem	L	T/P/D	C
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(R11ECE1103) SWITCHING THEORY AND LOGIC DESIGN

UNIT I

Number Systems And Codes: Philosophy of Number Systems Complement Representation of Negative Numbers , Binary Arithmetic, Binary Codes, Error Detecting and Error Correcting Codes, Hamming Codes.

Boolean Algebra and Switching Functions: Fundamental Postulates of Boolean Algebra. Basic theorems and Properties , Switching Functions, Canonical and Standard forms , Algebra Simplification, Digital Logic Gates, Universal Gates, Multilevel NAND/NOR Realizations.

UNIT II

Minimization of Switching Functions: K-map method , Prime Implicants , Don't care Combinations , Minimal SOP and POS forms, Tabular Method ,Prime Implicant chart, Simplification rules.

Combinational Logic Design: Design using Conventional logic gates, Encoder, Decoder, Multiplexer, De- Multiplexer, Modular Design using IC Chips, Design of code converters, Parity bit generator, Hazards and Hazard free Realizations.

UNIT III

Sequential Circuits – I: Classification of Sequential circuits (Synchronous, Asynchronous, Plus mode, Level mode with examples), Basic Flip-Flops, Triggering and Excitation tables, Flip-Flop conversions, Steps in Synchronous Sequential circuit Design, shift registers and their applications, Design of counters, Serial Binary Adder, Sequence detector.

UNIT IV

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

UNIT V

Programmable Logic Devices: Basic PLD's: ROM, PROM, PLA, PAL, Realization of Switching functions using PLD's.

Algorithmic State Machines : Salient features of the ASM chart, Simple examples, System Design using data path and control subsystems , Control Implementations, ASM charts for Flip-Flop's, Examples of Dice Game and Binary Multiplier.

TEXT BOOKS:

1 Switching and Finite Automata Theory- Zvi Kohavi, 2nd Edition, TMH.
2 Degital Design – Morris Mano, 3rd Edition, PHI, 2006.
3 Switching Theory and Logic Design – A. Anand Kumar, PHI , 2008

REFERENCES:

1. An Engineering Approach to Digital Design – Fletcher, PHI.
2. Fundamentals of Logic Design – Charles H, Roth, 5th Edition, Thomson Publications, 2004.
3. Digital Logic Applications and Design – John M. Yarbrough, Thomson Publications, 2006
4. Modern Digital Electronics – R.P. Jain, 4th Edition.

II Year B.Tech EEE – II Sem	L	T/P/D	C
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(R11EEE1106) CONTROL SYSTEMS

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 AND TIME RESPONSE ANALYSIS

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.
Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.
UNIT –III
STABILITY ANALYSIS IN S-DOMAIN
The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability

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

UNIT – IV

FREQUENCY RESPONSE AND STABILITY ANALYSIS IN FREQUENCY DOMAIN

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.

UNIT – V

CLASSICAL CONTROL DESIGN TECHNIQUES AND STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS

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

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

REFERENCES

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 and Control Of Dynamic Systems" by Narciso F. Macia George J. Thaler, Thomson Publishers.

II Year B.Tech EEE – II Sem	L	T/P/D	C
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(R11HAS1102) BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

UNIT I

Business and new economic environment

Characteristic features of business; Features and evaluation of sole proprietorship; Partnership; Joint stock company; Public enterprises and their types; Changing business environment in post- liberalization scenario.

UNIT II

Introduction to business economics, and demand analysis

Definition; Nature and scope of managerial economics - demand analysis determinants; Law of demand and its exceptions.

Elasticity of demand and demand forecasting

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, and judgmental approach to demand forecasting.

UNIT III

Cost analysis

Cost concepts - opportunity cost, fixed vs. variable costs, explicit costs vs. implicit costs, and out of pocket costs vs. imputed costs; Break-even analysis (BEA) - determination of break-even point (simple problems), managerial significance, and limitations of BEA.

Capital and capital budgeting

Capital and its significance; Types of capital; Estimation of fixed and working capital requirements; Methods and sources of raising finance.

Nature and scope of capital budgeting; Features of capital budgeting proposals; Methods of capital budgeting - payback method, accounting rate of return (ARR), and net present value method (simple problems)

UNIT IV

Theory of production

Production function - isoquants and isocosts, least cost combination of inputs, and laws of returns; Internal and external economics of scale.

Market structures

Types of competition; Features of perfect competition, monopoly, and monopolistic competition; Price-output determination in case of perfect competition and monopoly.

Pricing policies and methods

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.

UNI T V

Introduction to financial accounting

Double-entry book keeping; Journal; Ledger; Trial balance; Final accounts - trading account, profit and loss account, and balance sheet with simple adjustments.

Financial analysis through ratios

Computation; Analysis and interpretation of liquidity ratios - current ratio, and quick ratio; Activity ratios - inventory turnover ratio, and debtor turnover ratio; Capital structure ratios – debt-equity ratio, and interest coverage ratio; Profitability ratios - gross profit ratio, net profit ratio, operating ratio, P/E ratio, and EPs.

TEXT BOOK

1. Managerial Economics and Financial Analysis *by* Aryasri, 2009; *Publisher: Tata McGraw Hill*.
2. Managerial Economics *by* Varshney & Maheswari, 2009; *Publisher: Sultan Chand*.

REFERENCES

1. Financial Accounting for Management: An analytical perspective *by* Ambrish Gupta, 2010; *Publisher: Pearson Education*.
2. Managerial Economics *by* H. Craig Peterson & W. Cris Lewis; *Publisher: Prentice Hall of India*.

II Year B.Tech EEE – II Sem	L	T/P/D	C
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(R11EEE1107) POWER SYSTEMS-I

Objective

Electrical Power plays significant role in day to day life of entire mankind. This course concerns the generation and distribution of power along with the economic aspects.

UNIT-I

Introduction and Hydro Power Plants

General discussion on various types of conventional and non-conventional power Generation

Hydro-Electric Stations-Choice of site, arrangement of hydroelectric installations, Hydrology, Mass curve, flow duration curve, water storage, classification of hydro electric plants, pumped storage plants, operating cost of hydroelectric station, tidal power generation, mini-micro hydro power systems

UNIT-II

Thermal and Nuclear Power Stations

Line diagram of Thermal Power Station (TPS) 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.

UNIT-III

Gas and Non Conventional Power Generation

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

Non conventional Power generation (Elementary treatment only) : Solar Radiation, Solar Energy Collectors, Energy Resources, Solar Cell, Wind Power Stations, Geo thermal and Tidal Power generation.

UNIT-IV

General Aspects of Distribution Systems and D.C. and A.C Distribution Systems

Substation Layouts (Air and Gas Insulated) - Classification of Distribution Systems - Comparison of DC vs. AC and Under-Ground vs. Over - Head Distribution Systems-Requirements and Design features of Distribution Systems-Voltage Drop Calculations (Numerical Problems) in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at both the ends (equal/unequal Voltages) and Ring Main Distributor. Voltage Drop Calculations (Numerical Problems) in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.

UNIT-V

Economic Aspects of Power Plants

Economic Aspects of Power Plant Operation-Fixed charges, interest and depreciation charges, methods of depreciation, straight line and sinking fund methods, different tariffs, effect of load factor, demand and diversity factors, power factor improvement. Optimal design of shunt capacitors for the power factor improvement- problems.

TEXT BOOKS

1. Generation and utilization of Electrical Energy – C.L.Wadhawa, New age International (P) Limited, Publishers 1997.
2. Electrical Power Systems by C.L.Wadhawa, 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, Dhanpat Rai and Co. Pvt. Ltd., 1999.

REFERENCES

1. Elements of Power Station design and practice by M.V. Deshpande, Wheeler Publishing.
2. Electrical Power Generation, Transmission and Distribution by S.N.Singh., PHI, 2003.
3. Gas turbine performance, by PP Wals, P.Fletcher, Blackwell Publisher, 2004.

VNR Vignana Jyothi Institute of Engineering and Technology

II Year B.Tech EEE – II Sem	L	T/P/D	C
	3	1	3

(R11ECE1131) ELECTRONIC CIRCUITS

UNIT –I

Multi Stage Amplifiers : Multi Stage, Amplifiers Methods of Inter Stage Coupling, n – Stage Cascaded Amplifier, Equivalent Circuits, Miller's Theorem, Frequency Effects, Amplifier Analysis, Transistor Circuits. Cascade – Transistor Configuration, CE-CC Amplifiers (Darlington Pair), Two Stage RC Coupled JFET amplifier (in Common Source configuration), Difference Amplifier.

BJT and FET FREQUENCY RESPONSE

Logarithms- Decibels- General frequency consideration- Low frequency response of BJT amplifiers – Low frequency response of FET amplifier- Miller effect capacitance – High frequency response of BJT amplifier

UNIT – II

FEEDBACK AMPLIFIERS

Concept of feedback, Classification of feedback amplifiers, General characteristics of negative 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 wein- bridge oscillators.

UNIT-III

LARGE SIGNAL AMPLIIFERS

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, square and ramp inputs.

UNIT –I V

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, saturation parameters of Transistor and their variation with temperature, Design of transistor switch, transistor- switching times.

UNIT – V MULTIVIBRATORS

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

TEXT BOOKS:

1. Electronic Device 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.

REFERENCES:

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

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(R11EEE1108) ELECTRICAL MACHINES – II

UNIT – I

Transformers-I

Transformer principle-Need of Transformer-construction-core type-shell type-Emf equation-core losses-Dependency of core losses on frequency-Transformer on No-load-phasor diagram-Excitation phenomenon-Inrush currents-Ideal Transformer on load-Real Transformers on load-phasor diagrams-leakage reactance-Equivalent circuit diagram

UNIT – II

Transformers-II

Voltage Regulation-Dependency of voltage Regulation on load power factor-losses-Efficiency-Condition for maximum efficiency-Maximum efficiency of Power and Distribution Transformers-Testing of Transformers-OC Test-SC Test- Polarity Test -Sumpners Test - Auto Transformer – Equivalent Circuit- All day efficiency.

UNIT – III

Parallel operation and Three Phase Transformers

Construction of three phase transformer -Polyphase connections - Y/Y, Y/Δ, Δ/Y, Δ/Δ and open Δ, Zig-Zag Connections - Third harmonics in phase voltages-three winding transformers-tertiary windings- Scott connection - Parallel operation –conditions-problems-ON load tap changer, OFF load tap changer -cooling of a transformer.

UNIT – IV

Poly Phase Induction Motors-I

Three phase induction motors - construction – Types of rotor – Rotating Magnetic field – Principle of operation – Slip – Rotor frequency – Rotor Equivalent Circuit – Rotor Input – Mechanical Power developed- Complete equivalent circuit –Phasor diagrams at starting and running conditions – Losses and power flow –Efficiency- Torque Equation – Starting and maximum torque – Torque Slip Characteristics – Deep bar and double cage rotors.

UNIT – V

Poly phase Induction Motors-II

Circle diagram-No load and Blocked rotor tests-Performance Analysis from circle diagram – starting of Induction motors – Different Starters – Speed control – Control from stator and rotor sides – Crawling and cogging – Induction Generator.

TEXT BOOKS

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

REFERENCES

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 and D.P.Kothari,Tata Mc Graw Hill, 7th Edition.2005
4. Electromechanics-II (transformers and induction motors) S. Kamakashaiah Hitech publishers.

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(R11EEE1204) ELECTRICAL MACHINES-I LABORATORY

CYCLE –I

1. Swinburne's Test and Brake test on D.C.Shunt Machine
2. Magnetization characteristics of DC Shunt Generator
3. Load Test on D.C.Shunt Generator
4. Magnetization Characteristics Of D.C.Series Generator
5. Hopkinson's Test on a Pair of Identical D.C. Shunt Machines
6. Speed Control of D.C.Shunt Motor
7. Separation of Losses of a D.C.Machine

CYCLE –II

1. Load Test on D.C.Series Generator
2. No-Load and Load Characteristics' of D.C.Compound Generator
3. OC and SC Tests on 1-phase Transformer
4. Field's Test on a Pair of Identical D.C. Series Machines
5. Load Test on 1-phase Transformer
6. Retardation Test on D.C.Shunt Motor

Additional Experiments

1. Brake Test on D.C.Compound Motor
2. Ward Leonard Speed Control of D.C.Shunt Motor
3. No-load and Load Characteristics of Separately Excited D.C.Generator

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(R11ECE1209) ELECTRONIC CIRCUITS LABORATORY

1. Frequency response of CE Amplifier.
2. Frequency response of CC Amplifier.
3. Frequency response of FET Amplifier.
4. Linear wave shaping.
5. Non Linear wave shaping – Clippers.
6. Non Linear wave shaping – Clampers.
7. Transistor as a switch.
8. Study of Logic Gates and Some applications.
9. Study of Flip-Flops and some applications.
10. Astable Multivibrator.
11. Monostable Multivibrator.
12. Bistable Multivibrator
13. Hartley Oscillator

Any Ten of the above experiments are to be conducted.

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(R11ECE1108) MICROPROCESSORS AND MICROCONTROLLERS

UNIT I

Introduction to 8085 Microprocessor, Architecture of 8086 Microprocessor, Addressing modes of 8086, Instruction set of 8086, Assembler directives, simple assembly language programs, procedures, and macros. Pin diagram of 8086-Minimum mode and maximum mode of operation. Memory and I/O organization of 8086.

UNIT II

8255 PPI – various modes of operation and interfacing to 8086. Interfacing Keyboard and Displays, D/A and A/D converter to 8086 using 8255, memory interfacing to 8086, Interfacing 8257 DMA Controller to 8086.

UNIT III

Serial Communication standards, serial data transfer schemes, 8251 USART architecture and interfacing, RS-232, IEEE 488 standards. Interrupt structure of 8086, Interrupt Vector Table. Need for 8259 Programmable Interrupt Controller.

UNIT IV

Introduction to Microcontrollers, 8051 Microcontroller Architecture, I/O ports, memory organization, counters and Timers, Serial data Input/Output, Interrupts. Addressing modes, Instruction set of 8051, Simple programs.

Timer, serial port and Interrupts programming: Programming 8051 timers/counters, 8051 serial port programming, programming timer interrupts, programming External hardware interrupts, programming serial communication interrupts.

UNIT V

The AVR RISC microcontroller architecture: Introduction, AVR family architecture, Register File, The ALU, Memory access and Instruction execution, I/O memory, EEPROM, I/O ports, Timers, UART, Interrupt structure.

TEXT BOOKS

1. Microprocessors and interfacing – Douglas V. Hall, TMH, 2nd Edition, 1999.
2. 8051 Microcontroller – Kenneth J. Ayala, Penram International/ Thomson, 3rd Edition.
3. The 8051 microcontrollers and Embedded systems- Mazidi and mazidi, PHI, 2000.

REFERENCES

1. Micro computer systems, The 8086/8088 Family Architecture, Programming and Design – Y.Liu and G.A. Gibson, PHI, 2nd edition.
2. Advanced microprocessors and Peripherals – A.K.Ray and K.M.Bhurchandi, TMH, 2000.
3. Micro Computer System 8086/8088 Family Architecture Programming and Design – By Liu and GA Gibson PHI, 2nd Edition
4. Microcontrollers and Applications, Ajay V. Deshmukh, TMGH, 2005.
5. The 8085 Microprocessor : Architecture Programming and Interfacing – K.Uday Kumar, B.S Umashankar, Pearson, 2008.

III Year B.Tech EEE – I sem	L	T/P/D	C
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(R11EIE1106) LINEAR AND DIGITAL IC APPLICATIONS

UNIT I

INTEGRATED CIRCUITS

Classification, chip size and circuit complexity, basic information of Op-amp, ideal and practical Op-amp, internal circuits, Op-amp characteristics, DC and AC characteristics, 741 op-amp and its features, modes of operation-inverting, non-inverting, differential.

OP-AMP APPLICATIONS

Basic application of Op-amp, instrumentation amplifier, ac amplifier, V to I and I to V converters, sample and hold circuits, Instrumentation amplifier, Log and antilog amplifier, Precision rectifiers, Differentiators, Integrators, and comparators, sample and hold circuits..

UNIT II

ACTIVE FILTERS and OSCILLATORS

Introduction, 1st order LPF, HPF filters. Band pass, Band reject and all pass filters. Oscillator types and principle of operation – RC, Wien and quadrature type, waveform generators – triangular, sawtooth, square wave and VCO. Comparators.

UNIT III

SPECIAL ICs

Introduction to 555 timer, functional diagram, monostable and astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks of 565, introduction to voltage regulators, series voltage regulator , shunt voltage regulator and IC 723 Voltage Regulator.

D-A AND A- D CONVERTERS

Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC. DAC and ADC specifications.

UNIT IV

LOGIC FAMILIES

Classification of Integrated circuits, standard TTL NAND Gate- Analysis and characteristics, TTL open collector O/Ps, Tristate TTL, MOS and CMOS open drain and tristate outputs, CMOS transmission gate, IC interfacing- TTL driving CMOS and CMOS driving TTL .

UNIT V

DIGITAL CIRCUIT DESIGN

Design using TTL-74XX and CMOS 40XX series, code converters, decoders, Demultiplexers, decoders and drives for LED and LCD display. Encoder, priority Encoder, multiplexers and their applications, priority generators/checker circuits. Digital arithmetic circuits-parallel binary adder/subtractor circuits using 2's, Complement system. Digital comparator circuits.

SEQUENTIAL CIRCUITS

Design of synchronous counters, Decade counter, shift registers and applications using TTL-74XX and CMOS 40XX series, familiarities with commonly available 74XX and CMOS 40XX series of IC counters.

Memories: ROM architecture, types and applications, RAM architecture, Static and Dynamic RAMs, synchronous DRAMs.

TEXT BOOKS

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

REFERENCES:

1.Operational Amplifiers and Linear Integrated Circuits – R.F. Coughlin and Fredrick F. Driscoll, PHI, 1977.
2.Operational Amplifiers and Linear Integrated Circuits: Theory and Applications –Denton J. Daibey, TMH.
3.Design with Operational Amplifiers and Analog Integrated Circuits - Sergio Franco, McGraw Hill, 3rd Edition, 2002.
4. Op Amps and Linear Integrated Circuits: Concepts and Applications, Fiore,Cengage Publications.
5. Operational Amplifiers and Linear Integrated Circuits by K.Lal Kishore- Pearson education,2008.

III Year B.Tech EEE – I sem	L	T/P/D	C
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(R11EEE1109)POWER SYSTEMS-II

Objective :

This course is an extension of Power systems-I course. It deals with basic theory of transmission lines modeling and their performance analysis. Also this course gives emphasis on mechanical design of transmission lines, cables and insulators.

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 and GMD, symmetrical and asymmetrical conductor configuration with and without transposition, Numerical Problems.

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 Problems.

UNIT-II

Performance of Short and Medium Length Transmission Lines and Long Transmission Lines

Classification of Transmission Lines - Short, medium and long line and their model representations - Nominal-T, Nominal-Pie and A, B, C, D Constants for symmetrical and Asymmetrical Networks, Numerical Problems.

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

Long Transmission Line-Rigorous Solution, evaluation of A,B,C,D Constants, Interpretation of the Long Line Equations, Incident, Reflected and Refracted Waves -Surge Impedance and SIL of Long Lines, Wave Length and Velocity of Propagation of Waves - Representation of Long Lines - Equivalent-T and Equivalent Pie network models (numerical problems).

UNIT – III

Power System Transients and Various Factors Governing the Performance of Transmission line

Types of System Transients - 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 (Numerical Problems). Bewley's Lattice Diagrams (for all the cases mentioned with numerical examples).

Skin and Proximity effects - Description and effect on Resistance of Solid Conductors -

Ferranti effect - Charging Current - Effect on Regulation of the Transmission Line, Shunt Compensation.

Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference.

UNIT-IV

Overhead Line Insulators and Sag and Tension Calculations

Types of Insulators including polymeric insulators, String efficiency and Methods for improvement, Numerical Problems - voltage distribution, calculation of string efficiency, Capacitance grading and Static Shielding. Sag and Tension Calculations with equal and unequal heights of towers, Effect of Wind and Ice on weight of Conductor, Numerical Problems - Stringing chart and sag template and its applications.

UNIT-V

Underground Cables

Types of Cables, Construction, Types of Insulating materials, Calculations of Insulation resistance and stress in insulation, Numerical Problems.

Capacitance of Single and 3-Core belted cables, Numerical Problems.

Grading of Cables - Capacitance grading, Numerical Problems, Description of Inter-sheath grading. Cable Jointing, stressscons and Grading

TEXT BOOKS

1. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A.Chakrabarthy, Dhanpat Rai and Co Pvt. Ltd.
2. Electrical power systems - by C.L.Wadhwa, New Age International (P) Limited, Publishers,1998.
3. Power System Engineering by I.J.Nagaraj and D.P.Kothari, Tata McGraw Hill.

REFERENCES

1. Power system Analysis-by John J Grainger William D Stevenson, TMC Companies, 4th edition
2. Power System Analysis and Design by B.R.Gupta, Wheeler Publishing.
3. Power System Analysis by Hadi Saadat – TMH Edition.
4. Modern Power System Analysis by I.J.Nagaraj and D.P.Kothari, Tata McGraw Hill, 2nd Edition.

III Year B.Tech EEE – I sem	L	T/P/D	C
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(R11EEE1110) POWER ELECTRONICS

UNIT-I

Introduction to Power Electronics:

Thyristors – Silicon Controlled Rectifiers (SCR's) – BJT – Power MOSFET – Power IGBT and their characteristics and other thyristors – Basic theory of operation of SCR – Static characteristics – Turn on and turn off methods- Dynamic characteristics of SCR - Turn on and Turn off times -Salient points .

Two transistor analogy-SCR-UJT firing circuit – Series and parallel connections of SCR's – Snubber circuit details – Specifications and Ratings of SCR's, Numerical problems – Line Commutation and Forced Commutation circuits.

UNIT-II

Single Phase Controlled Converters:

Single Phase Half Controlled Converters: Phase control technique – Single phase line commutated converters – Midpoint and Bridge connections – Half controlled converters with Resistive, RL loads and RLE load – Derivation of average load voltage and current – Active and Reactive power inputs to the converters without and with Freewheeling Diode –Numerical problems

Single Phase Fully controlled Converters: Fully controlled converters, Midpoint and Bridge connections with Resistive, RL loads and RLE load- Derivation of average load voltage and current – Line commutated inverters- Active and Reactive power inputs to the converters, Effect of source inductance – Derivation of load voltage and current- Numerical problems.

UNIT-III

Three Phase line Commutated Converters: Three phase converters – Three pulse and six pulse converters – Midpoint and bridge connections average load voltage with R and RL loads – Effect of Source inductance – Dual converters (both single phase and three phase)- Waveforms – Numerical Problems.

Choppers: Time ratio control and Current limit control strategies – Step down choppers- Derivation of load voltage and current with R, RL, and RLE loads- Step up chopper – load voltage expression- Jones chopper - Principle of operation and Waveforms - Numerical Problems.

UNIT-IV

AC Voltage Controllers and 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 – Firing circuits – Numerical problems – Cyclo converters – Single phase midpoint cyclo converters with Resistive and inductive load (Principle of operation only)-Bridge configuration of single phase cyclo converter (Principle of operation) – Wave forms

UNIT-V

Inverters:

Single phase inverter – Basic series inverter – Basic parallel Capacitor inverter- bridge inverter – Wave forms-– Voltage control techniques for inverters, Pulse width modulation techniques – Numerical Problems- Three Phase Inverters: analysis of 180 degree and 120 degree modes of operation with resistive, inductive loads.

TEXT BOOKS

1. Power Electronics – MD Singh, KB Kanchandhani, TMH publications, 2nd edition.
2. Power Electronics – Mohammed H. Rashid – Pearson Education –Third Edition – First Indian reprint 2004.
3. Power Electronics – Ned Mohan, Tore M. Undeland and William P. Robbins – John Wiley and Sons – Second Edition.
4. Thyristorised Power Controllers - S R Doradla,A Joshi,R.M K Sinha G K Dubey - New Age Books

Reference Books

1. Fundamentals of Power electronics and Drives-A.Chakrabarti, Dhanpat Rai & Co Ltd.
2. Power electronics, by P C Sen-Tata McGraw-Hill Education.
3. Power electronics, by P S Bimbhra- Khanna Publishers.

III Year B.Tech EEE – I Sem	L	T/P/D	C
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(R11EEE1111) ELECTRICAL MACHINES – III

Objective

This subject is an extension of previous machine courses. It deals with the detailed analysis of Synchronous generators and motors which are the prime source of electrical power generation and its utilities. Also concerns about the different types of single phase motors which are having significant applications in house hold appliances and control systems.

UNIT – I Fundamentals of 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 Generators

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

Synchronization of Alternators with infinite bus – Methods of Synchronization-synchronizing power and torque – parallel operation and load sharing – Numerical Problems - Effect of change of excitation and mechanical power input. Short circuit Analysis – Short circuit current oscillogram – determination of sub-transient, transient and steady state reactances.

UNIT – IV Synchronous Motors

Construction and types of Synchronous Motors – Methods of Starting - Synchronous Induction Motor. Variation of current and power factor with excitation control – phasor diagrams – V and Inverted V Curves. Synchronous condenser – Applications - Problems - Mathematical analysis for power developed. Excitation and power circles – hunting and its suppression.

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 and performance of A.C. Series motor-Universal motor – Principle of permanent magnet and reluctance motors. Stepper Motors – Types.

TEXT BOOKS

1. Electric Machines – by I.J.Nagrath and 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 and Sons.
2. Electric Machinery – by A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw-Hill Companies, 5th edition, 1990.
3. Theory of Alternating Current Machinery by Langsdorf, Tata Mc Graw-Hill, 2nd edition.
4. Fundamentals of Electrical Machines, Stephen Chapman, Tata Mc Graw-Hill Publishers
5. Electromachanics-III (Synchronous and single phase machines), S.Kamakashiah, Right Publishers.

III Year B.Tech EEE – I sem	L	T/P/D	C
	0	3	2

(R11ECE1204) MICROPROCESSORS AND MICROCONTROLLERS LABORATORY

I. Microprocessor 8086 and Interfacing:

1. Introduction to MASM/TASM.
2. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
3. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.
5. 8255 : Interface keyboard
6. 8255 : Interface Display
7. Serial communication between 8086 processors and PC through 8251.

II. Microcontroller 8051 and Interfacing:

1. Programming using arithmetic, logical and Bit manipulation instructions of 8051
2. Reading and Writing on a parallel port.
3. Timer in different modes
4. Serial communication between 8051 and PC
5. Interrupt programming
6. LCD Interfacing
7. Keyboard Interfacing
8. ADC Interfacing
9. DAC Interfacing
10. Stepper motor Interfacing
11. DC motor Interfacing
12. Sensor Interfacing and signal conditioning

(At least 5 interfacing experiments must be completed in addition to programming experiments from part-II)

III Year B.Tech EEE – I sem	L	T/P/D	C
	0	3	2

(R11EEE1205) ELECTRICAL MACHINES- II LABORATORY

Cycle-I Experiments

1. No-Load and locked rotor tests on 3-phase squirrel-cage Induction Motor
2. Power angle curve and efficiency of 3-phase synchronous machine
3. Parallel operation of 3-phase Alternator with grid.
4. Regulation of 3-phase Alternator by synchronous impedance method.
5. Brake test on 3-phase squirrel cage Induction Motor
6. Equivalent Circuit andBrake test on 1-phase Induction Motor

Cycle-II Experiments

1. Scott-connected Transformer
2. Regulation of 3-phase Alternator by ZPF Method
3. Slip test on 3-phase salient pole Alternator
4. Sumpner's test on two identical 1-phase transformers
5. V and inverted V curves of a 3-phase synchronous motor
6. Speed control of 3-phase slip ring Induction Motor

Additional Experiments

1. Sequence impedances of synchronous machines
2. Power factor improvement of 3-phase squirrel cage Induction Motor
3. Separation of iron losses of a 1-phase transformer
4. Group testing and parallel operation of 3-phase transformer

III Year B.Tech EEE – I sem	L	T/P/D	C
	0	3	2

(R11EEE1206) CONTROL SYSTEMS AND SIMULATION LABORATORY

Any Eight of the following experiments are to be conducted:

1. Time response of Second order system including MATLAB Programming and Simulink Model
2. Characteristics of Synchros
3. Programmable logic controller – Study and verification of truth tables of logic gates, simple Boolean expressions and application of speed control of motor.
4. Effect of feedback on DC servo motor
5. Transfer function of DC motor
6. Effect of P, PD, PI, PID Controller on a second order systems including SIMULINK Models
7. Lag and lead compensation – Magnitude and phase plot
8. Transfer function of DC generator
9. Temperature controller using PID Controller
10. Characteristics of magnetic amplifiers
11. Characteristics of AC servo motor
12. Stepper Motor characteristics

Any four simulation experiments have to be conducted.

1. Introduction to MATLAB Programming: A) Solving fundamental problems using if, while and for Loops
   B) MATRIX Operations: Addition, Subtraction, determinant, Eigen values etc.
2. MATLAB Simulation of P, PI, PID Controller.
3. Linear system analysis (Time domain analysis, Error analysis) using MATLAB .
4. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system using MATLAB
5. State space model for classical transfer function using MATLAB –Verification.

REFERENCES

1. Simulation of Electrical and electronics Circuits using PSPICE – by M.H.Rashid, M/s PHI Publications.
2. MATLAB Manual
3. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.

III Year B.Tech EEE – II Sem	L	T/P/D	C
	4	0	4

(R11HAS1103) MANAGEMENT SCIENCE

UNIT I

Introduction to management

Concepts of management - nature, importance, and functions of management; Taylor's scientific management theory; Fayol's principles of management; Mayo's Hawthorne experiments; Maslow's theory of human needs; Douglas McGregor's theory X and theory Y; Herzberg's two-factor theory of motivation; System and contingency approach to management; Planning – meaning, significance, and types of plans; Decision making and steps in decision making process; Leadership styles; Social responsibilities of management.

Organizing - Meaning, and features; Process of organization; Principles of organization; Elements of organization; Organization chart; Span of control - Graicunas formulae; Centralization and decentralization; Types of mechanistic and organic structures of organization - line organization, line and staff organization, functional organization, committee organization, matrix organization, virtual organization, cellular organization, team structure, boundary less organization, inverted pyramid structure, and lean and flat organization structure; Their merits, demerits and suitability.

UNIT II

Human resources management

Concepts of HRM;

Basic functions of HR manager - human resource planning (definition; objectives; process), recruitment (definition; sources; techniques), selection (definition; process), induction and orientation, training and development (definition; need; methods), employee exit process, employee relations management, employee compensation and benefits administration, job evaluation (objectives; process; methods), and performance appraisals (objectives; process; methods).

UNIT III

Strategic management

Mission; Goals; Objectives; Policy; Strategy; Programmes; Elements of corporate planning process - environmental scanning; value chain analysis, BCG matrix, generic strategy alternatives, SWOT analysis, and steps in strategy formulation and implementation; Balance

score card; Capability maturity model (CMM)/ People capability maturity model (PCMM).

UNIT IV

Operations management

Plant location; Types of plant layout; Methods of production – job, batch, and mass production; Work study-basic procedure involved in method study and work measurement.

Materials management

Objectives; Need for inventory control; EOQ, ABC Analysis; Purchase procedure; Value analysis; JIT, Six sigma; TQM; Supply chain management; Stores management and stores records.

Marketing

Functions of marketing; Marketing mix, and marketing strategies based on product life cycle; Channels of distribution.

UNIT V

Project management – network analysis

Network analysis; Programme evaluation review technique - PERT (probability of completing the project within given time); Critical path method - CPM (Identifying critical path); Project cost analysis; Project crashing; Simple problems.

TEXT BOOK

1. Management Science *by* Aryasri; *Publisher: Tata McGraw Hill, 2009.*
2. Management *by* James Arthur, Finch Stoner, R. Edward Freeman, and Daniel R. Gilbert 6th Ed; *Publisher: Pearson Education/Prentice Hall.*
3. Principles and Practice of Management - L.M. Prasad; *Publisher: Sultan Chand Publications, New Delhi.*

REFERENCES

1. Principles of Marketing: A South Asian Perspective *by* Kotler Philip, Gary Armstrong, Prafulla Y. Agnihotri, and Eshan ul Haque , 2010, 13th Edition, *Publisher: Pearson Education/ Prentice Hall of India*.
2. A Handbook of Human Resource Management Practice *by* Michael Armstrong, 2010; *Publisher: Kogan Page Publishers*.
3. Quantitative Techniques in Management *by* N.D. Vohra, 4th edition, 2010; *Publisher: Tata McGraw Hill*.
4. Operations Management: Theory and Practice *by* B. Mahadevan, 2010; *Publisher: Pearson Education*.
5. Strategic Management *by* V.S.P. Rao and V. Hari Krishna, 2010; *Publisher: Excel Books*.

III Year B.Tech EEE – II Sem	L	T/P/D	C
	4	1	4

(R11EEE1112) POWER SEMICONDUCTOR DRIVES

UNIT – I

Control of DC motors by Single phase and 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- Problems 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 – Problems.

UNIT – 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)

UNIT-III

Control of DC motors by Choppers

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

UNIT – IV

Control of Induction Motor through Stator voltage and Stator 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 cyclo converters- PWM control – Comparison of VSI

and CSI operations – Speed torque characteristics – numerical problems on induction motor drives – Closed loop operation of induction motor drives (Block Diagram Only)

UNIT –V

Rotor side Control of Induction motor and Control of Synchronous Motors

Static rotor resistance control – Slip power recovery – Static Scherbius drive – Static Kramer Drive – their performance and speed torque characteristics – advantages applications – problems-Separate control and 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 Problems – Closed Loop control operation of synchronous motor drives (Block Diagram Only), variable frequency control, Cyclo converter, PWM, VFI, CSI

TEXT BOOKS

1. Fundamentals of Electric Drives – by G K Dubey, Narosa Publications
2. Power Electronic Circuits, Devices and applications by M.H.Rashid, PHI Publications.

REFERENCS

1. Power Electronics – MD Singh and K B Khanchandani, Tata – McGraw-Hill Publications,1998
2. Modern Power Electronics and AC Drives by B.K.Bose, PHI Publications.
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 Electronics by P.C.Sen, McGraw-Hill Professional Publications.

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III Year B.Tech EEE – II Sem	L	T/P/D	C
	3	1	3

(R11EEE1113) ELECTRICAL MEASUREMENTS & INSTRUMENTATION

UNIT-I

Measuring Instruments

Classification-Deflecting, Control and Damping Torques-PMMC, Moving iron type instruments-Expression for the deflecting torque and control torque-Extension of range using shunts and series resistance. Measurement of Power and Energy-Electrostatic Voltmeters

UNIT-II

Measurement of Resistance, Inductance and Capacitance

Measurement of low, medium and high resistances, insulation resistance measurement, AC bridges for inductance and capacitance measurement, Megger.

UNIT-III

Instrument Transformers

Current and Potential transfers, ratio and phase angle errors, testing. Potentio meters, AC and DC potentiometers, Calibration of Voltmeters and Ammeters.

UNIT-IV

Electronic Measurements

Electronic voltmeter, multimeter, wattmeter & energy meter. Time, Frequency and phase angle measurements using CRO; Spectrum & Wave analyzer. Digital counter, frequency meter, voltmeter, multimeter and storage oscilloscope.

UNIT-V

Instrumentation

Transducers, classification & selection of transducers, strain gauges, inductive & capacitive transducers, piezoelectric and Hall-effect transducers, thermisters, thermocouples, photo-diodes & photo-transistors, encoder type digital transducers, signal conditioning and telemetry, basic concepts of smart sensors and application. Data Acquisition Systems.

TEXT BOOKS

1. “Electrical and Electronics measurements And Instrumentation”, A.K.Sawhney, Dhanpat rai & co publications.
2. “Modern Electronic Instrumentation and Measurement Techniques”, Helfrick and Cooper, Prentice-Hall of India, Reprint 1988.
3. “Instrumentation Measurement and Feedback”, . Jones, B.E., Tata McGraw-Hill, 1986.

REFERENCES

1. “ Electrical Measurement and Measuring Instruments”, Golding, E.W, Sir Issac Pitman and Sons, 1960.
2. Buckingham, H. and Price, E.N., “Principles of Electrical Measurements”, 1961.

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III Year B.Tech EEE – II Sem	L	T/P/D	C
	4	1	4

(R11EEE1114) POWER SYSTEM ANALYSIS

Objective

The main objective of this course is to study various methods of Load flow and their merits and demerits. It also deals with short circuit, steady state and transient stability analysis.

UNIT-I

Power System Network Matrices-1

Graph Theory: Basic Concepts-Branch, Link, Incidence Matrix, Bus Impedence Matrix and Admitance Matrix, Numerical Problems. Formation of Z_{Bus}: Partial network, Algorithm for the Modification of Z_{Bus} Matrix for addition element for the following cases: Addition of element from a new bus to reference, Addition of element from a new bus to an old bus, Addition of element between an old bus to reference and Addition of element between two old busses (Derivations and Numerical Problems).- Modification of Z_{Bus} for the changes in network (Problems)

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: Algorithm and Flowchart. Numerical Load flow Solution for Simple Power Systems: Determination of Bus Voltages, Injected Active and Reactive Powers (Sample One Iteration only) and finding Line Flows/Losses for the given Bus Voltages.

Newton Raphson Method in Rectangular and Polar Co-Ordinates Form: Load Flow Solution - Algorithm and Flowchart, Numerical Problems.

Principles of Decoupled and Fast Decoupled Methods.- Comparison of Different Methods.

UNIT – III

Short Circuit Analysis-1

Per-Unit System of Representation. Per-Unit equivalent reactance network of a three phase Power System, Numerical Problems.

Symmetrical fault Analysis: Short Circuit Current and MVA Calculations, Fault levels, Application of Series Reactors, Numerical Problems.

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 Problems.

Unsymmetrical Fault Analysis: LG, LL, LLG faults, Interconnection of sequence networks, effect of fault impedance, Numerical Problems.

UNIT –IV

Power System Steady State Stability Analysis

Concepts of Steady State, Dynamic and Transient Stabilities, Steady State Stability Power Limit, Transfer Reactance, Synchronizing Power Coefficient, Power Angle Curve and Determination of Steady State Stability and Methods to improve steady state stability.

UNIT –V

Power System Transient Stability Analysis

Derivation of Swing Equation. Determination of Transient Stability by Equal Area Criterion, Application of Equal Area Criterion, Critical Clearing Angle Calculation.- Solution of Swing Equation: Point-by-Point Method. Methods to improve Stability - Application of Auto Reclosing and Fast Operating Circuit Breakers.

TEXT BOOKS

1. Elements of Power System by Stevenson – Tata McGraw Hill
2. Computer Techniques in Power System Analysis by M.A.Pai, TMH Publications.
3. Modern Power system Analysis – by I.J.Nagrath and D.P.Kothari: Tata McGraw-Hill Publishing company, 2nd edition.

REFERENCES

1. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.
2. Power System Analysis – by A.R.Bergen, Prentice Hall, Inc.
3. Power System Analysis by Hadi Saadat – TMH Edition.
4. Power System Analysis by B.R.Gupta, Wheeler Publications.

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III Year B.Tech EEE – II Sem	L	T/P/D	C
	4	1	4

(R11EEE1115) SWITCH GEAR AND PROTECTION

UNIT – I

Circuit Breakers

Circuit Breakers: Elementary principles of arc interruption, Recovery, Restriking Voltage and Recovery voltages. - Restriking Phenomenon, Average and Max. RRRV, Numerical Problems - Current Chopping and Resistance Switching - CB ratings and Specifications: Types, testing of circuit breakers and Numerical Problems. – Auto reclosures.

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

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, DMT and IDMT types.

Application of relays: Over current/ Under voltage relays, Direction 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: Static Relays verses Electromagnetic Relays.

UNIT – III

Equipment Protection

Protection of generators against Stator faults, Rotor faults, and Abnormal Conditions. Restricted Earth fault and Inter-turn fault Protection. Numerical Problems on % Winding Unprotected.

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

Feeder Protection and Relay coordination

UNIT – IV

Neutral Grounding

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

UNIT – V

Protection against over voltages

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.

Text Books

1.Switchgear And Power System Protection By Singh, Ravindra P, PHI publications.

2.Switch gear and Protection by Haroon Asf, Khanna publications.

Reference Book:

1.Switch gear and Protection By M.V.Bashi U, Techinical Publications

III Year B.Tech EEE – II Sem	L	T/P/D	C
	0	3	2

(R11EEE1207) ELECTRICAL MEASUREMENTS LABORATORY

1. Calibration of ac voltmeter and ac ammeter
2. Calibration and Testing of single phase energy meter
3. Measurement of % ratio error and phase angle of given C.T. by comparison.
4. Measurement of power and power factor of a single phase inductive load and to study effect of capacitance connected across the load on the power factor
5. Measurement of low resistance by Kelvin's double bridge
6. Measurement of voltage, current and resistance using dc potentiometer
7. Schering bridge and Anderson bridge.
8. Measurement of parameters of a choke coil using 3 voltmeter and 3 ammeter methods.
9. Calibration LPF wattmeter – by Phantom testing
10. Measurement of Iron loss in a bar specimen using a CRO and using a wattmeter.
11. Dielectric testing of transformer oil
12. Ratio and Polarity test of Single phase transformer.
13. Verification of vector groups in three phase transformer.

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III Year B.Tech EEE – IIsem	L	T/P/D	C
	0	3	2

(R11EEE1208) POWER ELECTRONICS AND SIMULATION LABORATORY

PART A :

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 and Class E)
6. DC Jones chopper with R and RL Loads
7. Single Phase Parallel, inverter with R and RL loads
8. Single Phase Cycloconverter with R and RL loads
9. Single Phase Half controlled converter with R load
10. Three Phase half controlled bridge converter with R-load
11. Single Phase series inverter with R and RL loads
12. Single Phase Bridge converter with R and RL loads
13. Single Phase dual converter with RL loads

PART B: Simulation experiments with PSPICE/PSIM/MATLAB

1. Simulation of single-phase Half wave converter using R and RL loads
2. Simulation of single-phase full converter using R, RL and RLE loads
3. Simulation of single-phase Semi converter using R, RL and RLE loads
4. Simulation of Single-phase AC voltage controller using R and RL loads
5. Simulation of for Single phase cyclo-converter with R and RL-loads
6. Simulation of resonant pulse commutation circuit and Buck chopper
7. Simulation of single phase Inverter with PWM control
8. Simulation of three phase fully controlled converter with R and RL loads, with and without freewheeling diode. Observation of waveforms for Continuous, and Discontinuous modes of operation.

Any Eight Experiments from PART A and Any Four Experiments from PART B are to be conducted

REFERENCES

1. Simulation of Electric and Electronic circuits using PSPICE – by M.H.Rashid, PHI Publications.
2. PSPICE A/D user's manual – Microsim, USA.
3. PSPICE reference guide – Microsim, USA.
4. MATLAB and its Tool Books user's manual and – Mathworks, USA.

III Year B.Tech EEE –II Sem	L	T/P/D	C
	0	3	2

(R11HAS1204) ADVANCED ENGLISH COMMUNICATION SKILLS LABORATORY

Introduction

This course aims to offer students a practical approach to Technical Writing, and provide a relevant, contemporary and authoritative introduction to the dynamic field of technical communication that prepares them for Workplace Communication. Each unit in the syllabus is devised so as to include a writing component as well as an oral component.

The objectives of this course are to

i) expose students to workplace writing
ii) initiate them into the Process of Technical Communication
iii) to enable the students to create clear, accurate, and succinct content
iv) enable students to produce documents reflecting different types of technical communication such as Abstracts, Proposals and Technical Reports through ample practice
v) enable students to adjust technical content to meet the needs of a specific target audience
vi) groom students in behavioral skills

Methodology

Writing Component

A Process- Genre methodology will be used in teaching the technical genres. This method would enable students to understand the use of particular lexico-grammatical patterns required of in the context of technical writing. They would learn to use language to express the particular communicative intent that is required of in the context of writing these genres.

Oral Communication Component

The objective of including Oral Communication is to impart behavioral skills and prepare students to speak to a large group or team, keeping in mind the audience, context and purpose of communication. This Oral Communication component must enable students to speak in an organized and mature way, without any inhibitions. They will be groomed to relate their speech to their audience.

Objectives of Oral Communication Component

i) equip students with Behavioral skills
ii) prepare them for Oral presentations, and Group Discussions
iii) equip them with Interview skills

Syllabus Outline
Unit I

1. Applications and Covering letters
2. Resume Writing
3. Oral Communication :Self Introduction

Unit II

1. Introduction to Technical Writing
   - Defining Technical Writing
   - Distinguishing it from other types of writing
   - Determining audience, purpose and context

2. Summarizing and Synthesizing Information

3. Behavioral Skills and Personality Development
   a) Building a Positive Attitude, Building a Positive Personality, Motivation, Goal Setting & Values &
   Vision
b) Problem Solving and Decision Making; Negotiation Skills through Role Play
c) Team Building and Leadership Abilities

Unit III
1. Verbal Ability : Language, Reasoning Skills, Analytical Ability, Reading and Listening Skills
2. Oral Communication: Presentation Skills (Oral and Visual)

Unit IV

1. Writing Research Abstracts
2. Oral Communication: Group Discussions

Unit V.
1. Writing Project Proposals
2. Writing Project Reports
3. Oral Communication: Interview Skills

REQUIRED TEXT BOOKS AND MATERIALS

1. Technical Writing: Process and Product *by* Sharon J. Gerson and Steven M. Gerson (1999); *Publisher: Prentice Hall.*
2. Effective Technical Communication *by* Ashraf Rizvi, M., (2005); Publisher: *Tata Mc Graw Hill*.
3. Anderson, Paul V. (2003). Reports. In Paul V. Anderson's Technical Communication: A Reader-Centered Approach (5th ed.) (pp. 457-473). Boston: Heinle.

REFERENCES

1. Technical Communication *by* Rebecca E. Burnett, 5th edition (2001); *Publisher: Thomson/Wadsworth*
2. Technical Communication: A Practical Approach (7th ed.) *by* William S. Pfeiffer; *Publisher: Person education*
3. Technical Communication: Situations and Strategies *by* Mike Markel (2006-2007); *Publisher: Bedford/ St. Martins*.
4. Anderson, Paul V. (2003). Three Types of Special Reports. In Paul V. Anderson's Technical Communication: A Reader-Centered Approach (5th ed..) ((pp. 474-513). Boston:Heinle.
5. Bolter, Jay David (2001), "The Late Age of Print" in Robert P. Yagelski's Literacies and Technologies: A Reader for Contemporary Writers (135-145); *Publisher: Longman*.
6. Brandt, Deborah. (1998) Sponsors of literacy. College Composition and Communication 49.2, 165-185.
7. Burnett, Rebecca, E. (2001) "Locating and Recording Information" in Rebecca E. Burnett's Technical Communication (pp. 164-195).
8. Johnson-Sheehan, Richard (2007). "Starting Your Career" in Richard Johnson-Sheehan's Technical Communication Today (2nd ed.) (pp. 388-402). New York: Longman.
9. Business Correspondence and Report Writing by R. C. Sharma and K. Mohan, Third Edition (2002); *Publisher: Tata McGraw Hill*.
10. Technical Communication: Principles and Practices by M. Raman and S. Sharma (Indian edition; 2004); *Publisher: Oxford University Press*.

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IV Year B.Tech EEE – I sem	L	T/P/D	C
	3	1	3

(R11EEE1116) POWER SYSTEM OPERATION AND CONTROL

Objective :
This subject deals with Economic operation of Power Systems, Hydrothermal scheduling and modeling of turbines, generators and automatic controllers. It emphasizes on single area and two area load frequency control and reactive power control.

UNIT – I
Economic Operation of Power Systems
Optimal operation of Generators in Thermal Power Stations, - heat rate Curve – Cost Curve – Incremental fuel and Production costs, input-output characteristics, Optimum generation allocation with line losses neglected, Unit commitment.

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 problems-Short term Hydrothermal scheduling problem.

Modelling of Turbine : Modelling of Turbine: First order Turbine model, Block Diagram representation of Steam Turbines and Approximate Linear Models.

UNIT – III Modelling of Generator and Automatic Controllers
Modelling of Generator (Steady State and Transient Models): Description of Simplified Network Model of a Synchronous Machine (Classical Model), Description of Swing Equation (No Derivation) and State-Space II-Order Mathematical Model of Synchronous Machine.

Modeling of Governer: Mathematical Modelling of Speed Governing System – Derivation of small signal transfer function.

Modelling of Excitation System: Fundamental Characteristics of an Excitation system, Transfer function, Block Diagram Representation of IEEE Type-1 Model.

UNIT –IV

Single 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.

Two-Area Load Frequency Control: Load frequency control of 2-area system – uncontrolled case and controlled case, tie-line bias control. Power pools and pool operation, advantages. Inter area and Intra area controls.

UNIT – V

Load Frequency Controllers

Proportional plus Integral control of single area and its block diagram representation, steady state response –Automatic Generation Control and Economic dispatch control.

Reactive Power Control

Overview of Reactive Power control – Reactive Power compensation in transmission systems – advantages and disadvantages of different types of compensating equipment for transmission systems; load compensation – Specifications of load compensator, Uncompensated and compensated transmission lines: shunt and Series Compensation.

TEXT BOOKS:

1. Electrical Power Systems by C.L.Wadhwa, Newage International-3rd Edition
2. Modern Power System Analysis – by I.J.Nagrath and D.P.Kothari Tata M Graw – Hill Publishing Company Ltd, 2nd edition.
3. Electric Energy systems Theory – by O.I.Elgerd, Tata Mc Graw-hill Publishing Company Ltd., Second edition.

REFERENCE BOOKS:

1. Power System Analysis and Design by J.Duncan Glover and M.S.Sarma., THOMPSON, 3rd Edition.
2 Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.
3 Power System Analysis by Hadi Saadat – TMH Edition.
4. Economic Operation of Power Systems. by Kirchmayer, John Wiley Publications.

IV Year B.Tech EEE – I sem	L	T/P/D	C
	4	1	4

(R11ECE1109) DIGITAL SIGNAL PROCESSING

UNIT I

Introduction: Introduction to Digital Signal Processing: Discrete time signals and sequences, linear shift invariant systems, stability, and causality. Applications of Z-Transforms Solution of Linear constant coefficient difference equations, Block diagram representation of LCCD equations. System function, Frequency domain representation of discrete time signals and systems.

Discrete Fourier series: Properties of discrete Fourier series, DFS representation of periodic sequences, Relation between Z-transform and DFS.

UNIT II

Discrete Fourier Transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT.

Fast Fourier Transforms: Fast Fourier transforms (FFT) – Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT, and FFT for composite N.

UNIT III

IIR Digital Filters: Analog filter approximations- Butterworth and Chebyshev, Design of IIR Digital filters from analog filters, Step and Impulse invariance transformation techniques, Bilinear transformation method. Spectral transformations (Analog to Analog).

Realization of IIR Filters: Direct, Canonic, Cascade, Parallel and Ladder forms.

UNIT IV

FIR Digital Filters : Introduction to characteristics of linear phase FIR filters, Frequency response, Design of FIR filters : Fourier Method, windowing methods: Rectangular window, Hanning window, Hamming window, Generalized Hamming window, Bartlett triangular window, Frequency Sampling method, Comparison of IIR and FIR filters.

Realization of FIR Filters: Direct form, cascade realization and Linear phase Realization.

UNIT V

Multirate Digital Signal Processing: Introduction, Down sampling, Decimation, Up sampling, Interpolation, sampling rate conversion, Implementation of sampling rate conversion, Applications of Multirate Signal Processing.

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

TEXT BOOKS

1. Digital Signal Processing: Principles, Algorithms and Applications – John G.Proakis,, D.G.Manolakis, 3rd Edition, Perason/PHI, 2007.
2. Discrete Time Signal Processing – A.V.Oppenheim and R.W. Schaffer, PHI, 2009
3. Digital Signal Processing – A Pratical Approach – Emmanuel C.Ifeacher, Barrie. W. Jervis, 2nd Edition., Pearson Education, 2009.

REFERENCES

1. Digital Signal Processing- Fundamentals and Applications – Li Tan, Elsevier , 2008.
2. Fundamentals of Digital signal Processing using MatLab- Robert J.Schilling, Sandra L.Harris, Thomson , 2007.
3. Digital Signal Processing – S.Salivahanan, A.Vallavaraj, C.Gnanapriya,TMH , 2009.
4. Fundamentals of Digital Signal Processing - Loney Ludeman, John Wiley ,2009.
5. Discrete Systems and Digital Signal Processing with MatLab -Taan S. ElAli, CRC Press ,2009.

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Elective-I

(R11EEE1117)ELECTRICAL DISTRIBUTION SYSTEMS

UNIT I

GENERAL CONCEPTS: 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

DISTRIBUTION FEEDERS AND SUBSTATIONS: Design Considerations of Distribution Feeders: Radial and loop types of primary feeders, voltage levels, feeder loading; basic design practice of the secondary distribution system. Substations, Location of Substations: Rating of distribution substation, service area within primary feeders. Benefits derived through optimal location of substations.

UNIT III

DISTRIBUTION SYSTEM ANALYSIS: Voltage drop and power-loss calculations: Derivation for voltage drop and power loss in lines, manual methods of solution for radial networks, three phase balanced primary lines.

UNIT IV

PROTECTION: Objectives of distribution system protection, types of common faults and procedure for fault calculations. Protective Devices: Principle of operation of Fuses, Circuit Reclosures, line sectionalizers, and circuit breakers Coordination of Protective Devices: General coordination procedure Concepts of Smart grid and demand side management.

UNIT V

ENHANCEMENT OF POWER QUALITY : Analysis of Power Quality indices 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 location. Voltage Control: Equipment for voltage control, effect of series capacitors, effect of AVB/AVR, line drop compensation.

TEXT BOOKS

1. Electric Power Distribution system, Engineering – by Turan Gonen, TMH.

2. Electric Power Distribution – by A.S. Pabla, Tata Mc Graw-hill Publishing Company, 6th edition, 1997.

REFERENCES

1.Electrical Power Distribution and Automation by S.Sivanagaraju,V.Sankar,Dhanpat Rai and Co, pvt. Ltd.

2. Electrical Power Distribution Systems by V.Kamaraju,TMH Publishers, 2nd Edition.

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Elective-I

(R11EEE1118) RELIABILITY ENGINEERING AND APPLICATIONS TO POWER SYSTEMS

UNIT – I

Basics of Probability theory and Distribution: Concepts of Reliability, Unreliability, Availability, Unavailability–rules for combining probabilities of events – Bernoulli's trials – probability density and distribution functions – binomial distribution – expected value and standard deviation of binomial distribution, Applications of binomial distribution.

UNIT – II

Network Modelling and Reliability Analysis: Analysis of Series, Parallel, Series-Parallel networks–complex networks: decomposition method, Path based and Cutset based approaches.

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 – III

Markov Modelling: Discrete Markov chains: General modeling concepts-concept of stochastic transitional probability Matrix, Evaluation of limiting state Probabilities, Continuous Markov processes: one component repairable model – time dependent probability evaluation using Laplace transform approach – evaluation of limiting state probabilities using STPM – two component repairable models.

Frequency and Duration Techniques : Frequency and duration concept – Evaluation of frequency of encountering state, MTTF and MTTR of one , two component repairable models – evaluation of cumulative probability and cumulative frequency of encountering of merged states of two component repairable model.

UNIT – IV

Generation 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.

UNIT – V

Composite System Reliability Analysis: Decomposition method – Reliability Indices – Weather Effects on Transmission Lines.

Distribution System and Reliability Analysis: Basic Concepts – Evaluation of Basic and performance reliability indices of radial networks.

TEXT BOOKS

1. Reliability Evaluation of Engg. System – R. Billinton, R.N.Allan, BS Publications.
2. Reliability Evaluation of Power systems – R. Billinton, R.N.Allan, BS Publications.

REFERENCE BOOKS:

1. “Reliability Engineering: Theory and Practice”, By Alessandro Birolini, Springer Publications.
2. “An Introduction to Reliability and Maintainability Engineering”, Charles Ebeling, TMH Publications.
3. “Reliability Engineering”, E. Balaguruswamy, TMH Publications.
4. “Reliability Engineering”, Elsayed A. Elsayed, Prentice Hall Publications.

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Elective-I

(R11MED1157) OPTIMIZATION TECHNIQUES

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 problems.

Classical Optimization Techniques

Single variable Optimization – multi variable Optimization without constraints – necessary and sufficient conditions for minimum/maximum – multivariable Optimization with equality constraints.

Solution by method of Lagrange multipliers – multivariable Optimization with inequality constraints – Kuhn – Tucker conditions.

UNIT – II

Linear Programming

Standard form of a linear programming problem – geometry of linear programming problems – 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.

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 problems.

UNIT – III

Unconstrained Nonlinear Programming:

One – dimensional minimization methods: Classification, Fibonacci method and Quadratic interpolation method

Unconstrained Optimization Techniques

Univariate method, Powell's method and steepest descent method.

UNIT – IV

Constrained Nonlinear Programming:

Characteristics of a constrained problem, Classification, Basic approach of Penalty Function method; Basic approaches of Interior and Exterior penalty function methods. Introduction to convex Programming Problem.

UNIT – V

Dynamic Programming:

Dynamic programming multistage decision processes – types – concept of sub optimization and the principle of optimality – computational procedure in dynamic programming – examples illustrating the calculus method of solution - examples illustrating the tabular method of solution.

TEXT BOOKS

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. Kasene and K.D. Kumar, Springer(India), Pvt .LTd.

REFERENCES

1 " Optimization Methods in Operations Research and systems Analysis" – by K.V. Mital and C. Mohan, New Age International (P) Limited, Publishers, 3rd edition, 1996.
2. Operations Research – by Dr. S.D.Sharma.
3. "Operations Research : An Introduction" – by H.A. Taha, PHI Pvt. Ltd., 6th edition
4. Linear Programming – by G. Hadley

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Elective-I

(R11EEE1119) NEURAL NETWORKS AND FUZZY LOGIC

Objective :

This course introduces the basics of Neural Networks and essentials of Artificial Neural Networks with Single Layer and Multilayer Feed Forward Networks. Also deals with Associate Memories and introduces Fuzzy sets and Fuzzy Logic system components. The Neural Network and Fuzzy Network system application to Electrical Engineering is also presented. This subject is very important and useful for doing Project Work.

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, Classification Taxonomy of ANN – Connectivity, Neural Dynamics (Activation and Synaptic), 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, Limitations of the Perceptron Model, Applications.

Multilayer Feed forward Neural Networks

Credit Assignment Problem, Generalized Delta Rule, Derivation of Back propagation (BP) Training, Summary of Backpropagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

Unit III: Associative Memories

Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory (Associative Matrix, Association Rules, Hamming Distance, The Linear Associator, Matrix Memories, Content Addressable Memory), Bidirectional

Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function, Proof of BAM Stability Theorem
Architecture of Hopfield Network: Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis, Capacity of the Hopfield Network
Summary and Discussion of Instance/Memory Based Learning Algorithms, Applications.

Unit – IV:
Classical and Fuzzy Sets
Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.
Fuzzy Logic System Components
Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

UNIT V: Applications
Neural network applications: Process identification, control, fault diagnosis and load forecasting.
Fuzzy logic applications: Fuzzy logic control and Fuzzy classification.

TEXT BOOKS*:*
1. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by Rajasekharan and Rai – PHI Publications.
2. Artificial neural networks, B.Yegnarayana, PHI publications.

REFERENCE BOOKS*:*
1. Neural Networks – James A Freeman and Davis Skapura, Pearson Education, 2002.
2. Neural Networks – Simon Hakins , Pearson Education
3. Neural Engineering by C.Eliasmith and CH.Anderson, PHI Publications.
4. Neural Networks and Fuzzy Logic System by Bart Kosko, PHI Publications.
5. Introduction to Artificial Neural Systems, J.M.Zurada, Jaico Publishing House.
6. Introduction to Neural Networks using MATLAB 6.0 - S.N.Sivanandam, S.Sumathi, S.N.Deepa, TMH, 2006.

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Elective-II

(R11EEE1120) SPECIAL ELECTRICAL MACHINES AND CONTROL

UNIT-I

Stepping Motors

Constructional features, principle of operation, modes of excitation, single phase stepping motors, torque production in variable Reluctance (VR) stepping motor, Dynamic characteristics, Drive systems and circuit for open loop control, Closed loop control of stepping motor, microprocessor based controller.

UNIT-II

Synchronous Reluctance Motors

Constructional features: axial and radial air gap Motors. Operating principle, reluctance torque –Phasor diagram, motor characteristics, linear induction motors.

UNIT-III

Switched Reluctance Motors

Constructional features, principle of operation. Torque equation, Power controllers, Characteristics and control. Microprocessor based controller. Sensor less control.

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UNIT-IV

Permanent Magnet Brushless DC Motors

Commutation in DC motors, Difference between mechanical and electronic commutators, Hall sensors, Optical sensors, Multiphase Brushless motor, Square wave permanent magnet brushless motor drives, Torque and emf equation, Torque-speed characteristics, Controllers-Microprocessor based controller. Sensorless control.

UNIT-V

Permanent Magnet Synchronous Motors

Principle of operation, EMF equation, power input and torque expressions, Phasor diagram, Power controllers, Torque speed characteristics, Self control, Vector control, Current control schemes. Sensor less control.

TEXT BOOKS

1. T.J.E. Miller, „Brushless Permanent Magnet and Reluctance Motor Drives", Clarendon Press, Oxford, 1989.
2. P.P. Aearnley, „Stepping Motors – A Guide to Motor Theory and Practice", Peter Perengrinus, London, 1982.

REFERENCE BOOKS

1. T. Kenjo, „Stepping Motors and Their Microprocessor Controls", Clarendon Press London, 1984.
2. T. Kenjo and S. Nagamori, „Permanent Magnet and Brushless DC Motors", Clarendon Press, London, 1988.

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Elective-II

(R11ECE1110) VLSI DESIGN

UNIT I

INTRODUCTION: Introduction to MOS Technology – MOS, PMOS, NMOS, CMOS and BiCMOS technologies- Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Encapsulation , Packing

BASIC ELECTRICAL PROPERTIES : Basic Electrical Properties of MOS ,CMOS and BiCMOS Circuits: Ids-Vds relationships, MOS transistor threshold Voltage, gm, gds, figure of merit w_o, Pass transistor, NMOS inverter, Various pull ups, Determination of pull-up to pull-down ratio(Z_{pu} / Z_{pd}) , CMOS Inverter analysis and design, BiCMOS inverters, Latch-up in CMOS circuits.

UNIT II

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

UNIT III

GATE LEVEL DESIGN AND LAYOUT: Architectural issues, Switch logic networks: Implementation of AND,OR and Multiplexer , Gate logic , Other forms of CMOS logic-Pseudo-NMOS , Dynamic CMOS logic. Basic circuit concepts, Sheet Resistance R_S and its concept to MOS, Area Capacitance Units, Calculations, The delay unit T, Inverter Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers.

UNIT IV

SUBSYSTEM DESIGN Process: Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generator, Comparators, Zero/One Detectors, Counters, Memory elements.

SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN: PLDs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach.

UNIT V

VHDL SYNTHESIS : VHDL Synthesis, Circuit Design Flow, Circuit Synthesis, Simulation, Layout, Design capture tools, Design Verification Tools.

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

TEXTBOOKS

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, PHI, Edition, 2005.
2. VLSI DESIGN – K.Lal Kishore , VSV 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. Moderan VLSI Design –Wayne Wolf, Pearson Education , 3rd Edition, 1997.
3. VLSI Design – A.Albert Raj, Latha PHI, 2008.
4. .Introduction to VLSI Design- Mead and Convey , BS Publcations, 2010.
5. VLSI Design – M. Michal Vai, CRC Press, 2009.

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Elective-II

(R11EEE1121) POWER PLANT INSTRUMENTATION AND CONTROL

UNIT I

OVERVIEW OF POWER GENERATION

Brief survey of methods of power generation – Hydro, thermal, nuclear, solar and wind power – Importance of instrumentation in power generation – Thermal power plants – Block diagram – Details of boiler processes - Cogeneration.

UNIT II

MEASUREMENTS IN POWER PLANTS

Electrical measurements – Current, voltage, power, frequency, power factor etc. – Non electrical parameters – Flow of feed water, fuel, air and steam with correction factor for temperature – Steam pressure and steam temperature – Drum level measurement – Radiation detector – Smoke density measurement – Dust monitor.

UNIT III

ANALYSERS IN POWER PLANTS

Flue gas oxygen analyser – Analysis of impurities in feed water and steam – Dissolved oxygen analyser – Chromatography – pH meter – Fuel analyser – Pollution monitoring instruments.

UNIT IV

CONTROL LOOPS IN BOILER

Combustion control – Air/fuel ratio control – Furnace draft control – Drum level control – Main steam and reheat steam temperature control – Super heater control – Air temperature – Deaerator control – Distributed control system in power plants – Interlocks in boiler operation.

UNIT V

TURBINE – MONITORING AND CONTROL

Speed, vibration, shell temperature monitoring and control – Steam pressure control – Lubricant oil temperature control – Cooling system.

TEXT BOOKS

1. Sam G. Dukelow, 'The Control of Boilers', Instrument Society of America, 1991.
2. P.K. Nag, 'Power Plant Engineering', Tata McGraw Hill, 2001.
3. Modern Power Stations Practice, vol. 6, Instrumentation, Controls and Testing- Pergamon Press, Oxford, 1971.
4. Power Plant Technology – by Wakil M.M., Tata McGraw Hill.

REFERENCES

1. S.M. Elonka and A.L. Kohal, 'Standard Boiler Operations', Tata McGraw Hill, New Delhi,1994.
2. R.K.Jain, 'Mechanical and Industrial Measurements', Khanna Publishers, New Delhi, 1995.
3. E.Al. Wakil, 'Power Plant Engineering', Tata McGraw Hill, 1984.-
4. Standard Boiler Operations - Questions and Answers – by Elonka S.M., and Kohal A.L., TMH, New Delhi, 1994.

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Elective-II

(R11EEE1122) HIGH VOLTAGE ENGINEERING

UNIT I

INTRODUCTION TO 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, 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

OVER VOLTAGE PHENOMENON AND TESTING OF ELECTRICAL APPARATUS

Natural causes for over voltages – Lightning phenomenon, Over voltage due to switching surges, system faults and other abnormal conditions, Principles of Insulation Coordination on High voltage and Extra High Voltage power systems. Testing of Insulators and bushings, Testing of Isolators and circuit breakers, Testing of cables, Testing of Transformers, Testing of Surge Arresters, Radio Interference measurements.

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.

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Elective-III

(R11EEE1123) HVDC TRANSMISSION

UNIT – I

BASIC CONCEPTS

Economics and Terminal equipment of HVDC transmission systems: Types of HVDC Links – Apparatus required for HVDC Systems – Comparison of AC andDC Transmission, Application of DC Transmission System – Planning and Modern trends in D.C. Transmission.

ANALYSIS OF HVDC CONVERTERS

Choice of Converter configuration – analysis of Graetz –characteristics of 6 Pulse and 12 Pulse converters – Cases of two 3 phase converters in star –star mode – their performance.

UNIT – II

CONVERTER and HVDC SYSTEM CONTROL

Principal of DC Link Control – Converters Control Characteristics – Firing angle control – Current and extinction angle control – Effect of source inductance on the system; Starting and stopping of DC link; Power Control.

REACTIVE POWER CONTROL IN HVDC

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

UNIT –III

POWER FLOW ANALYSIS IN AC/DC SYSTEMS

Modelling of DC Links-DC Network-DC Converter-Controller Equations-Solution of DC loadflow – P.U. System for DC quantities-solution of AC-DC Power flow-Simultaneous method-Sequential method.

UNIT-IV

CONVERTER FAULT and PROTECTION

Converter faults – protection against over current and over voltage in converter station – surge arresters – smoothing reactors – DC breakers –Audible noise-space charge field-corona effects on DC lines-Radio interference.

UNIT – V

HARMONICS

Generation of Harmonics –Characteristic harmonics, calculation of AC Harmonics, Non-Characteristic harmonics, adverse effects of harmonics – Calculation of voltage and Current harmonics – Effect of Pulse number on harmonics

FILTERS

Types of AC filters, Design of Single tuned filters –Design of High pass filters.

TEXT BOOKS

1. HVDC Power Transmission Systems: Technology and system Interactions – by K.R.Padiyar, New Age International (P) Limited, and Publishers.
2. HVDC Transmission, S K Kamakshaiah, V Kamaraju, TMH Publishers.
3. EHVAC and HVDC Transmission Engineering and Practice – S.Rao, Khanna Publications.

REFERENCES

1. HVDC Transmission – J.Arrillaga, IEE Power and Energy series.
2. Direct Current Transmission – by E.W.Kimbark, John Wiley and Sons.
3. Power Transmission by Direct Current – by E.Uhlmann, B.S.Publications.

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Elective-III (R11EEE1124) LINEAR SYSTEM ANALYSIS

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 FOURIER SERIES AND FOURIER TRANSFORM REPRESENTSATION

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.

APPLICATIONS OF FOURIER SERIES AND FOURIER TRANSFORM REPRESENTATION

Introduction, 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.

UNIT – III LAPLACE TRANSFORM APPLICATIONS

Application of Laplace transform Methods of Ananlysis – Response of RL, RC, RLC Networks to Step, Ramp, and impulse functions, Shifting Theorem – Convolution Integral – Applications

TESTING OF POLYNOMIALS

Elements of realisability-Hurwitz polynomials-positive real functions-Properties-Testing-Sturm's Test, examples.

UNIT-IV NETWORK SYSNTHESIS

Network synthesis:Synthesis of one port LC networks-Foster and Cauer methods-Synthesis of RL and RC one port networks-Foster and Cauer methods

SAMPLING

Sampling theorm – Graphical and Analytical proof for Band Limited Signal impulse sampling, natural and Flat top Sampling, Reconstruction of signal from its samples, 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.

UNIT-V Z-TRANSFORMS

Fundamental difference between continous and discrete time signals, discrete time complex, exponential and sinusoidal signals, periodicity of discrete time complex exponential, concept of Z-Transform of a discrete sequence. Distinction between Laplace, Fourier and Z-Transforms. Region of convergence in Z-Transforms, constraints on ROC for various classes of signals, Inverse Z-Transform, properties of Z-Transforms.

TEXT BOOKS:

1.Signals, Systems and Communications by B.P. Lathi, BS Publications 2003.
2.Network Analysis and Synthesis – Umesh Sinha- Satya Prakashan Publications.

REFERENCE BOOKS:

1. Linear System Analysis – A N Tripathi, New Age International
2. Network and Systems – D Roy Chowdhary, New Age International
3 Engineering Network Analysis and Filter Desgin- Gopal G Bhisk and Umesh
4. Linear system anlysis by A.Cheng, Oxford publishers.

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(R11CSE1114) OBJECT ORIENTED PROGRAMMING

UNIT – I

Fundamentals of Object Oriented programming: Object Oriented paradigm - Basic concepts of Object Oriented Programming - Benefits of OOP - Applications of OOP

Java Evolution: Java Features - How Java differs from C and C++ - Java and Internet - Java and World Wide Web - Web Browsers - Hardware and Software Requirements - Java Environment. Overview of Java Language: Simple Java Program - Java Program Structure - Java Tokens- Java Statements - Implementing a Java Program - Java Virtual Machine - Constants - Variables - Data types - Scope of Variables-Symbolic Constants-Type Casting and type promotions – Operators, Operator Precedence and Associativity - Control Statements – break - continue- Arrays-Multi dimensional arrays, Wrapper Classes - Simple examples.

UNIT – II

Classes - Objects - Constructors – methods - this keyword – garbage collection- finalize - Overloading methods and constructors - Access Control- Static members – nested and inner classes – command line arguments - variable length arguments.

Inheritance – forms of inheritance – specialization, specification, construction, extension, limitation, combination, benefits and costs of inheritance. Super uses- final - polymorphism, method overriding - dynamic method dispatch –abstract classes – exploring string class.

UNIT – III

Packages & Interfaces - Defining and accessing a package – understanding CLASSPATH – access protection importing packages – Interfaces - Defining and implementing an interface, Applying interfaces, Variables in interfaces and extended interfaces. Exploring java.lang and java.util packages.

Exception Handling-Fundamentals, usage of try, catch, multiple catch clauses, throw, throws and finally. Java Built in Exceptions and creating own exception subclasses.

UNIT – IV

Multithreaded Programming: Java Thread life cycle model – Thread creation - Thread Exceptions - Thread Priority – Synchronization - Messaging - Runnable Interface - Interthread Communication - Deadlock - Suspending, Resuming and stopping threads.

I/O Streams: File – Streams – Advantages - The stream classes – Byte streams – Character streams.

Networks basics: Socket Programming - Proxy Servers - TCP/IP Sockets - Net Address - URL - Datagram's

UNIT – V

Applet Programming: How Applets differ from Applications - Applet Life Cycle - Creating an Applet - Running the Applet- Designing a Webpage - Applet Tag - Adding Applet to HTML file - More about Applet Tag - Passing parameters to Applets - Aligning the display.

Event handling- basics of event handling, Event classes, Event Listeners, delegation event model, handling mouse and keyboard events, adapter classes, AWT Class hierarchy - AWT Controls - Layout Managers and Menus, limitations of AWT, Swing, MVC architecture, components, containers, exploring swing.

TEXT BOOKS

1. The Complete Reference Java J2SE, Herbert Schildt, 5th Edition, TMH.
2. Core Java 2 Volume I Fundamentals, Cay S.Horstmann, Gary Cornell, 5th Edn. PHI,2000.

REFERENCES:

1. The Java Programming Language, K. Arnold and J. Gosling, Second Edition, Addison Wesley, 1996.
2 Java Programming and Objected Oriented Application Development, Richard A. Johnson INDIA Edition CENGAGE Learning.
3. Object Oriented Programming with Java, R.Buyya, S.T.Selvi, X.Chu, TMH.
4. An Introduction to Java Programming, Y.Daniel Liang, Pearson Education.

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Elective-III

(R11CSE1110) DATA BASE MANAGEMENT SYSTEMS

UNIT-I

Introduction to Databases and Database Management System - Database system Applications - Advantages of DBMS over File System - Data Models – Instances and schema - View of Data - Database Languages -DDL-DML - Database Users and Administrator - Database System Structure.

UNIT-II

Database Design and ER diagrams – Attributes and Entity Sets – Relationships and Relationship Sets – Constraints - Keys - Design Issues - Entity-Relationship Diagram- Weak Entity Sets - Extended E-R Features - Database Design with ER model - Database Design for Banking Enterprise

UNIT – III

Introduction to the Relational Model – Structure of RDBMS - Integrity Constraints over Relations – Enforcing Integrity Constraints – Querying Relational Data - Relational Algebra and Calculus.

Introduction to SQL- Data Definition commands, Data Manipulation Commands, Basic Structure, Set operations Aggregate Operations - Join operations - Sub queries and correlated queries, SQL functions , views ,Triggers, Embedded SQL.

UNIT – IV

Functional Dependencies– Introduction , Basic Definitions, Trivial and Non trivial dependencies, closure of a set of dependencies, closure of attributes, irreducible set of dependencies- Schema Refinement in Database Design- Problems Caused by Redundancy – Decompositions – Problem Related to Decomposition –- Lossless Join Decomposition – Dependency Preserving Decomposition - FIRST, SECOND, THIRD Normal Forms – BCNF – – Multivalued Dependencies – Fourth Normal Form.

UNIT-V

Transaction concept- Transaction state- Implementation of atomicity and Durability- Concurrent executions – Serializability, Recoverability

Lock Based Protocols, Timestamp Based Protocols, Validation Based Protocols, Multiple Granularity, Dead Lock Handling – Failure Classification – Storage Structure - Recovery and Atomicity- Log Based recovery – Recovery with concurrent transactions – Checkpoints .

File Organization – Organization of records in file - Data Dictionary Storage – Indexing and Hashing – Basic Concepts , Ordered Indices,B^+Tree Index files, B- tree index files – Static Hashing – Dynamic Hashing – Comparision of Indexing with Hashing.

TEXTBOOKS.

1. Database System Concepts, Silberschatz, Korth , Fifth Edition, McGraw hill (1,2,3 and 5 Units)
2. Introduction to Database Systems, C.J.Date, Pearson Education (4^{th} Unit)

REFERENCES:

1. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
2. Database Management Systems, Raghuramakrishnan, Johannes Gehrke, TATA Mc Graw Hill(1,2,3 and 5 Units)
3. Data base Systems design, Implementation, and Management, Peter Rob and Carlos Coronel 7th Edition.
4. Data Base Systems using Oracle : A simplified guide to SQL and PL /SQL, Shah, PHI

IV Year B.Tech EEE – I sem	L	T/P/D	C
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(R11EEE1209)POWER SYSTEMS AND SIMULATION LABORATORY

Any Twelve of the following experiments need to be conducted

1. Differential protection of 1-Φ transformer.
2. IDMT directional and non-directional relays.
3. Static phase sequence detection.
4. Transformer fault analysis, LG,LL,3-Φ faults using PSIM.
5. Group testing of transformer and parallel operation of 3-Φ transformer using PSIM.
6. LG, LL and 3-Φ fault analysis of 3-Φ synchronous machine using PSCAD or MATLAB .
7. Transient analysis of 3-Φ fault on a 3-Φ synchronous generator using PSCAD.
8. Power flow analysis of an IEEE interconnected system using MATLAB .
9. Fault analysis of an IEEE 9-bus test system using POWERWORLD or MIPOWER.
10. Power system transient analysis of opened line, short circuited line using PSCAD/MATLAB .
11. ABCD constants and regulation of a 3-Φ transmission line Model using PSCAD.
12. Receiving end power circle diagrams of a 3-Φ transmission line model.
13. Sending end power circle diagrams of a 3-Φ transmission line model.
14. Voltage profile improvement using shunt compensation for a model power system using POWERWORLD or MIPOWER.
15. Frequency and Power deviation of Two area Load Frequency control
16. Distance protection of transmission lines
17. Testing of CT and PT's, insulator strings.
18. Fault diagnosis of cables.
19. Finding the sequence impedances of 3-Φ synchronous machine
20. Finding the sequence impedances of 3-Φ Transformer.

VNR Vignana Jyothi Institute of Engineering and Technology

IV Year B.Tech EEE – I Sem	L	T/P/D	C
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(R11ECE1208) DIGITAL SIGNAL PROCESSING LABORATORY

The following experiments are to be performed using MATLAB

1) Circular Convolution
2) Correlation of signals and sequences
3) Discrete Fourier Transform
4) Power Density Spectrum
5) Filter Design
6) Implementation of Decimation and Interpolation processes, I/D sampling Rate Converters.
7) To find the Impulse Response/frequency response of given system in Transfer Function/Difference Equation Form

Getting familiarity with SimuLink:

i. Features of DSP Processor Kit (DSK)
ii. Installation Procedure for DSK
iii. Introduction To Code Composer Studio
iv. Procedure to Work On CCS

The following Experiments are to be performed using DSP Processor Kit.

1. To Verify Linear Convolution (AsSembly Language program Using 67XX Instructions).
2. To Verify Circular Convolution.
3. Design FIR (Low Pass/High Pass) using Windowing Technique.
    i. Using Rectangular Window
    ii. Using Triangular Window
    iii. Using Kaiser Window
4. To Design IIR Filter (Low Pass and High pass).
5. To Find The FFT Of given 1-D Signal And Plot
6. To Compute Power Density Spectrum Of a Sequence

IVYear B.Tech EEE –II Sem	L	T/P/D	C
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(R11EEE1125) UTILIZATION OF ELECTRICAL ENERGY

UNIT I

ILLUMINATION ENGINEERING

Nature of light, units, sensitivity of the eye, luminous efficiency, glare. Production of Light; Incandescent lamps and discharge lamps LED Lamps - fluorescent lamps-polar curves, effect of voltage variation on efficiency and life of lamps, Distribution and control of light, lighting calculations, solid angle, inverse square and cosine laws-calculations, factory lighting, flood lighting and street lighting-problems.

UNIT II

HEATING AND WELDING

Electrical heating-advantages, methods and applications, resistance oven general construction, design of heating elements, efficiency calculations. Induction heating: core type furnaces, core less furnaces and high frequency eddy current heating, dielectric heating: principle and applications - Problems, arc furnaces: direct arc furnaces, Indirect arc furnaces, Problems.

Electric welding- types, merits and demerits.

UNIT III

TRACTION

Advantages and disadvantages of electric traction. Mechanics of train movement: simplified speed time curves, Quadrilateral and Trapezoidal speed time curves. Average and scheduled speed, tractive effort, specific energy consumption, factors affecting specific energy consumption, problems.

UNIT IV

TRACTION MOTORS

DC motors, DC series motor and Induction motor, starting and control of traction motors, braking of traction motors. Modern 25 KV A.C. single phase traction systems: advantages, equipment and layout of 25 KV, single phase A.C. traction.

UNIT V

ELECTRIC DRIVES

Individual and collective drives- electrical braking, plugging, rheostatic and regenerative braking load equalization, use of fly wheel criteria for selection of motors for various industrial drives. Characteristics and speed control of various DC and AC motors, Electric Drive Applications to lifts and cranes, problems.

TEXT BOOKS:

1. Utilisation 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. Utilization of Electrical Power by J.B.Gupta, Kataria publishers.

IV Year B.Tech EEE – II Sem	L	T/P/D	C
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Elective – IV

(R11EEE1126) ADVANCED CONTROL SYSTEMS

Objective :

This subject deals with state space, describing function, phase plane and stability analysis including controllability and observability. It also deals with modern control and optimal control systems.

UNIT – I

STATE SPACE ANALYSIS

State Space Representation, Solution of State Equation, State Transition Matrix, Canonical Forms – Controllable Canonical Form, Observable Canonical Form, Jordan Canonical Form.

Tests for controllaboratoryility 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 functions, describing function analysis of nonlinear control systems.

UNIT-III

PHASE-PLANE and STABILITY ANALYSIS

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

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

MODAL CONTROL

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

UNIT-V

CALCULUS OF VARIATIONS and OPTIMAL CONTROL

Minimization of functionals 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 problems. State regulator problem. Output regulator problem. Tracking problem, Continuous-Time Linear Regulators

TEXT BOOKS

1.Modern Control System Theory – by M. Gopal, New Age International Publishers, 2nd edition, 1996.

REFERENCES

1.Modern Control Engineering – by K. Ogata, Prentice Hall of India, 3rd edition, 1998

2.Control Systems Engineering by I.J. Nagarath and M.Gopal,New Age International (P) Ltd.

3.Digital Control and State Variable Methods – by M. Gopal, Tata Mc Graw-Hill Companies.

4. Systems and Control by Stainslaw H. Zak , Oxford Press, 2003.

IV Year B.Tech EEE – II Sem	L	T/P/D	C
	3	1	3

Elective-IV

(R11EEE1133) ELECTRICAL ENGINEERING MATERIALS

UNIT-I

Classification of Electrical Engineering Materials and Conducting Materials

Classification of materials into conducting, semi conducting and insulating materials through a brief reference to their atomic structures and energy bands

Conducting Materials

Introduction, Resistance and factors affecting it such as alloying and temperature etc, Superconductor, Classification of conducting material as low resistivity and high resistivity materials, Low resistance materials

Copper: Its general properties as conductor, resistivity, temperature coefficient, density, mechanical properties of hard-drawn and annealed copper, corrosion, contact resistance. Application in the field of electrical engineering.

Aluminum: General properties as conductor, resistivity, temperature coefficient, density, mechanical properties of hard and annealed aluminum, solderability, contact resistance. Applications in the field of electrical engineering.

Steel: General properties as conductor, resistivity, corrosion, temperature coefficient, density, mechanical properties, solderability, Applications in the field of electrical engineering.

Introduction to handle conductors and its applications

Low resistivity copper alloys: Brass, Bronze (cadmium and Beryllium), their practical applications with reasons for the same 2.5 Applications of special metals e.g. Silver, Gold, Platinum etc.

High resistivity materials and their applications e.g., manganin, constantin, Nichrome, mercury, platinum, carbon and tungsten, Superconductors and their applications

UNIT-II

Semi-conducting Materials and Advances

Introduction, Semi-conductors and their properties, Different semi-conducting materials (silicon and germanium) used in manufacture of various semiconductor devices (i.e p-type and n-type semiconductors), Materials used for electronic components like resistors, capacitors, diodes, transistors and inductors etc., Advanced Semiconductor materials

UNIT-III

Insulating materials- General Properties & Applications:

General Properties

Electrical Properties: Volume resistivity, surface resistance, dielectric loss, dielectric strength (breakdown voltage) dielectric constant

Physical Properties: Hygroscopicity, tensile and compressive strength, abrasive resistance, brittleness
Thermal Properties: Heat resistance, classification according to permissible temperature rise. Effect of overloading on the life of an electrical appliance, increase in rating with the use of insulating materials having higher thermal stability, Thermal conductivity, Electro-thermal breakdown in solid dielectrics
Chemical Properties: Solubility, chemical resistance, weather ability
Mechanical properties: mechanical structure, tensile structure
Applications
Plastics, Definition and classification
Thermosetting materials: Phenol-formaldehyde resins (i.e. Bakelite) amino resins (urea formaldehyde and Malamine-formaldehyde), epoxy resins – their important properties and applications
Thermo-plastic materials: Polyvinyl chloride (PVC), polyethelene, silicons, their important properties and applications
Natural insulating materials, properties and their applications:
Mica and Mica products, Asbestos and asbestos products, Ceramic materials (porcelain and steatite),
Glass and glass products, Cotton, Silk, Jute, Paper (dry and impregnated), Rubber, Bitumen, Mineral and insulating oil for transformers switchgear capacitors, high voltage insulated cables, insulating varnishes for coating and impregnation, Enamels for winding wires, Glass fiber sleeves, Gaseous materials; Air, Hydrogen, Nitrogen, SF6 and their properties and applications
UNIT-IV
Magnetic Materials:
Introduction - ferromagnetic materials, permeability, B-H curve, magnetic saturation, and hysteresis loop (including) coercive force and residual magnetism, concept of eddy current and hysteresis loss, curie temperature, magneto striction effect.
Soft Magnetic Materials:
Alloyed steels with silicon, high silicon, alloy steel for transformers, low silicon alloy steel for electric rotating machines, Cold rolled grain oriented steels for transformer, Non-oriented steels for rotating machine, Nickel-iron alloys, Soft Ferrites, Hard magnetic materials Tungsten steel, chrome steel, hard ferrites and cobalt steel, their applications

UNIT-V
Special Materials:
Thermocouple, bimetals, lead soldering and fuse material, their applications
Introduction of various engineering materials necessary for fabrication of electrical machines such as motors, generators, transformers etc.
Materials and the future (Reference from India 2020 by Dr.A P J Abdul Kalam)

Text Books:

1. Electrical and Electronic Engineering Materials by SK Bhattacharya, Khanna Publishers.
2. Electrical Engineering Materials by PL Kapoor, Khanna Publishers, New Delhi

Reference Books:

1. Electronic Components and Materials by Grover and Jamwal, Dhanpat Rai and Co.,
2. Electrical Engineering Materials by Sahdev, Unique International Publications
3. Electronic Components and Materials by SM Dhir, Tata Mc Graw Hill, New Delhi
4. Electronic Engineering Materials by ML Gupta, Dhanpat Rai & Sons, New Delhi
5. India 2020, A vision for the New Millennium by Dr.A P J Abdul Kalam with Y.S.Rajan
6. Electrical & Electronics Engineering Materials BR Sharma and Others, Satya Parkashan.

IV Year B.Tech EEE – II Sem	L	T/P/D	C
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Elective-IV

(R11EEE1127) EHV AC TRANSMISSION

UNIT – 1

Line and ground reactive parameters:

Necessity of EHV AC transmission – advantages and problems–power handling capacity and line losses- mechanical considerations – resistance of conductors – properties of bundled conductors – bundle spacing and bundle radius- Examples. Line inductance and capacitances – sequence inductances and capacitances – modes of propagation – ground return –Design of grounding grids- Examples

UNIT – II

Voltage gradients of conductors Electro static field:

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

Corona effects:

Power loss and audible noise (AN) – corona loss formulae – charge voltage diagram – generation, characteristics - limits and measurements of AN – relation between 1-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 – Insulation coordination-Examples.

UNIT- IV

Travelling wave theory

Lightning Phenomena-Travelling wave expression and solution- source of excitation- terminal conditions- open circuited and short-circuited end- reflection and refraction coefficients-

Lumped parameters of distributed lines-generalized constants-No load voltage conditions and charging current.

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.

Text Books:

1. Rokesh Das Begamudra, “Extra High Voltage AC Transmission Engineering, Third Edition”. New Age International (P) Ltd: 2006.
2. M.S Naidu, “High Volage Engineering, 2 Edition” Tata MG Hill.

Reference Books:

1. High Voltage Engineering Fundamentals, Second Edition E. Kuffel, J.Kufel, W.S.Zeengl.
2. High Voltage Engineering and Testing Author: H M Ryan, Institute of engineering and technology.

IV Year B.Tech EEE – II Sem	L	T/P/D	C
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Elective-IV

(R11EEE1128) RENEWABLE ENERGY SOURCES

UNIT-I

SOLAR ENERGY

Photo voltaic power generation, spectral distribution of energy in solar radiation, solar cell configurations, voltage developed by solar cell, photo current and load current, practical solar cell performance, commercial photo voltaic systems, test specifications for pv systems, applications of super conducting materials in electrical equipment systems.

UNIT-II

MAGNETOHYDRODYNAMIC (MHD) GENERATION

Principles of MHD power generation, ideal MHD generator performance, practical MHD generator, MHD technology.

UNIT-III

WIND ENERGY

Wind Energy conversion: Power from wind, properties of air and wind, types of wind Turbines, operating characteristics. Tides and tidal power stations, Modes of operation , tidal project examples, turbines and generators for Tidal power generation. Wave energy conversion: properties of waves and Power content, vertex motion of Waves, device applications. Types of Ocean thermal energy conversion systems Application of OTEC systems Examples, micro hydel developments.

UNIT-IV

NON-CONVENTIONAL ENERGY

Miscellaneous energy conversion systems: coal gasification and liquefaction, biomass conversion, geothermal energy, thermo electric energy conversion, fuel cells and batteries, principles of EMF generation, description of fuel cells, description of batteries, battery application for large powers.

UNIT-V

CO-GENERATION AND ENERGY STORGE

Co-generation and energy storage, combined cycle co-generation, energy storage. Global energy position and environmental effects: energy units, global energy position. Environmental effects of energy conversion systems, pollution from coal and preventive measures steam stations and pollution, pollution free energy systems.

TEXT BOOK

1. “Energy conversion systems” by Rakosh das Begamudre, New age international publishers, New Delhi - 2000.

REFERNCE BOOK

1. “Renewble Energy Resources’’ by John Twidell and Tony Weir,2nd edition,Fspon & co.

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Elective-V

(R11EEE1129) MODERN POWER ELECTRONICS

UNIT-I

High-Power Semiconductor Devices:

Introduction, High-Power Switching Devices, Diodes, Silicon-Controlled Rectifier (SCR), Gate Turn-Off (GTO) Thyristor, Gate-Commutated Thyristor (GCT), Insulated Gate Bipolar Transistor (IGBT), Other Switching Devices, Operation of Series-Connected Devices, Main Causes of Voltage Unbalance ,Voltage Equalization for GCTs, Voltage Equalization for IGBTs

UNIT-II

Two-Level Voltage Source Inverter:

Introduction, Sinusoidal PWM , Modulation Scheme ,Harmonic Content, Overmodulation,Third Harmonic Injection PWM, Space Vector Modulation , Switching States , Space Vectors, Dwell Time Calculation, Modulation Index , Switching Sequence, Spectrum Analysis, Even-Order Harmonic Elimination, Discontinuous Space Vector Modulation.

UNIT-III

Cascaded H-Bridge Multilevel Inverters:

Introduction, H-Bridge Inverter, Bipolar Pulse-Width Modulation, Unipolar Pulse-Width Modulation, Multilevel Inverter Topologies, CHB Inverter with Equal dc Voltage, H-Bridges with Unequal dc Voltages, Carrier Based PWM Schemes, Phase-Shifted Multicarrier Modulation, Level-Shifted Multicarrier Modulation, Comparison Between Phase- and Level-Shifted,PWM Schemes , Staircase Modulation.

UNIT-IV

Diode-Clamped Multilevel Inverters:

Introduction, Three-Level Inverter , Converter Configuration, Switching State ,Commutation, Space Vector Modulation, Stationary Space Vectors , Dwell Time Calculation, Relationship Between *V_ref* Location and Dwell Times, Switching Sequence Design, Inverter Output Waveforms and Harmonic Content , Even-Order Harmonic Elimination, Neutral-Point Voltage Control, Causes of Neutral-Point Voltage Deviation

UNIT-V

DC-DC Switch-mode converters and Switching DC power supplies:

Introduction, control of dc-dc converter, Buck converter, boost converter, buck-boost converter, cuk dc-dc converter, full-bridge dc-dc converter, dc-dc converter comparison.

Linear power supplies, overview of switching power supplies, dc-dc converters with electrical isolation, control of switch mode dc power supplies, power supply protection, and electrical isolation in the feedback loop, designing to meet the power supply specifications.

TEXT BOOKS

1. Power electronics circuits, Devices and applications – M.H. Rashid PHI –I edition –1995.
2. "Power Electronics converters, Applications and Design" Ned Mohan, Tore M. Undeland and William P. Robbins, A John Wiley & Sons, Inc., Publication 3rd Edition.

REFERENCES

1. "High-Power Converters And Ac Drives" Bin Wu, A John Wiley & Sons, Inc.,

IV Year B.Tech EEE –II Sem	L	T/P/D	C
	3	1	3

ELECTIVE-V

(R11EEE1130) FLEXIBLE A.C. TRANSMISSION SYSTEMS

Unit I

FACTS concepts: Transmission interconnections power flow in an AC system, loading capability limits, Dynamic stability considerations, importance of controllable parameters basic types of FACTS controllers, benefits from FACTS controllers.

Unit II

Voltage source converters: Single phase three phase full wave bridge converters transformer connections for 12 pulse 24 and 48 pulse operation.

Three level voltage source converter, pulse width modulation converter, basic concept of current source Converters, and comparison of current source converters with voltage source converters.

Unit III

Static shunt compensation: Objectives of shunt compensation, midpoint voltage regulation, voltage instability prevention, improvement of transient stability, Power oscillation damping, Methods of controllable var generation, variable impedance type static var generators, switching converter type var generators, hybrid var generators.

Unit IV

SVC and STATCOM: The regulation and slope transfer function and dynamic performance, transient stability enhancement and power oscillation damping operating point control and summary of compensator control.

Unit V

Static series compensators: concept of series capacitive compensation, improvement of transient stability, power oscillation damping Functional requirements. GTO thyristor controlled series capacitor(GSC), thyristor switched series capacitor(TSSC), and thyristor controlled series capacitor(TCSC) control schemes for GSC TSSC and TCSC.

Text Book

1. “Understanding FACTS Devices” N.G. Hingorani and L. Guygi. IEEE Press Publications 2000.

IV Year B.Tech EEE – II Sem	L	T/P/D	C
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Elective-V

(R11EIE1124) PROGRAMMABLE LOGIC CONTROLLERS

UNIT-I

PLC Basics: PLC system, I/O modules and interfacing, CPU processor, programming Equipment, programming formats, construction of PLC ladder diagrams, Devices connected to I/O modules.

PLC Programming: Input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill press operation.

UNIT-II

Digital logic gates, programming in the Boolean algebra system, conversion examples

Ladder Diagrams for process control: Ladder diagrams and sequence listings, ladder diagram construction and flowchart for spray process system.

UNIT-III

PLC Registers: Characteristics of Registers, module addressing, holding registers, Input Registers, Output Registers.PLC Functions: Timer functions and Industrial applications, counters, counter function industrial applications, Arithmetic functions, Number comparison functions, number conversion functions

UNIT-IV

Data Handling functions: SKIP, Master control Relay, Jump, Move, FIFO, FAL, ONS, CLR and Sweep functions and their applications.Bit Pattern and changing a bit shift register, sequence functions and applications, controlling of two-axis and three axis Robots with PLC, Matrix functions.

UNIT-V

Analog PLC operation: Analog modulesand systems, Analog signal processing, Multi bit Data Processing, Analog output Application Examples, PID principles, position indicator with PID control, PID Modules, PID tuning, PID functions.

TEXT BOOKS

1. Programmable Logic Controllers- Principles and Applications by John W. Webb and Ronald A. Reiss, Fifth Edition, PHI.
2. Programmable Logic Controllers- Programming Method and Applications –JR.Hackworth andF.D Hackworth Jr. –Pearson, 2004.

IV Year B.Tech EEE –II Sem	L	T/P/D	C
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Elective-V

(R11ECE1132) EMBEDDED SYSTEMS

UNIT I

Embedded Computing : Introduction, Complex Systems and Microprocessor, The Embedded System. Design Process, Formalisms for System Design, Design Examples

The 8051 Architecture : Introduction, 8051 Micro controller Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts.

UNIT II

Basic Assembly Language Programming Concepts : The Assembly Language Programming Process,Programming Tools and Techniques, Programming the 8051. Data Transfer and Logical Instructions.

Arithmetic Operations, Decimal Arithmetic. Jump and Call Instructions, Further Details on Interrupts.

UNIT III

Applications : Interfacing with Keyboards, Displays, D/A and A/D Conversions, Multiple Interrupts, Serial Data Communication.

Introduction to Real – Time Operating Systems : Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environnent. (Chapter 6 and 7 from Text Book 3, Simon)

UNIT IV

Basic Design Using a Real-Time Operating System : Principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (Open Source); Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using LABORATORY Tools, An Example System.

UNIT V

Introduction to advanced architectures: ARM and SHARC, Processor and memory organization and Instruction level parallelism; Networked embedded systems: Bus protocols, I2C bus and CAN bus; Internet-Enabled Systems, Design Example-Elevator Controller.

TEXT BOOKS

1. Computers and Components, Wayne Wolf, Elseveir.
2. The 8051 Microcontroller, Kenneth J.Ayala, Thomson, Third Edition.

REFERENCES

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