COURSE STRUCTURE
AND
DETAILED SYLLABUS

COLLEGE CODE: C4

ELECTRICAL & ELECRONICS ENGINEERING

B.TECH. FOUR YEAR DEGREECOURSE
(Applicable for the batches admitted from2018-2019)

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

Narasampet, Warangal – 506 332
Telangana State, India

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

ELECTRICAL & ELECTRONICS ENGINEERING
COURSE STRUCTURE
(Applicable from the batch admitted from 2018-19 onwards)

IYEAR **I SEMESTER**

S.No	Subject Code	Subject	Marks		Hours /Week			Credits
			Internal	External	L	T	P	
1.	J1001	Mathematics- I	30	70	3	1	0	4
2.	J1011	English	30	70	2	0	0	2
3.	J1501	Programming for Problem Solving	30	70	3	1	0	4
4.	J1201	Basic Electrical Engineering	30	70	3	1	0	4
5.	J1302	Engineering Graphics	30	70	1	0	4	3
6.	J1012	English Language and Communication Skills Lab	30	70	0	0	2	1
7.	J1502	Programming for Problem Solving Lab	30	70	0	0	3	1.5
		Total			**12**	**3**	**9**	**19.5**

I YEAR **IISEMESTER**

S.No	Subject Code	Subject	Marks		Hours /Week			Credits
			Internal	External	L	T	P	
1.	J2002	Mathematics – II	30	70	3	1	0	4
2.	J2007	Engineering Physics	30	70	3	1	0	4
3.	J2008	Engineering Chemistry	30	70	3	1	0	4
4.	J2503	Object Oriented Programming	30	70	3	0	0	3
5.	J2504	Object Oriented Programming Lab	30	70	0	0	3	1.5
6.	J2009	Engineering Physics and Chemistry Lab	30	70	0	0	3	1.5
7.	J2304	Engineering Workshop & IT Work Shop	30	70	1	0	3	2.5
		Total			**13**	**3**	**9**	**20.5**

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II YEAR **ISEMESTER**

S.No.	Code	Subject	Marks		Hours /Week			Credits
			Internal	External	L	T	P	
1.	J3003	Transformation and Complex Variables	30	70	3	1	0	4
2.	J3205	Electromagnetic Fields	30	70	2	1	0	3
3.	J3206	Electrical circuits-I	30	70	2	1	0	3
4.	J3210	DC Machines & Transformers	30	70	2	1	0	3
5.	J3401	Electronics Devices and Circuits	30	70	3	0	0	3
6.	J3404	Electronics Devices and Circuits Lab	30	70	0	0	3	1.5
7.	J3207	Electrical Circuits Lab	30	70	0	0	3	1.5
8.	J3211	Electrical Machines-I Lab	30	70	0	0	3	1.5
		Total			**12**	**4**	**9**	**20.5**
9	JMC01	Environmental Science	30	70	3	0	0	0

II YEAR **IISEMESTER**

S.No.	Code	Subject	Marks		Hours /Week			Credits
			Internal	External	L	T	P	
1.	J4212	Electrical circuits-II	30	70	2	1	0	3
2.	J4213	ACMachines	30	70	2	1	0	3
3.	J4215	Power systems-I	30	70	2	1	0	3
4.	J4414	IC Applications	30	70	3	0	0	3
5.	J4216	Electrical Measurements & Instrumentation	30	70	2	1	0	3
6.	J4214	Electrical Machines-II Lab	30	70	0	0	3	1.5
7.	J4420	IC Applications Lab	30	70	0	0	3	1.5
8.	J4217	Electrical Measurements &InstrumentationLab	30	70	0	0	3	1.5
		Total			**11**	**4**	**9**	**19.5**
9	JMC02	Gender Sensitization	100	--	2	0	0	0

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III YEAR ISEMESTER

S.No.	Code	Subject	Marks		Hours /Week			Credits
			Internal	External	L	T	P	
1.	J5218	Power system-II	30	70	2	1	0	3
2.	J5219	Control Systems	30	70	2	1	0	3
3.	J5221	Power Electronics	30	70	2	1	0	3
4.		**Open Elective-I**	30	70	3	0	0	3
5.		**ProfessionalElective-I**	30	70	3	0	0	3
6.	J5222	Power Electronics Lab	30	70	0	0	3	1.5
7.	J5220	Control Systems Lab	30	70	0	0	3	1.5
		Total			**12**	**3**	**6**	**18**
8.	JMC03	Constitution of India	30	70	3	0	0	0

III YEAR IISEMESTER

S.No.	Code	Subject	Marks		Hours /Week			Credits
			Internal	External	L	T	P	
1.	J6226	Static Drives	30	70	2	1	0	3
2.	J6227	Switch Gear and Protection	30	70	2	1	0	3
3.	J6228	Computer Methods in Power Systems	30	70	2	1	0	3
4.	J6424	Microprocessors& Microcontrollers	30	70	2	1	0	3
5.		**Open Elective-II**	30	70	3	0	0	3
6.		**ProfessionalElective-II**	30	70	3	0	0	3
7.	J6229	Simulation of Electrical Systems Lab	30	70	0	0	3	1.5
8.	J6430	Microprocessors& Microcontrollers Lab	30	70	0	0	3	1.5
9.	J6280	Summer Internship	100	--	0	0	2	1
		Total			**14**	**4**	**8**	**22**

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IV YEAR **ISEMESTER**

S.No.	Code	Subject	Marks		Hours /Week			Credits
			Internal	External	L	T	P	
1.	J7233	Power System Operation & Control	30	70	2	1	0	3
2.	J7235	Utilization of Electrical Energy	30	70	2	1	0	3
3.		**Open Elective-III**	30	70	3	0	0	3
4.		**ProfessionalElective-III**	30	70	3	0	0	3
5.		**ProfessionalElective-IV**	30	70	3	0	0	3
6.	J7234	Power Systems Simulation lab	30	70	0	0	3	1.5
7.	J7281	Mini Project	100	--	0	0	5	2.5
		Total			**13**	**2**	**8**	**19**

IVYEAR **II SEMESTER**

S.No.	Code	Subject	Marks		Hours /Week			Credits
			Internal	External	L	T	P	
1.	J8242	Fundamentals of HVDC & FACTS	30	70	3	0	0	3
2.		**ProfessionalElective-V**	30	70	3	0	0	3
3.		**Professional Elective –VI**	30	70	3	0	0	3
4.	J8282	Technical Seminar	100	--	0	1	0	1
5.	J8283	Comprehensive Viva-Voce	100	--	0	2	0	2
6.	J8284	Major Project	30	70	0	0	18	9
		Total			**9**	**3**	**18**	**21**
7	J8285	*NSS			0	0	0	2

* Refer Academic Regulation, Item no.01 sub section (ii)

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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ELECTRICAL & ELECTRONICS ENGINEERING

LIST OF PROFESSIONAL ELECTIVES

Professional Elective-I:

S.No.	Subject Name	Subject Code	Preferred Semester
1.	Renewable Energy Sources	J5223	V
2.	Energy Storage Systems	J5224	V
3.	Special Electrical Machines	J5225	V

Professional Elective-II:

S.No.	Subject Name	Subject Code	Preferred Semester
1.	Electrical Distribution Systems	J6230	VI
2.	Electrical Estimation and Costing	J6231	VI
3.	Power Quality	J6232	VI

ProfessionalElective-III:

S.No.	Subject Name	Subject Code	Preferred Semester
1.	High Voltage Engineering	J7236	VII
2.	Advanced Power System Protection	J7237	VII
3.	Industrial Electrical Systems	J7238	VII

ProfessionalElective-IV:

S.No.	Subject Name	Subject Code	Preferred Semester
1.	Advanced Control Systems	J7239	VII
2.	Power system Dynamics	J7240	VII
3.	Linear system Analysis	J7241	VII

Professional Elective-V:

S.No.	Subject Name	Subject Code	Preferred Semester
1.	Smart Grid	J8243	VIII
2.	Modern Power Electronic Converters	J8244	VIII
3.	Power System Reliability	J8245	VIII

Professional Elective-VI:

S.No.	Subject Name	Subject Code	Preferred Semester
1.	Soft Computing Techniques	J8246	VIII
2.	Digital Control systems	J8247	VIII
3.	Extra high Voltage AC Transmission	J8248	VIII

B.TECH

I YEAR
I & II SEMESTER
SYLLABUS

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

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(J1001) MATHEMATICS - I

B.Tech I-Year I-Semester: Common toallbranches	**L**	**T**	**P**
	C3	**1**	**0**
			4

Pre-requisites: Mathematical Knowledge at pre-university level

Objectives: The Students able to learn

1. Types of matrices and theirproperties.
2. Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linearequations.
3. Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonicalform
4. Concept ofSequence.
5. Concept of nature of theseries.
6. Geometrical approach to the mean value theorems and their application to the mathematicalproblems
7. Evaluation of surface areas and volumes of revolutions ofcurves.
8. Evaluation of improper integrals using Beta and Gammafunctions.
9. Partial differentiation, concept of total derivative Finding maxima and minimaof function of two and threevariables.

UNIT-I

Matrices: Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; Skew-Hermitian; orthogonal matrices; Unitary Matrices; rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; solving system of Homogeneous and Non-Homogeneous equations. Gauss-elimination method; Gauss Seidel Iteration Method.

UNIT-II

Eigen values and Eigen vectors: Linear Transformation and Orthogonal Transformation: Eigen values and Eigenvectors and their properties: Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of the Quadratic Forms; Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III

Sequence: Definition of a Sequence, limit; Convergent, Divergent and Oscillatory sequences.

Series: Convergent, Divergent and Oscillatory Series; Series of positive terms; Comparison test, p-test, D-Alembert's ratio test; Raabe's test; Cauchy's Integral test; Cauchy's root test; logarithmic test. Alternating series: Leibnitz test; Alternating Convergent series: Absolute and ConditionallyConvergence.

UNIT-IV

Calculus: Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series. Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-V

Multivariable calculus (Partial Differentiation and applications): Definitions of Limit and continuity.

Partial Differentiation; Euler's Theorem; Total derivative; Jacobian; Functional dependence &independence, Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

Text books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36thEdition,2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9thEdition, John Wiley &Sons,2006.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition,Pearson, Reprint, 2002.

References:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, LaxmiPublications, Reprint,2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi,11thReprint,2010.

***Outcomes*:** After learning the contents of this paper the student must be able to

1. Write the matrix representation of a set of linear equations and to analyse the solution of the system ofequations
2. Find the Eigenvalues and Eigenvectors
3. Reduce the quadratic form to canonical form using orthogonal transformations.
4. Analyse the nature of sequence andseries.
5. Solve the applications on the mean valuetheorems.
6. Evaluate the improper integrals using Beta and Gammafunctions
7. Find the extreme values of functions of two variables with/ without constraints.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J1011) ENGLISH

B.TechI-YearI-Semester:EEE	**L**	**T**	**P**
	C2	**0**	**0**
			2

Introduction:
In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. *The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts andcultures.*

Learning Objectives: The course will help to
1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Equip students to study academic subjects more effectively and critically usingthe theoretical and practical components of English syllabus.
3. Develop study skills and communication skills in formal and informalsituations.

Course Outcomes: Students should be able to
- Use English Language effectively in spoken and writtenforms.
- Comprehend the given texts and respondappropriately.
- Communicate confidently in various contexts and differentcultures.
- Acquire basic proficiency in English including reading and listening comprehension, writing and speakingskills.

SYLLABUS

UNIT –I

'The Raman Effect' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes.

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Basic Writing Skills: Sentence Structures - Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for writing precisely – **Paragraph writing** – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT –II

'Ancient Architecture in India' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Synonyms and Antonyms.

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Improving Comprehension Skills – Techniques for Good Comprehension

Writing: Format of a Formal Letter-**Writing Formal Letters** E.g.., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT –III

'Blue Jeans' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-skills of Reading- Skimming and Scanning

Writing: Nature and Style of Sensible Writing- **Defining- Describing** Objects, Places and Events – **Classifying**- Providing Examples or Evidence

UNIT –IV

'What Should You Be Eating' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Comprehension- Intensive Reading and Extensive Reading

Writing: Writing Practices--Writing Introduction and Conclusion - Essay Writing- Précis Writing.

UNIT –V

'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook 'English for Engineers' published by Cambridge University Press. Vocabulary: Technical Vocabulary and their usage

Grammar: Common Errors inEnglish

Reading: Reading Comprehension-Exercises forPractice

Writing: **Technical Reports**- Introduction – Characteristics of a Report – Categories of Report Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Prescribed Textbook:

1. **Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.**

References:

1. Swan, M. (2016). Practical English Usage. Oxford UniversityPress.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford UniversityPress.
3. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper ResourceBook.
5. Hamp-Lyons, L. (2006).Study Writing. Cambridge UniversityPress.
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford UniversityPress.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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(J1501) Programming for Problem Solving

B.TechI-YearI-Semester:EEE

L	T	P
C3	1	0
		4

Course Objectives:
1. To introduces the basics of computers and informationtechnology.
2. To educate problem solvingtechniques.
3. To impart programming skills in Clanguage.
4. To practice structured programming to solve real lifeproblems.
5. To study the concepts of Assembler, Macro Processor, Loader andLinker

UNIT-I
History and Classifications of Computers – Components of a Computer – Working Principle of Computer – Hardware – Software and its Types – Applications of Computers –Network and its Types – Internet and its services – Intranet– Extranet – Generations of Programming Languages Introduction to Number System.

UNIT-II
Problem solving techniques – Program development life-cycle – Algorithm – Complexities of Algorithm – Flowchart – Pseudo code. Introduction to C –C Program Structure – C tokens: Keyword, Identifiers, Constants, Variable, Data types (simple and user-defined) – Operators and its types – Operator Precedence – Expression Evaluation – Type Conversion – Input/outputoperations.

UNIT-III
Branching Statements – Looping Statements – Arrays – Multidimensional arrays. Functions: Function Prototype, Passing Arguments to Function – Call by Value and Call by Reference – Nested function call – Library Functions – User-defined Functions – Recursion. Strings – String I/O functions, String Library functions – Storage classes

UNIT-IV
Structures – Arrays and Structures – Nested structures – Structure as Argument to functions– Union Pointers – Declaration, Initialization and Accessing Pointer variable – Pointers and arrays – pointers as argument and return value – Pointers and strings - pointers and structures.

UNIT-V
Introduction to File Concepts in C – File types – I/O operations on files – File modes – Random access to files – Command line arguments. Dynamic Memory Allocation: MALLOC, CALLOC, FREE, REALLOC Introduction to preprocessor – Macro substitution directives – File inclusion directives – Compiler Control directives – Miscellaneousdirectives.

Text Books:
1. J. B. Dixit, "Computer Fundamentals and Programming in C", Firewall Media,2009.
2. Balagurusamy. E, "Programming in ANSI C", Tata McGraw Hill, Sixth edition,2012.

Reference Books:
1. Ashok N Kamthane, "Computer Programming", Pearson education, Second Impression,2008.
2. Venugopal.KandKavichithra.C,"ComputerProgramming",NewAgeInternationalPublishers,FirstEdition, 2007.
3. Byron S Gottfried, "Programming with C", Schaum's Outlines, Second Edition, Tata McGraw-Hill,2006.

4. Dromey R.G., “How to Solve it by Computer”, Pearson Education, Fourth Reprint,2007.
5. Kernighan,B.W and Ritchie,D.M, “The C Programming language”, Second Edition,Pearson Education,2006.

Course Outcomes:

1. Know the fundamentals ofcomputers
2. Uunderstand applying logical skills for problemsolving
3. Learn C programming languageconcepts
4. Apply C programming language concepts for problemsolving
5. Gain knowledge in using memory management techniques in programming skills

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J1201) BASIC ELECTRICAL ENGINEERING

B.Tech I Year I-Semester: EEE **L T P C**
3 1 0 4

Course Objectives:

1. To introduce the concepts of Electrical circuits and itscomponents.
2. To understand magnetic circuits, DC circuits and AC single phase & three phasecircuits
3. To study and understand the different types of DC/AC machines andTransformers.
4. To import the knowledge of various electricalinstallations.
5. To understand the working of different types of powerplants

UNIT –I DC Circuits

Electrical circuit elements (R, L and C) ,Definition of Voltage, Current, Power & Energy, Ohm's law, Voltage and Current sources,KVL & KCL- Division of current in Series & parallel circuits - analysis of simple circuits with DC excitation. Definition of Superposition, Thevenin's and Norton's Theorems, Time-domain analysis of first-order RL and RC circuits–Simple Problems.

UNIT –II AC Circuits

Representation of sinusoidal waveforms, Peak and RMS values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase AC circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel) -resonance.
Three phase balanced circuits, voltage and current relations in star and delta connections-Power measurement by two wattmeter method.

UNIT –III Electrical Machines

Law of Electromagnetic induction, Fleming's Right & Left hand rule - Generation of rotating magnetic fields, Principle of DC rotating machine, Types of DC machines, three-phase induction motor, Significance of torque-slip characteristic, single phase transformer, Auto transformer, single phase induction motor and synchronous motor, synchronous generators (Qualitative approach only)

UNIT –IV Electrical Installations

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

UNIT –V Power Plants

Layout of Thermal, Hydro and Nuclear power generation (block diagram approach only).Components of AC transmission and distribution systems –One linediagram.

Text-Books:

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGrawHill.
2. D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill,2009.
3. Electrical Machines – byP.S.Bimbra
4. Generation, Distribution and Utilization of electrical energy by C.L.Wadhwa, Newage InternationalPublishers.

Reference-Books:

1. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6th edition.
2. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford UniversityPress,2011.
3. E. Hughes, "Electrical and Electronics Technology", Pearson,2010.
4. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India,1989.

Course Outcomes: After going through this course the student gets Knowledge on

1. Electrical circuits using network laws andtheorems.
2. Analyze basic Electric and Magneticcircuits
3. Principles of ElectricalMachines
4. Low Voltage ElectricalInstallations
5. Working of different types of powerplants And increase employability

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)
(J1302) ENGINEERING GRAPHICS

B.TECH. I YEAR – I SEM: CSE & EEE	**L**	**T**	**P**	**C**
	1	**0**	**4**	**3**

Pre-requisites: Nil

Course objectives:

1. To Use various engineering drawing instruments along with learn the basics of drawings, dimensioning, scales and conic sections like ellipse, parabola andhyperbola.
2. To Learn projections of points, lines and plane viewed in differentpositions.
3. To Learn projections of solids and sections of solids in differentpositions.
4. To impart knowledge of development of surfaces and intersections is most useful of real time applications inindustry.
5. Attain the concept of isometric, orthographicprojections.

UNIT – I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Scales – Plain & Diagonal.

UNIT- II

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures.—Auxiliary Planes.

UNIT – III

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere

UNIT – IV

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Intersection of Solids: Intersection of – Prism vs Prism- Cylinder Vs Cylinder

UNIT – V

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa –Conventions

Introduction to CAD: (For Internal Evaluation Weightage only): Introduction to CAD Software Package Commands.- Free Hand Sketches of 2D- Creation of 2D Sketches by CAD Package

TEXTBOOKS:

1. Engineering Drawing N.D. Bhatt /Charotar
2. Engineering Drawing / N. S. Parthasarathy and Vela Murali/Oxford

REFERENCE BOOKS:

1. Engineering Drawing / Basant Agrawal and McAgrawal/ McGrawHill
2. Engineering Drawing/ M. B. Shah, B.C. Rane /Pearson.
3. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBSPublishers

Course Outcomes:

1. Select, construct and interpret appropriate drawing scales as per the situation and able to draw simplecurves.
2. Graduates are able to draw orthographic projections of points ,lines andplanes.
3. Able to draw the orthographic projections of solids and sections ofsolids.
4. Layout development of solids for practical situations along with able to draw sections of solids.
5. Comprehend the isometricprojections.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J1012) English Language and Communication Skills Lab

B.Tech I Year I-Semester: EEE

L	T	P	C
0	0	2	1

The **Language Lab** focuses on the production and practice of sounds of language. It familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

1. To facilitate computer-assisted multi-media instruction enablingindividualized and independent languagelearning
2. To sensitize the students to the nuances of English speech sounds, word accent, intonation andrhythm
3. To bring about a consistent accent and intelligibility in students' pronunciationof English by providing an opportunity for practice inspeaking
4. To improve the fluency of students in spoken English and neutralize theirmother tongueinfluence
5. To train students to use language appropriately for public speaking, group discussions andinterviews

Syllabus:

The language Lab shall have two parts:

Computer Assisted Language Learning (CALL) Lab

Interactive Communication Skills (ICS)Lab

Listening Skills:

Objectives:

- To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve theirpronunciation
- To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds andregions**.**
- Students should be given practice in listening to the sounds of the language to be able to recognize them, to distinguish between them to mark stress and recognize and use the right intonation insentences.
- Listening for generalcontent
- Listening to fill upinformation
- Intensivelistening
- Listening for specificinformation

Speaking Skills:

Objectives:

- To make students aware of the role of speaking in English and its contribution to their success.
- To enable students to express themselves fluently and appropriately in social and professionalcontexts.
- Oralpractice
- Describingobjects/situations/people
- Role play
- Just A Minute (JAM)Sessions.

Reading Skills:

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

- To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferencesetc.
- Skimming and Scanning thetext
- Understanding the gist of anargument
- Identifying the topicsentence
- Inferring lexical and contextual meaning
- Understanding discourse features

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

Writing Skills:
Objectives:

- To develop an awareness in the students about writing as an exact and formalskill
- To equip them with the components of different forms of writing, beginning with the lower order ones. Writingsentences
- Use of appropriatevocabulary
- Paragraphwriting
- Coherence andcohesiveness
- Narration /description
- NoteMaking
- Formal and informal letterwriting

The following course content is prescribed for the Lab.

Exercise – I
CALL Lab:
Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening.
Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab:
Understand: Communication at Work Place- Spoken vs. Written language.
Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II
CALL Lab:
Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context.
Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.
ICS Lab:
Understand: Features of Good Conversation – Non-verbal Communication.
Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III
CALL Lab:
Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).
Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.
ICS Lab:
Understand: How to make Formal Presentations.
Practice: Formal Presentations.

Exercise – IV
CALL Lab:
Understand: Listening for General Details.
Practice: Listening Comprehension Tests.
ICS Lab:
Understand: Public Speaking – Exposure to Structured Talks.
Practice: Making a Short Speech – Extempore.

Exercise – V
CALL Lab:
Understand: Listening for Specific Details.
Practice: Listening Comprehension Tests.
ICS Lab:
Understand: Interview Skills.
Practice: Mock Interviews.

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English languagelearning software for self- study by students.

System Requirement (Hardware component):
Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:
i) Computers with SuitableConfiguration
ii) High FidelityHeadphones
2. Interactive Communication Skills (ICS) Lab: A Spacious room with movable chairs and audio-visual aids with a Public-Address System, a LCD and a projectoretc.

Prescribed Lab Manuals:

- *ELCS Lab Manual – A Workbook for CALL and ICS Lab Activities*. Hyderabad,Orient Black Swan Pvt. Ltd. 2016.Print.
- Hart, Steve. Nair, Aravind R. and Bhambhani, Veena. *EMBARK- English for Undergraduates*. Delhi. Cambridge University Press. 2016.Print.

Suggested Software:

- Cambridge Advanced Learner's dictionary with CD, Fourthedition.
- Oxford Advanced Learner's Compass, 8th Edition, withCD.
- Hancock, Mark. *English Pronunciation in Use: Intermediate*. United Kingdom. Cambridge University Press,2007.
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE byCLIFFS).

References:

- Mohanraj, Jayashree. *Let Us Hear Them Speak.* New Delhi: Sage Texts. 2015.Print.
- Hancock, M. *English Pronunciation in Use. Intermediate Cambridge*. Cambridge University Press. 2009.Print.

Learning Outcomes: Students will be able to attain

1. Better understanding of nuances of English language through audio- visual experience and groupactivities
2. Neutralization of accent for intelligibility
3. Speaking skills with clarity and confidence which in turn enhancestheir employabilityskills.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J1502) PROGRAMMING FOR PROBLEM SOLVING LABORATORY

B.Tech I Year I-Semester: EEE

L	T	P	C
0	0	3	1.5

Course Objectives:

1. To study and understand the use of OScommands
2. To expose the undergraduate students to the practical implementation of C Programming concepts
3. To improve students capability in applying C Programming for problemsolving.
4. To make students use effective memory management techniques inprogramming
5. To expose students to modular programming concepts in problemsolving

LIST OF EXPERIMENTS:

Week 1: Study of OS commands

Week 2: Study of Compilation and execution of simple C programs

Week 3: Basic C Programs

a.Arithmetic Operations

b. Area and Circumference of a circle

c. Swapping with and without Temporary Variables

Week 4: Programs using Branchingstatements

a. To check the number as Odd orEven

b. Greatest of Three Numbers

c. CountingVowels

d. Grading based on Student'sMark

Week 5: Programs using ControlStructures

a. Computing Factorial of anumber

b. Fibonacci Series generation

c. Prime NumberChecking

d. Computing Sum ofDigit

Week 6: Programs using String Operations

a. PalindromeChecking

b. Searching and Sorting Names

Week 7: Programs using Arrays

Week 8: Programs usingFunctions

a. Computing nCr

b. Factorial usingRecursion

c. Call by Value and Call byReference

Week 9: Programs using Structure

a. Student Information System

b. Employee Pay SlipGeneration

c. Electricity Bill Generation

Week 10: Programs using Pointers

a. Pointer andArray

b. Pointer tofunction
c. Pointer toStructure

Week 11: Programs using File Operation
a. Counting No. of Lines, Characters and BlackSpaces
b. Content copy from one file toanother
c. Reading and Writing Data inFile

Text Books:

1. J. B. Dixit, “Computer Fundamentals and Programming in C”, Firewall Media,2009.
2. Balagurusamy. E, “Programming in ANSI C”, Tata McGraw Hill, Sixth edition,2012.

Course Outcomes:
1. Learn practical implementation of C programming languageconcepts.
2. Debug and document programs inC.
3. Know usage of logical skills in developing Cprograms.
4. Apply effective memory management techniques for problemsolving
5. Understand the file managementtechniques

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J2002) MATHEMATICS - II

B.TechI-YearII-Semester

L	T	P	C
3	1	0	4

Pre-requisites: Mathematical Knowledge at pre-university level

Objectives: The Students able to learn

1. Methods of solving the differential equations of first and higherorder.
2. Evaluation of multiple integrals and theirapplications
3. The physical quantities involved in engineering field related to vector valuedfunctions
4. The basic properties of vector valued functions and their applications to line, surfaceand volumeintegrals.

UNIT-I

First Order ODE: Exact, linear and Bernoulli's equations; Applications: Newton's law of cooling, Law of natural growth and decay; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT-II

Ordinary Differential Equations of Higher Order: Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type polynomials in, and ; method of variation of parameters; Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

UNIT-III

Multivariable Calculus (Integration): Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals. Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

UNIT-IV

Vector Differentiation: Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotational vectors.

UNIT-V

Vector Integration: Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

TextBooks:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition,2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley&Sons,2006
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition,Pearson, Reprint, 2002.

References:

1. Paras Ram, Engineering Mathematics, 2nd Edition, CBSPublishes
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India,1984.

Outcomes: After learning the contents of this paper the student must be able to

1. Identify whether the given differential equation of first order is exact ornot
2. Solve higher differential equation and apply the concept of differential equation to realworld problems.
3. Evaluate the multiple integrals and apply the concept to find areas andvolumes.
4. Evaluate the line, surface and volume integrals and converting them from one toanother.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

(J2007) ENGINEERING PHYSICS

B.Tech I-YearII-Semester:EEE **L T P C**

3 1 0 4

CourseObjectives:

1. Enable the student to connect the historical development of quantum mechanics and learn the basic principles of quantum mechanics and employs the Bloch's theorem to draw the band structure of solids on the basis of Kronig Pennymodel.

2. The students learn basic theory of semiconductors and principles and operations of optoelectronicdevices.

3. The Students to understand the basic properties of light, Concepts of LASER and it's engineeringapplications

4. Enable the students to learn the basic principles of dielectrics, magnetic superconductors and their engineering applications and also learn the preparation, dimensional characteristics of nano materials along with their engineeringapplications

5. Enable the students to learn about the types of oscillation, mechanics, which helps in analyzing and solving the engineeringproblems.

UNIT-I: Quantum Mechanics

Introduction to quantum mechanics**,** Wave nature of the particle, de-Broglie's hypothesis, Davisson and Germer's experiment, GP Thompson experiment, Heisen berg's uncertainty principle, Schrodinger time independent wave equation, Particle in one dimensional box.

Band theory of Solids: Electron in periodic potential – Bloch theorem**,** Kronig–Penny Model, Brillion zone concept, Effective mass of an electron, Origin of energy band formation-Classification of materials.

UNIT-II: Semiconductor Physics:

Introduction to intrinsic and extrinsic semiconductors, Carrier concentration in conduction band and valancy band of intrinsic and extrinsic semiconductor, Fermi level, Effect of carrier concentration and temperature on Fermi level, Hall Effect- Applications of semiconductors.

Semiconductor Optoelectronics: Radative and Non-radative recombination mechanisms in semiconductors, Formation of PN junction diode-V-I characteristics, Zener diode - characteristics, Solar cell and LED- Construction and working mechanism .

UNIT-III: Optics

Huygens' principle, Superposition of waves and interference of light by wave front splitting and amplitude splitting; Young's double slit experiment, Newton's rings, Michelson interferometer, Farunhofer diffraction from a single slit, Diffraction grating and resolving power.

LASERS: Introduction-characteristics of lasers, absorption, spontaneous emission, stimulated emission, Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, Ruby laser, He-Ne laser, Semiconductor diode laser, applications of lasers in science, Engineering and Medicine

UNIT-IV: Dielectric Materials

Introduction-Types of Polarizations, derivation for electronic and ionic polarizabilities, internal fields in solids, Clausius Mossotti equation, Ferro electricity, structure of $BaTiO_3$, piezo-electricity.

Magnetic Materials: Introduction-origin of magnetic moment, Bohr Magneton, classification of Dia, Para and Ferro magnetic materials, Hysteresis curve, Soft and hard magnetic materials; Superconductivity- properties, BCS theory, Type –I &II Superconductors-Applications.

UNIT-V: Oscillations, waves

Simple harmonic motion, Damped and forced simple harmonic oscillator, damped harmonic oscillator – heavy, critical and light damping quality factor, forced mechanical oscillators, mechanical impedance, steady state motion of forced damped harmonic oscillator.

Mechanics: Motion of a rigid body in the plane; Rotation in the plane; Kinematics in a coordinate system rotating and translating in the plane; Angular momentum about a point of a rigid body in planar motion; Euler's laws of motion, their independence from Newton's laws, and their necessity in describing rigid bodymotion.

Text Books:

1. Introduction to Quantum Physics-Eisberg andResnick
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-HillInc.
3. H.J. Pain, The Physics of vibrations andwaves
4. Quantum Mechanics-Decker
5. Ian G. Main, Oscillations and waves inphysics

REFERENCE :

1. Engineering Physics, P.K Palanisamy, ScitechPublications.
2. Applied Physics- Dr. N Chandra Shaker and P. AppalNaidu
3. Applied Physics for Engineers- P. Madhusudana rao, Academic PublishingCompany.
4. Engineering Physics, V. Rajandran, Tata mc. Graw Hill BookPublishers
5. Introduction to Mechanics — MKVerma

Course Outcomes:

1. The student learns about solving engineering solutions employing the quantum mechanical concepts

2. The students learns about the physics of semiconductor materials and along with their applications in science and engineering

3. The student learns about the construction, working and applications of LASER inengineering.

4. The students get exposure to dielectric and magnetic materials and their engineering applications.

5. The students learn about theory of waves and oscillation and mechanics of rigid bodies for engineeringapplications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES (UGC-AUTONOMOUS)

(J2008) ENGINEERING CHEMISTRY

B.TechI-YearII-Semester:EEE

L	T	P	C
3	1	0	4

Course Objectives:

1. To achieve the knowledge about various kinds of Orbitals & Splittingpatterns.
2. To know about the water quality and its parameters, learning the knowledge in the assessment of water quality andpurification.
3. To achieve the knowledge about various kinds of Electrochemical cells and batteries and corrosionphenomenon.
4. To understand the reactions, mechanism and stereochemistry of organicmolecules.
5. Understand the principle, instrumentation and applications of Spectroscopictechniques.

Unit-1: Molecular structure and Theories of Bonding:

Atomic and Molecular orbitals. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2,O_2 and F_2 molecules. π molecular orbitals of butadiene and benzene.

Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metalion d- orbitals in Tetrahedral, Octahedral and square planar geometries. Band structure of solids and effect of doping onconductance.

Unit-2: Water and its treatment:

Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Potable water and its specifications. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization. Boiler feed water and its treatment – Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange process. Desalination of water – Reverse osmosis. Numerical problems.

Unit-3: Electrochemistry and corrosion:

Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation Determination of pH of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications. Numerical problems. Potentiometric titrations. Batteries – Primary (Lithium cell) and secondary batteries (Lead – acid storage battery and Lithium ion battery).

Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application. Electroless plating of Nickel.

Unit-4: Stereochemistry, Reaction Mechanism and synthesis of drug molecules:

Introduction to representation of 3-dimensional structures, Structural and stereoisomers, configurations, symmetry and chirality. Enantiomers, diastereomers, optical activity and Absolute configuration. Conformation alanalysis of n- butane.

Substitution reactions: Nucleophilic substitution reactions: Mechanism of S_N1, S_N2 reactions. Electrophilic and nucleophilic addition reactions: Addition of HBr to propene. Markownikoff and anti Markownikoff's additions. Grignard additions on carbonyl compounds. Elimination reactions: Dehydro halogenation of alkylhalides. Saytzeff rule. Oxidation reactions: Oxidation of alcohols using $KMnO_4$ and chromicacid.

Reduction reactions: reduction of carbonyl compounds using $LiAlH_4$& $NaBH_4$. Hydroboration of olefins. Structure, synthesis and pharmaceutical applications of Paracetamol and Aspirin.

Unit-5: Spectroscopic techniques and applications:

Principles of spectroscopy, selection rules and applications of electronic spectroscopy. vibrational and rotational spectroscopy. Basic concepts of Nuclear magnetic resonance Spectroscopy, chemical shift. Introduction to Magnetic resonance imaging.

Text books:

1. Text Book of Engineering Chemistry by A.Jayashree, Wiley publications, NewDelhi.
2. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, NewDelhi
3. Text Book of Engineering Chemistry by ShashiChawla.
4. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengagelearning, New Delhi.(2016).
5. Text Book of Engineering Chemistry by C. Parameshwara Murthy. B.S.Publications.
6. Text Book of Engineering Chemistry by Y. Bharathi kumari and Jyotsna Cherikuri, VGS Publications.

Course Outcomes:

Students will gain the basic knowledge of atomic and molecular orbitals & Splitting patterns.

1. They can understand the basic properties of water and its usage in domestic and industrial purposes.
2. To gain the knowledge about the Electrochemical cells, batteries and corrosion phenomenon.
3. They learn about organic reactions and the stereochemistry of organicmolecules.
4. They can predict potential applications of spectroscopy and practical utility in order to become good engineers and entrepreneurs.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J2503) OBJECT ORIENTED PROGRAMMING

B.TechI-YearII-Semester:EEE

L	T	P	C
3	0	0	3

Course Objectives:

1. To expose the students to the concepts of Object-OrientedParadigm
2. To improve students capability in applying object oriented programming concepts in problemsolving.
3. To improve students expertise in implementing object oriented concepts using C++Programming
4. To enable students to understand concepts of templates and exceptionalhandling.
5. To study the concepts of Assembler, Macro Processor, Loader andLinker

UNIT- I

Principles of Object Oriented Programming: Procedure Vs Object Oriented, Paradigm, Basic concepts, benefits, Applications and Object Oriented Languages.

Introduction: Program structure, Creating, Compiling and Linking of C++ program.

Token, Expression and Control Structures: Tokens, Keywords, Identifiers and Constants, Data Types, Operators, Precedence, Type Compatibility, Control Structures, New Features of C++.

Functions: Function Prototype and Parameter Passing, Inline Functions, Default, Constant Arguments, Recursion, Function Overloading, Function Template.

UNIT -II

Classes and Objects: Defining classes and Member functions, Arrays, Static Members, Friend Functions.

Constructors and Destructors: Type of Constructors, Dynamic Initialization of Objects, Destructors.

UNIT – III

C++ operator overloading: Fundamentals, restrictions, overloading unary / binary operators, overloading ++ and --, Manipulation of Strings.

C++ Inheritance: Defining derived classes, Types of Inheritance, Virtual Base class Abstract Class, Nesting of classes.

UNIT- IV

Pointers and Polymorphism: Pointers and Generic pointer, Pointer to Objects and Derived Classes, this pointer, Virtual Functions, Virtual Destructors.

C++ Stream Input/Output: Streams, Stream classes, Formatted and Unformatted operations, Manipulators. **Files:** Classes for file Stream operations, Sequential and Random access operations, Command line Arguments

UNIT-V

C++ Templates: Introduction, class templates, member function template, overloading template functions.

C++ Exception Handling: Try, throw, catch

Text Books:

1. E. Balagurusamy **"**Object Oriented Programming with C++" , McGraw-Hill Education (India), 6th Edition 2013

2. Bjarne Stroustrup "The C++ Programming Language", Pearson Education, 5th Edition(2013)

3. Robert Lafore **"**Object-Oriented Programming in C++ " 4th Edition Sams Publishing,2002

Reference Books:

1. K.R. Venugopal, Rajkumar, T.Ravishankar, "Mastering C++", McGraw-Hill Education India Pvt.Ltd, Second Edition, ISBN: 0-07-463454-2, 1997.

2. Timothy Bud, "An Introduction to Object Oriented Programming", Pearson Education, SecondEdition, ISBN 81-7808-228-4,2004.

Course Outcomes:

1. Know the differences between procedural language and object-oriented languages

2 .Gain knowledge of Object-Oriented Paradigm for problem solving

3. Will be able to gain practical knowledge of OOP concepts usingC++

4. Apply reusability concepts like inheritance, polymorphism in application development

5.Use generic programming concepts and modularprogramming.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J2504) OBJECT ORIENTED PROGRAMMING LAB

B.Tech I-YearII-Semester:EEE

L	T	P	C
0	0	3	1.5

Course Objectives:

1. To expose the students to the practical implementation of Object-Oriented concepts using C++ programminglanguage
2. To improve students capability of object oriented programming for problemsolving
3. This course provides in-depth coverage of object-oriented programming principles and techniques using C++.
4. Topics include classes, overloading, data abstraction, information hiding, encapsulation, inheritance, polymorphism, file processing, templates, exceptions, container classes, and low-level languagefeatures.
5. To make students capable of using reusability and generic programming concepts indeveloping applications

LIST OF EXPERIMENTS:

Experiment-I

1. Read 10 numbers and displays them in sortedorder.
2. Write functions to swap two numbers using pointers andreferences.
3. Write a program that prints the sizes of the fundamental types, a few pointer types and a few enumeration of your choice. Use the size ofoperator.

Experiment-II

4. Write a function that counts the number of occurrences of pair of letters in a string, for example thepair "ab" appears twice in"xabaacbaxabb".
5. Find LCM of two, three and four numbers using functionoverloading.
6. Create a structure for storing students details (sno, sname, course, Array of five subject's marks) provide the functions for printing the total marks, calculating percentage and the result. (Note: Include the functions within thestructure).

Experiment-III

7. Write a macro to find square (A+B)-square(C+D).
8. Create a class for complex number and provide methods for addition, subtraction, multiplicationand division. Display the output in "a+ib"form.
9. Create a Distance class and provide methods for addition and subtraction of twodistances.

Experiment-IV

10. Create a complex number class with default, parameterized, copy constructors and adestructor.
11. Create a class which provides a method to count the number of objects that are created for that class. (Use staticmethod).
12. Create a class INT that behaves exactly like an int. (Note: overload +, -, *, /,%).

Experiment-V

13. Create a string class and overload + to concatenate two Strings, overload () to print substring and overload <, <=, >, >=, = = operators to compare two stringobjects.
14. Create Date class and overload ++ to print next date and overload -- to print previousdate.

Experiment-VI
15. Create a user defined array class Array and overload + to add two arrays, overload * to multiplytwo arrays, overload [] to access given position element and also to use left side of an assignmentoperator.
16. Create a complex number class and overload +, -, * operators using friendfunctions.
17. Program to perform Matrix operations using operator overloading with friendfunctions.

Experiment-VII
18. Programs to demonstrate Single, Multiple, Multilevel, Hierarchical, Hybrid and Multipathinheritance.
19. Programs to demonstrate constructors ininheritance.

Experiment-VIII
20. Create a Shape class with methods perimeter, area. Derive classes Circle, Square and Triangle from Shape class. Provide implementation for perimeter, area in the derived classes. (Declare perimeter, area as pure virtual functions).
21. Implement Multipath inheritance by declaring pointers to base class and access the derivedclass methods using base classpointers.
22. Program to demonstrate ofmanipulators

Experiment-IX
23. Write a function template to overload max method, which can find maximum of any datatype.
24. Create function template to sort an array, which can sort array of anytype.
25. Create a Generic calculator class to perform +, -, *, / operations on anytype.
26. Create a Generic class for array of variable size and provide sorting, searching on anytype.

Experiment-X
27. Find the roots of a quadratic equation. Handle exception for divide byzero.
28. Handle the Array Index out of Bounds Exception when accessing the elements ofArrays.
29. Create a text file of student information and display the contents offile.

Experiment-XI
30. Write a program to read a text file and remove all white space characters and replaceeach alphanumeric character with next character in the alphabet (Replace z by a and 9 by0).
31. Copy the contents of one file into another except the blank lines using command linearguments.
32. Create a file with floating point numbers. Read pair of floating numbers from the file and write into anotherfile.

Experiment-XII
33. Read the contents of three files concatenate them and displayit.
34. Write complex numbers into a file in binary format and in characterformat.
35. Create a class with integers and overload << to place integer into a file and overload >> to read an integer.

Course Outcomes:
After completion of the course, the student will be able to…
1: gain knowledge of implementing Object-Oriented Programming concepts using C++
2: know the application of Object-Oriented Programming concepts for developing applications
3: debug and document programs in C++
4: develop applications using modularization technique
5: apply reusability and generic programming concepts in application development

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J2009) ENGINEERING PHYSICS AND CHEMISTRY LAB

B.TechI-YearII-Semester:EEE

L	T	P	C
0	0	3	1.5

COURSE OBJECTIVES:

This course on Physical Sciences lab has been designed with 18 experiments in Physics and Chemistry. The objective of the course is that

1. Student will have exposure to various experimental skills which is very essential foran engineeringstudent.
2. The experiments are selected from various areas of physics and chemistry likePhysical Optics, Lasers, Fiber optics, waves and oscillations, semiconductors, Electricity, Conductometry, Potentiometry,etc...
3. The student is also exposed to various tools like Screw Gauge, Vernier callipers,Physical balance, Spectrometer, Microscope, Viscometer, and stalagmometer,etc…

PHYSICS LAB (CYCLE-1)

(Any Six Experiments compulsory)

1. Determination of Eenergy gap of semiconductor material of p-n junctiondiode.
2. Determination of frequency of electrical vibrator by using Melde'sexperiment.
3. Determination of wavelength of LASER by using diffractiongrating.
4. Determination of rigidity modulus of a given wire using Torsionalpendulum.
5. R-C circuitanalysis.
6. Determination of Numerical aperture of a given opticalfiber.
7. Determination of the radious of curvature of plano-convex lens by formingNewton's rings
8. LED-characteristics

CYCLE-

2CHEMISTRY

LAB

1. Determination of total hardness of water by complexometric method usingEDTA
2. Estimation of an HCl by Conductometrictitrations
3. Estimation of Acetic acid by Conductometrictitrations
4. Estimation of HCl by Potentiometrictitrations
5. Determination of rate constant of acid catalysed hydrolysis of methylacetate
6. Synthesis of Aspirin andParacetamol
7. Thin layer chromatography calculation of R_f values. egortho and para nitrophenols
8. Verification of freundlich adsorption isotherm-adsorption of acetic acid oncharcoal
9. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
10. Determination of surface tension of a give liquid usingstalagmometer.

Laboratory Manuals:

1. Laboratory Manual Of Engineering Physics By Dr. Y.Aparna And Dr K.Venkateswara Rao (V.G.SPublishers)
2. Practical Engineering Chemistry by K. Mukkanti, etal' B'S' Publications,Hyderabad.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

(J2304) ENGINEERING WORKSHOP & IT WORKSHOP

B.TECH. I YEAR – II SEM: EEE	L	T	P	C
	1	0	3	2.5

COURSE OBJECTIVES:

1. Know the usage of various tools and their application in carpentry, tinsmithy.
2. Know the usage of various tools and their application in black smithy, foundry, weldingand housewiring.
3. Make lap joint and dove tail joint incarpentry.
4. Make scoop, funnel and tray like items in tinsmithy.
5. Use one – way, two-way switches, parallel and series connections in house wiring. 6.Know the basics ofwelding.

UNIT – I

TRADES FOR EXERCISES: (Ten exercises are required to perform from the following trades)

1. Carpentry2
2. Fitting2
3. Tin – Smithy 2
4. Black Smithy1
5. House – wiring2
6. Plumbing 1

UNIT - II

TRADES FOR DEMONSTRATION & EXPOSURE

1. Demonstration of Powertools
2. Welding.

UNIT – III

IT WORKSHOP I: Computer hardware, identification of parts, Disassembly, Assembly of computer to working condition, simple diagnostic exercises.

IT WORKSHOP II: Installation of operating system windows and Linux simple diagnostic exercises.

TEXTBOOKS:

1. Workshop Manual – P.Kannaiah / K.L.Narayana/SciTech Publishers.
2. Workshop Manual – Venkat Reddy/BS Publication / 6th Edition.

COURSE OUTCOMES:

The students will be able to

1. Know the fundamental knowledge of various trades and their usage in real timeapplications.
2. Gain knowledge of Welding, Black smithy, Fitting, and housewiring.
3. Understand the basis for analyzing power tools in construction and wood working,electrical engineering and mechanicalengineering.
4. Use basic concepts of computer hardware for assembly anddisassembly.

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B.TECH

IIYEAR
I & II SEMESTER
SYLLABUS

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J3003) Transforms and Complex variables

B.TechII-YearI-Semester:EEE **L T P C**

3 1 0 4

Course Objectives: To learn

1. Concept, properties of Laplacetransforms
2. Solving ordinary differential equations using Laplace transformstechniques.
3. Expressing a periodic function by Fourier series and a non-periodic function by Fourier transforms
4. Differentiation and integration of complex valuedfunctions.
5. Evaluation of integrals using Cauchy's integral formula and Cauchy's residuetheorem.
6. Expansion of complex functions using Taylor's and Laurent'sseries.
7. Evaluation of the real integrals and transformations of one plane to anotherplane.

UNIT-I: Laplace Transforms

Laplace Transforms; Laplace Transform of standard functions; first shifting theorem; Laplace transforms of functions when they are multiplied and divided by't'. Laplace transforms of derivatives and integrals of function; Evaluation of integrals by Laplace transforms; Laplace transforms of Special functions; Laplace transform of periodic functions.

Inverse Laplace transform by different methods, convolution theorem (without Proof), solving ODEs by Laplace Transform method.

UNIT-II: Fourier series &Fourier transforms

Fourier series, Dircherlet's Conditions, Half-range Fourier series. Fourier Transforms, Fourier Sine and cosine transforms, Inverse Fourier transforms

UNIT-III: Complex Variables (Differentiation)

Limit, Continuity and Differentiationof Complex functions. Cauchy-Riemann equations (without proof), Milne- Thomson methods, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) and their properties

UNIT-IV: Complex Variables (Integration)

Line integrals, Cauchy's theorem, Cauchy's Integral formula, Liouville's theorem, Maximum-Modulus theorem (All theorems without proof); zeros of analytic functions, singularities, Taylor's series, Laurent's series; Residues, Cauchy Residue theorem (without proof)

UNIT-V: Evaluation of real integrals and conformal transformation

Evaluation of Real Integrals using Residues: ,

Introduction, linear and inverse Transformations, Bilinear Transformations, Conformal mapping

Text Books:

- B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition,2010.
- S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition,2005.
- J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc-Graw Hill,2004.

References

- M. K. Jain, SRK Iyengar, R.K. Jain, Numerical methods for Scientific andEngineering Computations , New Age International publishers.
- Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley &Sons,2006.

Course outcomes:

After learning the contents of this paper the student must be able to

1. Use the Laplace transforms techniques for solvingODE's
2. Express any periodic function in terms of sines andcosines.
3. Express a non-periodic function as an integralrepresentation.
4. Analyse the complex function with reference to their analyticity, integrationusing Cauchy's integral and residuetheorems
5. Taylor's and Laurent's series expansions of complexfunction
6. Evaluate the real integrals and transformations of one plane to anotherplane

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J3205) ELECTROMAGNETIC FIELDS

B.Tech II Year I-SemesterEEE

L	T	P	C
2	1	0	3

Pre requisites:
Knowledge of Mathematics, Vector Algebra and Basic concepts Engineering Physics.

Course Objectives:
1. To Study the relation between the electric field and the magnetic field, about the various laws governing the concepts of thesefields.
2. To understand the behavior of conductors and dielectrics, their boundary conditions, Maxwell's equations with respect to electrostatics and magnetostatics.
3. To utilize the concepts related to Static magnetic fields – Biot-Savart'slaw
4. To utilize the concepts related to time varying fields, about scalar and vector magnetic potential, self and mutualinductance.
5. To Study the phenomena of energy stored and energy density in electrostatics and magneto statics, and Poyntingtheorem

UNIT-I

Electrostatics:
Types of Co-ordinate systems: Rectangular, Cylindrical, Spherical system.
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 – Guass's law – Application of Guass's Law – Maxwell's first law, div D= $_v$ – Laplace's and Poison's equations – Solution of Laplace's equation in one variable. Electric dipole – Dipole moment – potential and EFI due to an electric dipole – Torque on an Electric dipole in an electric field.

UNIT-II

Dielectrics & Capacitance:
Behavior of conductors in an electric field – Conductors and Insulators – Electric field inside a dielectric material – polarization –Boundary conditions –Conductor and Dielectric Boundary conditions– Capacitance – Capacitance of parallel plates, 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 – 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 Magnetic field intensity – Maxwell's second Equationdiv(B)=0.

Ampere's Law & Applications:
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:

Force in Magnetic fields: 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.

Magnetic Potential and Concept of Inductance: Scalar magnetic potential and its limitations – vector magnetic potential and its properties –vector Poisson's equations - Self and Mutual inductance – Neumann's formulae – determination of self-inductance of a solenoid and toroid - mutual inductance between a straight long wire and a square loop wire in the same plane – energy stored and energy density in a magneticfield.

UNIT – V

Time Varying Fields:

Time varying fields – Faraday's laws of electromagnetic induction– Maxwell's fourth equation: Curl (E) = – B/ t – Statically and Dynamically induced EMFs – Simple problems - Modification of Maxwell's equations for time varying fields– Integral and point forms – Concept of Displacement current, Modified form of Ampere's Law for TV fields, Power in EM Fields and Poynting theorem.

TEXT BOOKS

1. "Engineering Electromagnetics" by William H. Hayt & John. A. Buck Mc. Graw-Hill Companies, 7th Editon.2009.
2. "Electromagnetic Fields" by Matthew.N.O.Sadiku, OxfordPublications
3. Elements of Electromagnetic Fields by S. P. Seth, Dhanpat RaiPublications.

REFERENCE BOOKS:

1. "Introduction to ElectroMagnetics" by CR Paul and S.A. Nasar, Mc-Graw HillPublications
2. " Engineering Electro magnetics" by Nathan Ida, Springer(India) Pvt. Ltd. 2ndEdition
3. "Introduction to Electro Dynamics" by D J Griffiths, Prentice-Hall of India Pvt.Ltd,2nd edition
4. "Electromagnetics" by Plonsy andCollin
5. "Static and Dynamic Electricity"Smyth.
6. "Electromagnetics" by J P Tewari.
7. "Electromagnetics" by J. D Kraus Mc Graw-Hill Inc. 4th edition1992.

Course Outcomes:

After completion of this course the student will have the knowledge regarding-

1. The relation between the electric field and the magnetic field, about the various laws governing the concepts of thesefields.
2. The behavior of conductors and dielectrics, their boundary conditions, Maxwell's equations with respect to electrostatics and magneto statics.
3. The concepts related to Static magnetic fields – Biot-Savart'slaw
4. The concepts related to time varying fields, about scalar and vector magnetic potential, self and mutualinductance.
5. The phenomena of energy stored and energy density in electrostatics and magneto statics, the concepts of conduction, convection and displacement current density, their equations, Power in EM fields and Poyntingtheorem.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J3206) ELECTRCAL CIRCUITS-I

B.Tech II Year ISemesterEEE **L T P C**
2 1 0 3

Course Objectives:

1. To Study the basics of circuit concepts, electrical parameters, and SourceTransformation
2. To Study the single phase AC circuits, three phase AC circuits andResonance
3. To Understand Locus diagrams, steady state and Transient analysis of AC & DCcircuits
4. To Study various circuits using network theorems ,analyzing Two-PortNetworks
5. To Study the series and parallel magneticcircuits

UNIT-I

Introduction to Electrical circuits: Ohm's law, R-L-C parameters, Voltage and Current sources, dependent and independent sources, Source Transformation, Voltage & Current relationship for passive elements for different input signals (square, ramp, saw-tooth, triangular).KCL, KVL, network reduction techniques, series, parallel, series-parallel, Star-Delta, Delta-Star transformations. Nodal analysis, Mesh analysis, Super node and Super mesh for DC excitations.

UNIT-II

Single phase AC Circuits: R.M.S, average values and from factor for different periodic wave forms-steady state analysis of R, L, C (in different combination) with sinusoidal excitation – concept of reactance, impedance, susceptance and admittance. Phase and phase difference, concept of power factor, real and reactive power, J-notation, complex and polar forms of representation, complex power, Resonance: Series, parallel circuits, concept of bandwidth and Q-factor.

Three phase circuits: Phase sequence – Star and delta connection – Relation between line and phase voltages

UNIT –III

Locus diagram: Series R-L, R-C, R-L-C and parallel combination with variation of various parameters.

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 – Classical method and Laplace transforms methods of solutions.

UNIT-IV

Network Theorems (with D.C and A.C Excitation): Super position, Reciprocity, Norton's, Thevenin's, Maximum power transfer, Milliman's Tellegen's and compensation theorems and Problems.

Network Parameters: Two port Network parameters – Z, Y, ABCD and Hybrid parameters and their inter-relations– 2-port network parameters using transformed variables.

UNIT-V

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

Text books:

1. Engineering Circuit Analysis by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6^{th} edition.
2. Network Analysis by A.Sudhakar and Shyammohan S Palli, Tata MC GrawHill
3. Electrical Circuits by A.Chakrabarthy, Dhanpat Rai &Sons.

Reference Books:

1. Network Analysis by M.E. VanValkenberg.
2. Linear Circuit Analysis (time domain, Phasor and Laplace transform approaches) Second edition by Raymond A. Decarlo and Penmin – L in, Oxford University Press. Second edition, 2004.
3. Electrical Circuits Theory by K.RJeswaram, Pearson Education,2004.
4. Basic Circuits Analysis by D.R. Cunningham & J.A. Stuller, JaicoPublications.

Course Outcomes:

After going through this course the student gets a thorough knowledge on

1. Basics of circuit concepts, electricalparameters,
2. Single phase AC circuits, Three Phase AC circuits,Resonance
3. Locus diagram, Steady state analysis of AC & DCcircuits
4. Various circuits using network theorems and Two–port networkparameters
5. Analysis of series and parallel magneticcircuits

With which he/she can able to apply the above conceptual things to real-world problems and applications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J3210) DC MACHINES & TRANSFORMERS

B.Tech. II-YearI-SemesterEEE **L T P C2 1 0 3**

Pre requisites: To learn this course student should have the concepts on the following subjects: In depth knowledge of physics oriented toward dynamics, heat, electricity, magnetism and calculus, analytical co-ordinate geometry and trigonometry.

Course Objectives:

1. To introduce the concept of rotating machines and the principle of Electro mechanical energyconversion.
2. To understand the functioning of different types of D.C. generators and study their performance.
3. To study the different types of D.C. generatorsCharacteristics.
4. To study the working principles of various types of D.C. motors and their load characteristics, starting and methods of speedcontrol.
5. To estimate the various losses occurring in D.C. machines and to study the different testing methods to derive its efficiency characteristics.

UNIT –I

Basic Principles of Rotating Electrical machines: Principles of Electromechanical Energy Conversion, Singly and doubly excited systems.

D.C.Generators: Principle of operation– Action of commutator– constructional features armature windings– lap and wave windings– simplex and multiplex windings–use of laminated armature– E.M.F Equation. -Numerical Problems

UNIT –II

Armature reaction: Cross magnetizing and de-magnetizing AT/pole– Interpoles, compensating winding–commutation–reactance voltage–methods of improving commutation. Methods of Excitation – separately excited and self excited generators–build-up of E.M.F-critical field resistance and critical speed-causes for failure to self excitation and remedial measures. Applications and Load characteristics of shunt, series and compound generators. Parallel operation of dc generators, Load sharing, Use of equalizer bars. -Numerical Problems

UNIT –III

D.C Motors: Principle of operation–Back E.M.F, Torque equation, Classification of dc motors – Characteristics and application of shunt, series and compound motors–Armature reaction and commutation. Speed control of D.C. Motors: Armature voltage and field flux control methods. Motor starters (3 point and 4 point starters). -NumericalProblems

Losses in D.C. machines: Losses–Constant &Variable losses– calculation of efficiency condition for maximum efficiency. -Numerical Problems

Testing of dc machines: Direct, indirect and regenerative testing- Brake Test, Swinburne's Test, Hopkinson's Test, Retardation Test, Field's Test, and Operating Characteristics & Applications of dc motors. -Numerical Problems

UNIT –IV

Single phase Transformer: Principle of operation, constructional details of 1-phase Transformer, ideal transformer, Emf equation. Operation on no load and on load with phasor diagrams, Magnetic flux leakage, Equivalent- Resistor, Reactance, Impedance, Regulation, Efficiency- Numerical Problems on Regulation, Efficiency and All day efficiency. Losses in Transformer, variation of core losses depends on supply voltage and frequency, Separation of Core losses. -Numerical Problems

Testing of Transformer: Polarity test, O.C & S.C tests, Sumpner's test, Parallel operation, Load sharing.

Auto Transformer: Principle of working, saving of copper as compared to two winding Transformer and applications. -Numerical Problems

UNIT –V

Three Phase Transformers: Three phase transformers connections Y-Y, Δ-Δ, Δ-Y, and Y-Δ, with clock notation, Tertiary winding, V-V and Scott connections, Three winding Transformer, determination of Zp, Zs and Zt Transients in Switching

Tap Changing Transformers: Concept of tap changing, on-load and off load tap changers

Text Books

1. Electric Machines by I.J. Nagarath &D.P. Kothari, Tata McGraw–Hill Publishers, 3rdedition,2004.
2. Electro mechanics–I (D.C. Machines) S. Kamakshaiah, Hi-TechPublishers.
3. Electrical Machines byRajput

ReferenceBooks

1. Performance and Design of D.C Machines–by Clayton &Hancock, BPBPublishers
2. Electric Machinery– A.E.Frizgerald, C.Kingsley and S.Umans, McGraw- Hill Companies,5thediton
3. Electrical Machines–P.S. Bimbra., Khannapublishers
4. Electrical Machines -Bandhyopadhyaya

Course Outcomes:

After going through this course the student gets a thorough knowledge on.

1. Principle of Energy Conversions andtransformers
2. Construction and Operation of Generators, Motors andtransformers
3. Characteristics of Different Generators & Motors, Remedies to overcome the Problems of failure ofGeneration.And to increase the employability
4. Applications and Speed control of DCMotors.
5. Testing of DC Machines andtransformers

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JAYMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)
(J3401) ELECTRONIC DEVICES AND CIRCUITS

B.Tech. II Year I Sem: ECE& EEE **L TP C3 0 0 3**

Objectives:
This is a fundamental course, which provides basic knowledge and essential to be learned by every circuit branch student. This course will focus:

1. to understand the principles and working of PN Diode as a Rectifier and Circuit element aRegulator.
2. to understand basic principles and working of BJT,FET and SpecialDevices.
3. to understand basic principles and working of different types ofFETs.
4. to understand Biasing and stabilization concepts of BJT.
5. to understand Special purpose devices such as Solar cells, LED, UJT &SCR

UNIT - I:
P-N JUNCTION DIODE:
Qualitative Theory of P-N Junction, P-N Junction as a Diode, Diode Current Equation, Volt-Ampere Characteristics, Diode Equivalent Circuits, Breakdown Mechanisms. Zener Diode Characteristics.

UNIT-II
RECTIFIERS AND FILTERS: Half Wave and Full Wave Rectifiers, Rectifier with L, C,L-Section and Pi-Section filters, Regulators.

UNIT-III:
BIPOLAR JUNCTION TRANSISTOR :
The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, Transistor Configurations, Limits of Operation, Comparison of CB, CE and CC Amplifier Configurations.

UNIT-IV:
TRANSISTOR BIASING AND STABILIZATION:
Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Bias Compensation using Diodes and Thermistors, Thermal Runaway, Thermal Stability

UNIT-V:
FIELD EFFECT TRANSISTOR:
Construction, principle of operation, symbol and Volt-Ampere characteristics of JFET and MOSFET.
Special Purpose Devices and Their Operations: Varactor Diode, Tunnel Diode, Photo Diode, LED, Solar Cell ,UJT & SCR.

TEXT BOOKS:

1. Electronic Devices and Circuits – David A. Bell, Oxford UniversityPress
2. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj,TMH.
3. Semiconductor Physics and Devices – D.Neamen, D. Biswas, McGrawhill Education Publications

REFERENCE BOOKS:

1. Electronic Devices and Circuits – J. Millman, C.C. Halkias, SatyabrathaJit,TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, ,PEI/PHI.
3. Electronic Devices and Circuits - K. Lal Kishore,BSP.

COURSE OUTCOMES:

At the end of the course, the student will be able to:

1. Understand and Analyse the different types of diodes, operation and itscharacteristics.
2. Design and analyse the DC bias circuitry of BJT andFET.
3. Design biasing circuits using diodes andtransistors.
4. To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FETdevices.
5. To analyze and understand the special purpose diodes and their application inindustry.

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JAYMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J3404) ELECTRONIC DECVICES AND CIRCUITS LAB

II Year I Sem B.Tech: ECE&EEE **L T P C**
0 0 31.5

PART A: (Only for Viva-voce Examination)
Electronic Workshop Practice (In 3 Lab Sessions):

1. Identification, Specifications, Testing of R, L, C Components (ColorCodes) Bread Boards,PCB‟s
2. Identification, Specifications and Testing of ActiveDevices. Study and operationof
3. DigitalMultimeters
4. FunctionGenerator
5. Regulated PowerSupplies
6. CRO.

PART B:

1. Forward & Reverse Bias Characteristics of PN JunctionDiode
2. Zener diode characteristics & Zener voltageRegulator.
3. Half Wave Rectifier with & without filters.
4. Full Wave Rectifier with & without filters.
5. Input & Output Characteristics of Transistor in CBConfiguration.
6. Input & Output Characteristics of Transistor in CEConfiguration.
7. Calculation of h-Parameters from CEcharacteristics.
8. FETcharacteristics.
9. UJTCharacteristics.
10. Design of self biascircuit.

PART C: Equipment required for Laboratories:

1. Regulated Power supplies (RPS) -0-30 V
2. CRO-(20MHz)
3. Function Generators -0-1MHz.
4. Multimeters
5. Ammeters(0-200μA,0-20mA)
6. Voltmeters(0-20V)
7. Electronic Components -Resistors, Capacitors,BJTs.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J3207) ELECTRICAL CIRCUITS LAB

B.Tech. II Year I-SemesterEEE **L T P C**
0 0 3 1.5

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

1. Verification of Kirchhoff's laws and Tellegen'sTheorem.
2. Verification of Thevenin's and Norton'sTheorems.
3. Verification of Superposition and ReciprocityTheorems
4. Verification of Maximum power transferTheorem
5. Locus Diagrams of RL and RC SeriesCircuits.
6. Series and ParallelResonance.
7. Two port network parameters – Z – Y parameters, Analyticalverification.
8. Two port network parameters – A, B, C, D & Hybrid parameters, Analyticalverification.

In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted:

1. Measurement of voltage and current in 3-Phase star and deltanetworks.
2. Measurement of Active power for Star and Delta connected balancedloads.
3. Verification of Millman's Theorem and Compensationtheorem.
4. Determination of Self, Mutual Inductances and Coefficient ofcoupling.
5. Time response of first order RC / RL network for periodic non – sinusoidal inputs –Time constant and Steady state error determination.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J3211) ELECTRICAL MACHINES – I LAB

B. Tech. II Year I-Sem EEE

L	T	P	C
0	0	3	1.5

The following experiments are required to be conducted compulsory experiments:

1. Magnetization characteristics of DC shuntgenerator.
2. Load test on DC shuntgenerator.
3. Load test on DC seriesgenerator.
4. Load test on DC compoundgenerator.
5. Swinburne's test on DC Shunt Machine and Speed control of DC shuntmotor.
6. Brake test on DC compoundmotor.
7. Hopkinson's tests on DC shuntmachines.
8. Field's test on DC seriesmachines.

In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted:

9. Brake test on DC shuntmotor.
10. Retardation test on DC shuntmotor.
11. Separations of constant losses in DC shuntmotor.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(JMC01) ENVIRONMENTAL SCIENCE

B.TechII-YearI-Semester

L	T	P	C
3	0	0	0

Course Objectives:

1. Understanding the importance of ecological balance for sustainabledevelopment.
2. Understanding the impacts of developmental activities and mitigationmeasures.
3. Understanding the environmental policies andregulations.

UNIT –I

Human Environment and Ecosystem: Introduction, Types of Environment (Natural Environment and its components). Man Made Environment, Social Environment, Concern about the environment, Potential hazards of carelessness in development activities (Bhopal tragedy, Chernobyl Accident).

Eco System: Definition, Types, structure, functional components of ecosystem, food chain and food web, flow of energy in an ecosystem, ecological pyramids, Bio magnification, Bio geochemical cycles (Gaseous and sedimentary cycles), ecosystem services and values.

UNIT –II

Natural Resources: Classification of resources, Living and Non living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT –III

Biodiversity and Biotic Resources: Introduction, genetic, species and ecosystem diversity, value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values, India as a mega diversity nation, Hot spots of biodiversity, threats to biodiversity; habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-situ and Ex-situ conservation.

UNIT –IV

Environmental Pollution and Control Technologies:

Environmental Pollution: Classification of Pollution

Air Pollution: Primary and Secondary pollutants, air pollution problems, Ambient Air Quality Standards

Water Pollution: Source and types of pollution, problems due to water pollution, drinking water quality standards.

Soil Pollution: Source and types, Impacts of modern agriculture, degradation of soil.

Noise Pollution: Sources and health hazards, standards.

Solid Waste: Municipal solid waste management, composition and characteristics of E-waste and its management.

Pollution Control Technologies: Wastewater treatments methods: Primary, secondary, tertiary

UNIT –V

Global Environmental Problems and Global Efforts: Climate change and impact on human environment. Ozone depletion and Ozone depleting substance (ODS). Acid rains, Deforestation anddesertification.

International Conventions/Protocols: Earth Summit, Kyoto protocol and Montreal Protocol.

Text Books:

1. Text book of Environmental Studies for undergraduates courses by Erach Bharucha for University GrantsCommission.
2. Environmental Studies by R.Rajagopalan, Oxford University Press.

Reference:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. NewDelhi
2. Environmental Engineering and Science by Gilbert M. Masters and Wendell P. Ela 2008 PHI LearningPvt.Ltd
3. Environmental Science by Daniel B. Botkin and Edward A.Keller, Wiley IndiaEdition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New Age International Publishers.
5. Text Book of Environmental Science and Technology- Dr.M.Anji Reddy 2007 BS Publication.

Course Outcomes: After undergoing the course the student would be able to know about

1. Understanding ofEcosystem
2. Natural resources, Depletion of natural resources and preventionmethods
3. Biodiversity, Protection, sharing of thebiodiversity.
4. Environmental pollution- Understanding of water, soil, noise and air pollution and their controlmeasures.
5. Students can understand about global environmental problems and they are aware of globalefforts.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J4212) ELECTRICAL CIRCUITS-II

B. Tech. II Year II- SemesterEEE

L	T	P	C
2	1	0	3

Pre-Requisites: To learn this course, the students are required to have the basic concepts out of the following subjects:
Electrical Circuits-I, Mathematics-I, Mathematics-II

Course Objectives:

1. To Study the Three Phase balanced and unbalancedcircuits
2. To Study the Networkfunctions
3. To Analyze Concept and Design of various types of passiveFilters
4. To study Fourier analysis of A.C. Circuits and FourierTransforms
5. To Design the Electrical Circuit using Graph theory

UNIT – I
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.

UNIT – II
Network functions:
Driving point and transfer impedance and admittance functions- poles and zeros of network function–necessary conditions for driving point functions and transfer functions

UNIT – III
Filters - Introduction to filters –low pass – high pass and band pass – RC, RL, filters-constant K and m derived filters and composite filter design

UNIT – IV
Fourier analysis of A.C. Circuits – Fourier Theorem, consideration of symmetry, exponential form of Fourier series, line and phase angle spectra, Fourier integrals and Fourier transforms properties of Fourier transforms.

UNIT – V
Network topology: Definitions – Graph – Tree, Basic cut-set and Basic Tie-set matrices for planar networks – Loop and Nodal methods of analysis of Networks with dependent & independent voltage and current sources - Duality & Dual networks.

TEXT BOOKS:

2. Engineering circuit analysis – by William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6th edition.
3. Fundamentals of Electric Circuits by Charles Alexander and Mathhew N.O. Sadiku, 5th Edition, Mc GrawHill.
4. Electrical Circuits by David .A. Bell Oxford University Press, 7thEdition.
5. Networks and systems by D. Roy Chowdary, New Age Internationalpublishers
6. Circuit Theory by A. Chakrabarthy, Dhanpat Rai &Sons.

REFERENCE BOOKS:

1. Network Analysis by Van Valkenburg, PHI.
2. Network Theory by N.C. Jagan & C. Lakshminarayana, B.S Publications.
3. Electric Circuit theory by K. RJeswaran, Pearson Education,2004.
4. Network Analysis by C.K. Mithal, KhannaPublishers.

Course Outcomes:

After going through this course the student gets a thorough knowledge on

1. Analysis of Balanced and Unbalanced Three-phase systems Measurement of power in 3-Phase Systems usingwattmeter's
2. Poles and zeros of network function–necessary conditions for driving point functions and transfer functions
3. Operation and design of various filtercircuits
4. Fourier transforms Analysis of AC circuit through Fourierseries
5. NetworktopologyWith which he/she can be able to apply the above conceptual things to the real world electrical and electronics problems and applications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J4213) ACMACHINES

B.Tech. II-YearII-SemesterEEE **L T P**

C2 1 0 3

Pre requisites: To learn this course student should have the concepts on the following subjects: In depth knowledge of physics oriented toward dynamics, heat, electricity, magnetism and calculus, analytical co-ordinate geometry and trigonometry, DC Machines and Transformers

Course Objectives:

1. To deal with the detailed analysis of poly phase Synchronousgenerators.
2. To introduce the concept of regulation and its calculations
3. To introduce the concept of parallel operation of synchronousgenerators.
4. To deal with the detailed analysis of poly phase synchronousmotors
5. To understand operation, construction and types of single phase motors andtheir applications in house hold appliances and controlsystems

UNIT-I

Polyphase Induction Motors: Polyphase induction motors-construction details of cage and wound rotor machines-production of rotating magnetic field - principle of operation - rotor EMF and rotor frequency - rotor reactance, rotor current and pf at standstill and during operation, Slip speed, slip, rotor power input, rotor copper loss and mechanical power developed and their inter relation- -Numerical Problems

UNIT-II

Characteristics of Induction Motors: Torque equation - expressions for maximum torque and starting torque – torque-slip characteristics - equivalent circuit - Phasor diagram - crawling and cogging. -Numerical Problems-Testing of Induction Motor: No-load Test and Blocked rotor test –Predetermination of performance using Circle Diagram-Numerical Problems-Methods of starting-Starting current and Torque calculations. Speed Control Methods: Speed control-change of voltage, change of frequency, V/f, injection of an EMF into rotor circuit – Numerical Problems- Induction generator – principle of operation and its role in electrical systems.

UNIT-III

Construction, Principle of operation, Characteristics & regulation of synchronous Generator: Principle of operation, Constructional features of round rotor and salient pole machines, Armature windings-Integral slot and fractional slot windings; Distributed and concentrated windings Distribution Pitch and windings factors, E.M.F Equation. Harmonics ingenerated E.M.F-Superposition of harmonics, Armature reaction-Leakage reactance, Synchronous reactance and impedance, Experimental determination, Phasor diagram, Load characteristics. Regulation by synchronous impedance method, MMF 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 polealternators.

UNIT-IV

Parallel operation of Synchronous generators: Synchronizing alternators with infinite bus bars, Synchronizing power torque, Parallel operation and load sharing, Effect of change of excitation and mechanical powerinput.

Synchronous motors- principle of operation: Theory of operation, Phasor diagram, Variation of current and power factor with excitation synchronous condenser, Mathematical analysis for power developed.

Power circles: Excitation and power circles - Hunting and its suppression, Methods of starting, synchronous induction motor.

UNIT-V:

Single phase motors & Special machines Single phase Motors: Single phase induction motor-Constructional features-Double revolving field theory, Cross Field theory Equivalent Circuit - Spilt phase motors – Capacitor start Capacitor run motors, shaded pole motor. Principle of A.C. Series motor-Universal motor, Stepper motor, PMDC and Reluctance Motor. (Qualitative Treatment only)

TEXT BOOKS:

1. Electrical Machines – by P.S. Bimbra, KhannaPublishers.
2. Electric Machines- by I.J. Nagrath & D.P. Kothari, Tata Mc Graw-Hill Publishers, 3rd Edition 2006.

REFERENCE BOOKS:

1. Performance and Design of AC Machines, MG. Say, BPB Publishers
2. Electrical Machines by Mulukutla S.Sarma, Mukesh K. Pathak, Cengage Learning,2009.
3. Electric Machinery – by A.E. Fitzgerald, C.Kingsley and S.Umans,Mc Graw-Hill Companies, 5th edition, 1990.

Course Outcomes:

After going through this course the student gets a thorough knowledge on,

1. Construction operation characteristics of synchronousmachines
2. Regulation of synchronousGenerator
3. Parallel-operation of Synchronous generators Determination of sub-transient, Transient and steady statereactance.
4. Construction operation characteristics of Synchronous motor and power circle starting methods of synchronousmotor
5. Construction operation characteristics of single-phase motor and special machines, with which he/she can be able to apply the above conceptual things to real-world electrical machines and itsapplications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J4215) POWER SYSTEMS-I

B.Tech. II Year II-Semester EEE

L	T	P	C
2	1	0	3

Pre requisites:
Basics of Electrical Circuits, Electrical Machines.

Course Objectives:

1. To Study the Operation of thermal, nuclear, power plantsoperation
2. To Study the Operation of Gas and Hydroelectric power plantsoperation,
3. To Design AC and DC distribution system and also Calculate voltage drop in distribution System
4. To Design Air insulated indoor/outdoor substations, and study the Voltage control and power factor improvementtechniques,
5. To Study the Economics aspects of power generation and Different types oftariff.

UNIT-I Thermal **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, Condensers, Chimney and cooling towers. Numerical Problems.

Nuclear Power Stations:
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. Numerical Problems.

UNIT –II Gas **and Hydroelectric Power Stations:**
Gas Power Stations: Principle of Operation and Components. Elements of hydro electric power station-types-concept of pumped storage plants-storage requirements, mass curve (explanation only) estimation of power developed from a given catchment area; heads and efficiencies. Numerical Problems

UNIT-III D.C**. Distribution Systems:**
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 the both the ends (equal/unequal Voltages) and Ring Main Distributor.

A.C. Distribution Systems:
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-IV Substations, Power Factor Control and Voltage Control:

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

Power Factor Control: Causes and disadvantages of Low Power factor-Methods of improving power factor-Most economical power factor-Numerical Problems.

Voltage Control: Dependency of Voltage on Reactive Power Flow - Methods of Voltage Control.

UNIT-V Economic Aspects of PowerGeneration:

Load curve, load duration and integrated load duration curves-load, demand, diversity, capacity, utilization and plant use factors- NumericalProblems.

Tariff: Costs of Generation and their division into Fixed, Semi-fixed and Running Costs. Desirable Characteristics of a Tariff-Objectives of Tariff-Types of Tariff-Numerical Problems**.**

TEXT BOOKS:

1. Generation, Distribution and Utilization of electrical energy by C.L.Wadhwa, New age InternationalPublishers.
2. Elements of Electrical Power Station Design, 3rd Edition, Wheeler. Pub.1998-M.V.Deshpande.
3. Power System Engineering- by R.K.RJput Laxmi Publications (P) Limited, New Delhi 2006.

REFERENCE BOOKS:

1. Principles of Power Systems by V.K Mehta and Rohit Mehta S.CHAND& COMPANY LTD., New Delhi2004.
2. Electrical Power Generation, Transmission and Distribution by S.N.Singh., PHI,2003.
3. Hand book of Switchgear (BHEL) Tata Mc-Graw Hill Publication2009.

Course Outcomes: After going through this course the student gets Knowledge on

1. Thermal, nuclear, power plants operation
2. Gas and Hydroelectric power plantsoperation,
3. AC and DC distribution, voltage dropcalculations
4. Air insulated indoor/outdoor substations, operation. Voltage control and power factor improvementtechniques,
5. Economic aspects of power generation and Different types oftariff

With which he/she can be able to apply the above conceptual things to real-world electrical power generation.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCEINCES

(UGC-AUTONOMOUS)

(J4414) ICAPPLICATIONS

B.Tech IIYearII-Sem:EEE **L T P C**

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Course Objectives:

The main objectives of the course are:

1. To Study the basic building blocks of Linear integratedcircuits.
2. To Study the applications of Operationalamplifiers.
3. To Study the Timers and Phase LockedLoops.
4. To Study the theory of ADC andDAC.
5. To understand the working of basic digital Integrated Circuits.

UNIT I:

INTEGRATED CIRCUITS: Introduction, Classification of Integrated Circuits, Fabrication Techniques of ICs

INTRODUCTION TO OP-AMP: Introduction, Internal blocks of Op-Amp, Ideal and Practical Op-Amp, Op-amp characteristics-DC and AC Characteristics.741 Op-Amp and its Features, Modes of operation- inverting, non-inverting.

UNIT II:

APPLICATIONS OF OP-AMPS:

Basic Applications- Summing Ampifier, Instrumentation Amplifier, AC Amplifier, V to I and I to V Converters, Sample & Hold Circuits, Differentiators and Integrators.

Comparators and waveform Generators- Comparators, Schmitt Trigger & its applications Multivibrators (Monostable and Astable).

UNIT III:

ACTIVE FILTERS

Introduction,First Order Low Pass, High Pass and Band Pass Filters, Active Band Reject and All Pass Filters.

TIMERS & PHASE LOCKED LOOPS

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, VCO.

UNIT IV:

D-A AND A- D CONVERTERS

Introduction, Basic DAC Techniques- Weighted Resistor Type. R-2R Ladder Type, inverted R-2R Type and IC 1408 DAC.

Different types of ADCs - Parallel Comparator Type, Counter Type, Successive Approximation Register Type and Dual Slope Type DAC and ADCSpecifications.

UNIT-V:

Digital ICs: Classifications, Standard TTL NAND Gate-Analysis & Characteristics, TTL Open Collector Outputs. Tristate TTL, MOS & CMOS open drain and tristate outputs.

Comparison of Various Logic Families. IC interfacing- TTL driving CMOS & CMOS driving TTL.

TEXT BOOKS:

1. Linear Integrated Circuits -D. Roy Chowdhury, New Age International (p)Ltd.

2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad.

REFERENCE BOOKS:

1. Op-Amps and Linear Integrated Circuits, R.F. Coughlin & Fredrick F. Driscoll,PHI.

2. Operational Amplifiers and Liner Integrated Circuits: theory & applications, Denton J. Daibey,TMH

3. Design with operational amplifiers &Analog Integrated Circuits, Serigo Franco.McGraw Hill.

4. Digital Fundamentals - Floyd and Jain, PearsonEducation.

Course Outcomes:

After completion of this course, students will have

1. A thorough understanding of Operational amplifiers with Linear Integrated Circuits.
2. Understanding of the Different families of Digital Integrated Circuits and their characteristics.
3. Also student will able to design circuits using Operational amplifiers for various applications such Timers andFilters.
4. Understands ADC & DAC along with types for Real worldproblems
5. Learned the concepts on Digital ICs for VLSI Technology andDesign

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J4216) ELETRICAL MEASUREMENTS & INSTRUMENTATION

B.Tech. IIYearII-Sem:EEE

L	T	P	C
2	1	0	3

Pre requisites: To learn this course student should have the concepts on the following subjects: Mathematics-I, Electrical Circuits-I & II, Engineering Physics

Course Objectives:

1. To Study the basic principles of all measuringinstruments.
2. To Calibrate the unknown resistance, current, and voltage usingpotentiometer.
3. To deal with the measurement of voltage, current, Power factor, power, energyand magneticmeasurements
4. To deal with the measurement of RLC parameters using AC and DCBridge
5. To Study the different types of Transducers & Oscilloscopesmeasurements.

UNIT-I: Introduction to Measuring Instruments

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

UNIT– II: Potentiometers & Instrument Transformers

Principle and operation of D.C. Crompton's potentiometer – standardization – Measurement of unknown resistance, current, voltage. A.C. Potentiometers: polar and coordinate type's standardization – applications. CT and PT – Ratio and phase angle errors.

UNIT –III: Measurement of Power & Energy

Single phase dynamometer wattmeter, LPF and UPF, Double element and three element dynamometer wattmeter, expression for deflecting and control torques – Extension of range of wattmeter using instrument transformers – Measurement of active and reactive powers in balanced and unbalanced systems.

Single phase induction type energy meter – driving and braking torques – errors and compensations – testing by phantom loading using R.S.S. meter. Three phase energy meter – tri-vector meter, maximum demand meters.

UNIT – IV: D.C & A.C Bridges

Method of measuring low, medium and high resistance – sensitivity of Wheat-stone's bridge – Carey Foster's bridge, Kelvin's double bridge for measuring low resistance, measurement of high resistance – loss of chargemethod.

Measurement of inductance- Factor - Maxwell's bridge, Hay's bridge, Anderson's bridge, Owen's bridge. Measurement of capacitance and loss angle - Desauty Bridge. Wien's bridge – Schering Bridge.

UNIT-V: Transducers& Oscilloscopes:

Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers; Principle operation of LVDT and capacitor transducers; LVDT Applications, Strain gauge and its principle of operation, gauge factor, Thermistors, Thermocouples, Piezo electric transducers, photovoltaic, photo conductive cells, photo diodes.

CRO: Cathode ray Oscilloscope-Cathode ray tube –time base generator-horizontal and vertical amplifiers-CRO probes-applications of CRO-Measurement of phase and frequency-lissJous patterns

Measurement of Non-Electrical Quantities

Measurement of strain, Gauge sensitivity, Displacement, Velocity, Angular Velocity, Acceleration, Force, Torque, Temperature, Pressure, Vacuum, Flow and Liquid level.

TEXT BOOKS:

1. Electrical & Electronic Measurement & Instruments, A.K.Sawhney Dhanpat Rai & Co. Publications.
2. Electrical and Electronic Measurements and Instrumentation, R. K. RJput, S. Chand & Company Ltd.

REFERENCE BOOKS:

1. Electrical and Electronic Measurements, G. K. Banerjee, PHI Learning Pvt.Ltd.
2. Electrical Measurements and Measuring Instruments, Golding and Widdis, Reem Publications.
3. Electrical Measurements, Buckingham and Price, Prentice –Hall
4. Electrical Measurements: Fundamentals, Concepts, Applications, Reissland, M.U, New Age International (P) Limited,Publishers.
5. Electrical Measurements and measuring Instruments, E.W. Golding and F.C. Widdis, fifth Edition, WheelerPublishing.

Course Outcomes:

After going through this student gets knowledge on:

1. Different types of measuring instruments their construction operation andcharacteristics
2. Resistance, voltage and current measurements through potentiometers, voltage & current measurements through instrumentstransformers.
3. Power and energy measurements through watt and energy meters,
4. Resistance measurements through DC bridges. Capacitance and inductance measurements through ACbridges.
5. Measurement of frequency and phase through CRO, range extension of measuring instruments and different types of errors & their reduction methods in measuring instruments.Overall improve the employability

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J4214)ELECTRICAL MACHINES – II LAB

B.Tech. IIYearII-Semester:EEE

L	T	P	C
0	0	3	1.5

The Following experiments are required to be conducted as compulsoryexperiments:

1. OC &SC tests on single phasetransformer.
2. Sumpner's test on a pair of single phasetransformers.
3. Brake test on three phase inductionmotor.
4. No load & blocked rotor tests on three phase inductionmotor.
5. Regulation of three phase alternator by synchronous impedance and m.m.fmethods.
6. Load test on Single phaseTransformer.
7. Equivalent circuit of a single phase inductionmotor.
8. Determination of Xd & Xq of a salient pole synchronousmachine.

In addition to the above eight experiments, atleast two of the following experiments are required to be conducted from the following list:

1. Parallel Operation of single phasetransformers.
2. Separation of core losses of a single phasetransformer.
3. Scott connection oftransformers.
4. Regulation of three-phase alternator by Z.P.F. and A.S.A methods.
5. Efficiency of a three phasealternator.
6. Heat run test on a bank of 3Nos.of Single phase Delta Connectedtransformers.
7. Measurement of sequence impedance of a three phasealternator.
9. 'V' & inverted 'V' curves of a three phase synchronous motor.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

II B.Tech. II -Sem :EEE **L T P C**
0 0 3 1.5

(J4420) IC Applications LAB

Part - I: Linear IC Experiments

1. OP AMP Applications – Adder, Subtractor,Comparators.
2. Integrator and Differentiator Circuits using IC741.
3. Active Filter Applications – LPF, HPF (firstorder)
4. IC 741 Waveform Generators - Sine, Square wave and Triangularwaves.
5. IC 555 Timer - Monostable and Astable MultivibratorCircuits.
6. Schmitt Trigger Circuits - Using IC741
7. IC 565 - PLLApplications.
8. Voltage Regulator using IC 723, Three Terminal Voltage Regulators - 7805, 7809,7912.

EQUIPMENT REQUIRED:

1. 20 MHz Cathode RayOscilloscope.
2. 1 MHz Function Generator (Sine, Square, Triangular andTTL).
3. Bus Connection to all thetables
4. Regulated Power supply-1No
5. Fixed 5V DC Power supply –1No.
6. Multimeter / VoltMeter.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J4217) ELECTRICAL MEASUREMENTS & INSTRUMENTATION LAB

B.Tech. IIYearII-Semester:EEE

L	T	P	C
0	0	3	1.5

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

1. Calibration and Testing of single phase energyMeter.
2. Calibration of dynamometer power factormeter.
3. Crompton D.C. Potentiometer – Calibration of PMMC ammeter and PMMCvoltmeter.
4. Kelvin's double Bridge – Measurement of resistance – Determination ofTolerance.
5. Dielectric oil testing using H.T. testingKit.
6. Schering bridge & Andersonbridge.
7. Measurement of 3-Phase reactive power with single-phase wattmeter.
8. Measurement of parameters of a choke coil using 3-voltmeter an 3-ammetermethods.

In addition to the above eight experiments, atleast two of the following experiments are required to be conducted from the following list:

9. Calibration LPF wattmeter – by Phantomtesting.
10. Measurement of 3-phase power with single watt meter and 2 No's ofC.T.
11. P.T. testing by comparison – V.G. as Null detector – Measurement of % ratio error and phase angle of the givenP.T.
12. LVDT and Capacitive pickup-Characteristics andcalibration
13. Resistance strain gauge – strain measurements and Calibration.
14. Transformer turns ratio measurement using a.c.bridge.
15. Measurement of % ratio error and phase angle of given C.T. bycomparison.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(JMC02) Gender Sensitization

B.Tech. II Year II Semester:AllBranches | **L T P C2**
0 0 0

Course Objectives:

1. To develop students' sensibility with regard to issues of gender incontemporary India.
2. To provide a critical perspective on the socialization of men andwomen.
3. To introduce students to information about some key biological aspects ofgenders.
4. To expose the students to debates on the politics and economics ofwork.
5. To help students reflect critically on genderviolence.
6. To expose students to more egalitarian interactions between men andwomen.

UNIT – I UNDERSTANDING GENDER:
Gender: Why Should We Study It? (Towards a World of Equals: Unit -1) Socialization: Making Women, Making Men (Towards a World of Equals: Unit -2) Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

UNIT – II GENDER AND BIOLOGY Missing Women:
Sex Selection and Its Consequences (Towards a World of Equals: Unit-4) Declining Sex Ratio. Demographic Consequences. Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit -10) Two or Many? Struggles with Discrimination.

UNIT – III GENDER AND LABOUR Housework:
the Invisible Labour (Towards a World of Equals: Unit -3) "My Mother doesn't Work." "Share the Load." Women's Work: Its Politics and Economics (Towards a World of Equals: Unit -7) Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

UNIT – IV ISSUES OF VIOLENCE Sexual Harassment:
Say No! (Towards a World of Equals: Unit -6) Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "Chupulu". Domestic Violence: Speaking Out (Towards a World of Equals: Unit -8) Is Home a Safe Place? -When Women Unite[Film]. Rebuilding Lives. Additional Reading: New Forums for Justice. Thinking about Sexual Violence (Towards a World of Equals: Unit -11) Blaming the Victim-"I Fought for my Life…." – Additional Reading: The Caste Face of Violence.

UNIT – V GENDER : CO – EXISTENCE Just Relationships:
Being Together as Equals (Towards a World of Equals: Unit -12) Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Additional Reading: Rosa Parks- The Brave Heart.

Prescribed Textbook : All the five Units in the Textbook, "Towards a World of Equals: A Bilingual Textbook on Gender" written by A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by Telugu Akademi, Hyderabad,Telangana State in the year 2015.

Note: Since it is an Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

REFERENCE BOOKS:

- Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books,2012
- Abdulali Sohaila. "I Fought For My Life…and Won."Available onlineat:
- http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/

Course Outcomes:

1. Students will have developed a better understanding of important issues related togender in contemporary India.
2. Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature andfilm.
3. Students will attain a finer grasp of how gender discrimination works in our societyand how to counterit.
4. Students will acquire insight into the gendered division of labour and its relation to politics andeconomics.
5. Men and women students and professionals will be better equipped to work and live together asequals.
6. Students will develop a sense of appreciation of women in all walks oflife.
7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to genderviolence.

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B.TECH

III YEAR
I & II SEMESTER
SYLLABUS

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J5218) POWER SYSTEMS-II

B.Tech. III YearI-SemesterEEE **L T P**
C2 1 0 3

Pre-requisites: To learn this course students should have the concepts on the followingsubjects: Power Systems-I, ElectricalCircuits-I

Course Objective:

1. To compute inductance and capacitance of different transmissionlines.
2. To understand performance of short, medium and long transmissionlines.
3. To examine the traveling wave performance and sag of transmissionlines.
4. To design insulators for over head lines and Calculatesag
5. To understand cables for Underground power transmissionSystem.

UNIT-I TRANSMISSION LINE PARAMETERS

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

Classification of Transmission Lines - Short, medium and long line and their model representations - Nominal-T, Nominal-Pie and A, B, C, D Constants for Short, medium, symmetrical & Asymmetrical Networks, Numerical Problems. Mathematical Solutions to estimate regulation and efficiency of all types of lines - Numerical Problems.

PERFORMANCE OF LONG TRANSMISSION LINES

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 (numericalproblems).

UNIT – III POWER SYSTEM TRANSIENTS

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, Attenuation and distortion of Travelling Waves.

VARIOUS FACTORS GOVERNING THE PERFORMANCE OF TRANSMISSION LINE

Skin and Proximity effects - Description and effect on Resistance of Solid Conductors - Ferranti effect - Charging Current - Effect on Regulation of the Transmission Line. Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference.

UNIT-IV

OVERHEAD LINE INSULATORS

Types of Insulators, String efficiency and Methods for improvement, Numerical Problems - voltage distribution, calculation of string efficiency, Capacitance grading and Static Shielding.

SAG AND TENSION CALCULATIONS

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, Calculation 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, HV cables.

TEXT BOOKS:

1. C.L. Wadhwa, Electrical power systems - New Age International (P) Limited, Publishers,1998.
2. I.J. Nagarath& D.P Kothari , Power System Engineering, TMH 2/e,2010
3. Power System Engineering- by R.K.RJput Laxmi Publications(P) Limited, New Delhi 2006.
4. Power System Analysis by Grainger and Stevenson, Tata McGrawHill.

REFERENCE BOOKS:

1. B.R. Gupta, Power System Analysis and Design, Wheeler Publishing.
2. AbhijitChakrpabarti, SunithaHalder, Power System Analysis, Operation and control, PHI, 3/e, 2010
3. TuranGonen, Electrical Power Transmission system engineering Analysis and design, CRC Press (Taylor & Francis Group) Special Indian Edition,2/e.
4. M.L. Soni, P.V. Gupta, U.S. Bhatnagar, A. Chakrabarthy, Power System Engineering, Dhanpat Rai & Co Pvt.Ltd.

Course Outcomes:

After going through this course the student gets a thorough knowledge

1. On calculation of transmission lineparameters,
2. analysis of short, medium, long length transmission lines.
3. the factors affecting the performance of transmission lines, transients in transmissionlines.
4. Operation of different types of overhead line insulators, sag and tension calculation of transmissionlines.
5. On calculation of underground cables for power transmission as well for distribution. With this subject which he/she can be able to apply the above conceptual things to real-world electrical systems and itsapplications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J5219)CONTROL SYSTEMS

B.Tech. IIIYearI-Sem:EEE **L T P C**
2 1 0 3

Pre- Requisites: To learn this course students should have the concepts on the following subjects: Electrical Circuits-I, Electrical Circuits-II, Electrical Machines

Course Objective:

1. The students the principles and applications of control systems in everyday life, and The basic concepts of block diagramreduction
2. To assess the system performance using time domain analysis and methods for improving it
3. Time domain analysis solutions to time invariant systems. And different aspects of stability analysis of systems in timedomain.
4. Deals with the different aspects of stability analysis of systems in frequencydomain
5. Concept on multi input and multi outputsystems.

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.

TRANSFER FUNCTION REPRESENTATION:

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

UNIT-II

TIME RESPONSE ANALYSIS:

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

UNIT –III STABILITY ANALYSIS:

The concept of stability – Routh- Hurwitz stability criterion – Absolute stability and conditional 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 STABILITY ANALYSIS IN FREQUENCY DOMAIN:

Frequency Response Analysis:

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.Polar Plots, Nyquist Plots and applications of Nyquist criterion to find the stability –Effects of adding poles and zeros to G(s)H(s) on the shape of the Nyquist diagrams.

UNIT –V STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS:

Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization - Solving the Time invariant state Equations- State Transition Matrix and its Properties. Concepts on Controllability and Observability

TEXT BOOKS:

1. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.
2. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John wiley andsons.
3. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.

REFERENCE BOOKS:

1. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.
2. Control Systems Engg. by NISE 3rd Edition – Johnwiley
3. Control Systems by S.Kesavan, HitechPublications.
4. "Modeling&ControlofDynamicSystems"byNarcisoF.Macia George J. Thaler, Thomson Publishers.
5. Solutions and Problems of Control Systems by A.K.Jairath, CBSPublictions,1992.

Course Outcomes:

After going through this course, the student gets knowledge on

1. Open loop and closed loop systems, concept of feedback in control systems, mathematical modeling and transfer function derivations of translational and rotational systems and transfer functions of servomotors and concepts ofsynchros.
2. Transfer function representation through block diagram algebra and signal flowgraphs,
3. Time response analysis of different ordered systems through their characteristic equation and time-domainspecifications.
4. Stability analysis of control systems in s-domain through R-H criteria and root-locus techniques.
5. Frequency response analysis through bodediagrams.

With which he/she can be able to apply the above conceptual things to real world electrical and Electronic problems and its applications

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J5221) POWER ELECTRONICS

B.Tech. III YearI-Sem EEE

L	T	P	C
2	1	0	3

Pre requisites: To learn this course student should have the concepts on the following subjects: Electrical Circuits-I & II, Electronic Devices and Circuits

Course Objective:

1. To study the Characteristics Power Semi Conductor Devices and Commutation Circuits
2. To study and design the Single phase Half wave and Full wave ControlledConverter
3. To study the Three phase converters with R and RL load and RLEloads
4. To study the Operational Characteristics of AC Voltage Controllers And Cyclo Converters
5. To study the operation of Choppers andInverters

UNIT – I: Power Semi Conductor Devices and Commutation Circuits

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 of SCR – R,RC,UJT firing circuits– Series and parallel connections of SCR's – Snubber circuit details – Specifications and Ratings of SCR's, BJT, IGBT - Numerical problems – Line Commutation and Forced Commutation circuits.

UNIT – II: Single Phase Half Wave Controlled Converters

Phase control technique – Single phase Line commutated converters – Half wave controlled converters with Resistive, RL load and RLE load– Derivation of average load voltage and current -Active and Reactive power inputs to the converters without and with Freewheeling Diode –Numericalproblems

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 , semi-converters, active and Reactive power inputs to the converters , Effect of source inductance – Expressions of load voltage and current – Numerical problems.

UNIT – III: Three Phase Line Commutated Converters

Three phase converters – Three pulse and six pulse converters and bridge connections with R, RL load voltage and current with R and RL load and RLE loads – Semi Converters, Effect of Source inductance–Dual converters Waveforms –NumericalProblems.

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 , Numericalproblems.

Cyclo Converters: Single phase midpoint cyclo converters with resistive and inductive loads, Bridge Configuration of cyclo converters- Waveforms.

UNIT – V: Choppers & Inverters

Choppers – Time ratio control and Current limit control strategies – Step down choppers- Derivation of load voltage and currents with R, RL and RLE loads- Step up Chopper – load voltage expression and Problems,D.C Jones Chopper,AC Chopper ,Problems

Inverters – Single phase inverter – Waveforms, Three Phase Inverters (180,120 degrees modes of operation), Voltage control techniques for inverters- Pulse width modulation techniques – Numerical problems.

TEXT BOOKS:

1. P.S.Bhimbra , "Power Electronics ", Khannapublications.
2. M. H. Rashid, Power Electronics : Circuits, Devices and Applications,– Prentice Hall of India, 2nd edition, 1998.
3. Power electronics: converters, applications, and design By Ned Mohan, Tore M. Undeland, John Wiley &Sons,2009.

REFERENCE BOOKS:

1. Power Electronics, Vedam Subramanyam, New Age International (P) Limited,Publishers.
2. Elements of Power Electronics, Philip T. Krein, Oxford UniversityPress.
3. Power Electronics, M. S. Jamil Asghar, PHI PrivateLimited.
4. Power Electronics, P.C.Sen,Tata Mc Graw-HillPublishing.

Course Outcomes:

At the end of the course, the students get a thorough knowledge on,

1. Characteristics of different types of power semiconductordevices.
2. Analyze single Phase Half wave and full wave controlledconverters.
3. Analyze the Three Phase Line CommutatedConverters
4. Analyze the AC voltage controllers and Cycloconverters.
5. Analyze and improve the employability in electrical industry DC –DC Choppers and analyze DC-ACInverters.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

PROFESSIONAL ELECTIVE-I

(J5223)RENEWABLE ENERGY SOURCES

B.Tech. IIIYearI-Semester:EEE **L T P C**

3 0 0 3

Pre-requisites: To learn this course student should have the concepts on the following subjects: Engineering Physics & Chemistry

Course Objectives: To make the student

1. Introduce to the technology of renewable sources ofenergy
2. Learn about the solar radiation, its applications and radiation measuringinstruments
3. Learn about the various types of geothermal resources and itsapplications
4. Study the biomass energy resources , bio-masssystems
5. Learn the methods of energy extraction from the wind and oceans and learn to the technology of direct energy conversionmethods

UNIT – I

PRINCIPLES OF SOLAR RADIATION: Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data for India.

UNIT-II

SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors, tracking CPC and solar swing

SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion, applications of PV system-PV hybrid systems

UNIT-III

WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria, analysis of aerodynamic forces acting on blade, applications. **BIO-MASS**: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects, biomass resource development in India.

UNIT-IV

GEOTHERMAL ENERGY: Structure of earth's interior- geothermal sites- earthquakes & volcanoes- geothermal resources- hot springs-steam ejection- principle of working- types of geothermal station with schematic representation site selection for geothermal power plants- problems associated with geothermal conversion-applications-geothermal energy prospects in India.

OCEAN ENERGY: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants and their economics

UNIT-V

DIRECT ENERGY CONVERSION: Need for DEC, Carnot cycle, limitations, principles of DEC. Thermo-electric generators, seebeck, peltier and joule Thomson effects and applications. MHD generators, principles and applications. Fuel cells, principles, and applications.

TEXT BOOKS:

1. Non-Conventional Energy Sources by G.D. Rai, Khanna Publihers, fourth edition, 2008

REFERENCE BOOKS:

1. Suhas.P.Sukhatma and Nayak.J.K., "solar Eenergy", TMH, New Delhi, 3rd edition,2008
2. D.P.Kothari and Rakesh Ranjan and K.C. Singal., " Renewable energy resourcesand emerging technologies"Prentice Hall of India Pvt.Ltd., 2nd Edition,2011
3. Non-Conventional Energy Systems / K Mittal/Wheeler

Course Outcomes:

At the end of the course, the student will be able to

1. Apply the technology to capture the energy from the renewable sources likesun, wind, ocean, biomass,geothermal.
2. Use different renewable energy sources to produce electricalpower.
3. Minimize the use of conventional energy sources to produce electricalenergy.
4. Identify the fact that the conventional energy resources aredepleted.
5. Identify the Direct EnergyConversion.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

PROFESSIONAL ELECTIVE-I

(J5224)ENERGY STORAGE SYSTEMS

B.Tech. III YearI-Semester:EEE **L T P C**

3 0 0 3

Pre-requisites: To learn this course student should have the concepts on the following subjects: Engineering Physics & Chemistry

Course Objectives:

1. Introduce to the technology of energy storagesystems
2. Learn about the characteristics of electricity and need of ESS in variousapplications
3. Learn about the various types and features of ESS
4. Learn about the practical applications ofESS
5. Learn about the New trends in applications ,Renewable energy generation, SmartGrid

UNIT-I ELECTRICAL ENERGY STORAGETECHNOLOGIES

Characteristics of electricity, Electricity and the roles of EES, High generation cost during peak-demand periods, Need for continuous and flexible supply, Long distance between generation and consumption, Congestion in power grids, Transmission by cable.

UNIT-II NEEDS FOR ELECTRICAL ENERGYSTORAGE

Emerging needs for EES, More renewable energy, less fossil fuel , Smart Grid uses, The roles of electrical energy storage technologies, The roles from the viewpoint of a utility, The roles from the viewpoint of consumers, The roles from the viewpoint of generators of renewable energy.

UNIT-III FEATURES OF ENERGY STORAGESYSTEMS

Classification of EES systems , Mechanical storage systems, Pumped hydro storage (PHS), Compressed air energy storage (CAES), Flywheel energy storage (FES),Electrochemical storage systems , Secondary batteries , Flow batteries, Chemical energy storage , Hydrogen (H2),Synthetic natural gas (SNG).

UNIT-IV TYPES OF ELECTRICAL ENERGY STORAGESYSTEMS

Electrical storage systems, Double-layer capacitors (DLC) ,Superconducting magnetic energy storage (SMES),Thermal storage systems ,Standards for EES, Technical comparison of EES technologies.

UNIT-V APPLICATIONS

Present status of applications, Utility use (conventional power generation, grid operation & service) , Consumer use (uninterruptable power supply for large consumers), New trends in applications ,Renewable energy generation, Smart Grid, Smart Micro grid, Smart House, Electric vehicles, Management and control hierarchy of storage systems, Internal configuration of battery storage systems, External connection of EES systems , Aggregating EES systems and distributed generation (Virtual Power Plant), Battery SCADA– aggregation of many dispersed batter

TEXT BOOKS

1. Thyristor control of Electric Drives - VedamSubranmanyam.
2. Analysis of electric machinery and Drives systems - Paul C. Krause, Oleg wasynezuk,Scott D. Sudhoff.
3. Electrical Energy Storage Systems-ICE whitepapers.

REFERENCES

1. T. B. Atwater and Arthur Dobley, *Metal/Air batteries,* Lindens Handbook of Batteries, 2011, ISBN978-0-07-162421-X.
2. D. Jähnig, et al.: *Thermo-chemical storage for solar space heating in a single-family house,* 10th International Conference on Thermal Energy Storage: Ecostock 2006,31 May - 2 June 2006, New Jersey,USA.
3. Shin-ichi INAGE: *Prospective on the Decarbonised Power Grid,* IEC/MSB/EES Workshop, Germany, 31 May - 1 June 2011.
4. P. Wolfrum, F. Steinke, C. Hoffmann: *EES Requirements for a renewableEurope,* Presentation,IEC Workshop EES, Freiburg, 31 May 2011.

COURSE OUTCOMES: At the end of the course, the student will be able to

1. Apply the technology to have energy storage system for electricalLoads
2. To save the electrical power in peak time loads usingESS
3. To store energy and to avoid the environmentalpollution
4. Design different types of Electrical storagesystems,
5. Adopt the new trends in applications of Renewable energy generation and SmartGrid.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

PROFESSIONAL ELECTIVE-I

(J5225)SPECIAL ELECTRICAL MACHINES

B.Tech. IIIYearI-Semester:EEE **L T P C**

3 0 0 3

Course Objectives:

1. Construction, principle of operation, control and performance of steppingmotors.
2. Construction, principle of operation, control and performance of switched reluctance motors.
3. Construction, principle of operation, control and performance of permanent magnet brushless D.C.motors.
4. Construction, principle of operation and performance of permanent magnet synchronous motors.
5. Construction, principle of operation and performance of other specialMachines.

UNIT I

STEPPER MOTORS

Constructional features–Principle of operation–Types–Torque predictions–Linear Analysis–Characteristics–Drive circuits–Closed loop control–Concept of lead angle-Applications.

UNIT II

SWITCHED RELUCTANCE MOTORS (SRM)

Constructional features–Principle of operation-Torque prediction–Characteristics Steady state performance prediction–Analytical Method–Power controllers–Control of SRM drive-Sensor less operation ofSRM–Applications.

UNIT III

PERMANENT MAGNET BRUSHLESS D.C. MOTORS

Fundamentals of Permanent Magnets-Types-Principle of operation-Magnetic circuit analysis-EMF and Torque equations-Power Converter Circuits and their controllers-Characteristics and control-Applications.

UNIT IV

PERMANENT MAGNET SYNCHRONOUS MOTORS (PMSM)

Constructional features-Principle of operation–EMF and Torque equations-Sine wave motor with practical windings-Phasor diagram-Power controllers–performance characteristics-Digital controllers–Applications.

UNIT V

OTHER SPECIAL MACHINES

Constructional features–Principle of operation and Characteristics of Hysteresis motor-Synchronous Reluctance Motor–Linear Induction motor-Repulsion motor-Application.

TEXT BOOKS:

1. K.Venkataratnam, 'Special Electrical Machines', Universities Press (India) Private Limited, 2008.
2. T. Kenjo, 'Stepping Motors and Their Microprocessor Controls', Clarendon Press London, 1984
3. E.G. Janardanan, 'Special electrical machines', PHI learning Private Limited, Delhi, 2014.

REFERENCES:

1. R.Krishnan, 'Switched Reluctance Motor Drives Modeling, Simulation, Analysis, Design and Application', CRC Press, New York,2001.
2. T. Kenjo and S. Nagamori, 'Permanent Magnet and Brushless DC Motors', Clarendon Press, London,1988.
3. T.J.E.Miller,'Brushless Permanent-Magnet and Reluctance Motor Drives', Oxford University Press,1989.
4. R.Srinivasan, 'Special Electrical Machines', Lakshmi Publications,2013

COURSE OUTCOMES:

Ability to acquire the knowledge on construction and operation of stepper motor.

1. Ability to construction, principle of operation, switched reluctancemotors.
2. Ability to acquire the knowledge on construction and operation of permanent magnet brushless D.C.motors.
3. Ability to acquire the knowledge on construction and operation of permanent magnet synchronousmotors.
4. Ability to select a special Machine for a particular application.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J5222) POWER ELECTRONICSLAB

B.Tech. IIIYearI-Semester:EEE

L	T	P	C
0	0	3	1.5

Any Ten of the Experiments From the following List:

1. Study of Characteristics of SCR, MOSFET & IGBT
2. Gate firing circuits forSCR's
3. Single Phase AC Voltage Controller with R and RLLoads
4. Single Phase fully controlled bridge converter with R and RLloads
5. Forced Commutation circuits (Class A, Class B, Class C, Class D & ClassE)
6. DC Jones chopper with R and RLloads.
7. Single phase parallel, inverter with R and RLload.
8. Single Phase Cycloconverter with R and RLloads
9. Single Phase half controlled converter with Rload
10. Three Phase half controlled bridge converter withR-load
11. Single phase series, inverter with R and RLload
12. Single Phase Mc-Murray Bridge converter with R and RLloads
13. Single phase dual converter with RLloads.
14. Operation of MOSFET basedchopper.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J5220)CONTROL SYSTEMS LAB

B.Tech. IIIYearI-Semester:EEE	**L**	**T**	**PC**	
	0	**0**	**3**	**1.5**

Any Ten of the following experiments are to be conducted:

1. Time response of Second ordersystem
2. Characteristics ofSynchros
3. Programmable logic controller – Study and verification of truth tables of logic gates, simple Boolean expressions and application of speed control ofmotor.
4. Effect of feedback on DC servomotor
5. Transfer function of DC motor
6. Effect of P, PD, PI, PID Controller on a second ordersystems
7. Lag and lead compensation – Magnitude and phase plot
8. Transfer function of DC generator
9. Temperature controller usingPID
10. Characteristics of magneticamplifiers
11. Characteristics of AC servomotor

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(JMC03) CONSTITUTION OF INDIA

B.Tech. III YearI-Semester:EEE

	L	T	P
C3	0	0	0

Course Objectives:

1. The Constitution is the basic and fundamentallaw
2. To introduce concepts and salient features of the constitutionIndian
3. Analyze the Preamble of the Constitution and identify the core values reflected init;
4. Appreciate the core constitutional values that permeate the salient features ofthe
5. Indian Constitution; and examine the nature of the Indian federal system and the parliamentary form of govern

Course outcome

1. It also tells us about the rights and also the duties of itscitizens.
2. They know about the role, powers of members of local sabha and rajsabha
3. It lays down the rules to govern thecountry
4. Role and function of electioncommissioner
5.Power and duties of elected represented s for panchayatraj , ZP, corporation and Importanceof democracy

Unit I

Introduction to Constitution' meaning of the term,, Indian Constitution: Sources and constitutional history, Features: Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of StatePolicy.

Unit II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre-State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha

Unit III

State Government and its Administration Governor: Role and Position, CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

Unit IV

Local Administration District's Administration head: Role and Importance, Municipalities:Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayatiraj: Introduction, PRI: Zila parishadh, Elected officials and their roles, CEO Zila parishadh: Position and role, Block level: Organizational Hierarchy (Different departments) village level: Role of Elected and Appointed officials,Importance of grass root democracy

Unit V

Election Commission Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women.

REFERENCES

1. Books.Recommended
2. Indian Polity' byLaxmikanth
3. Indian Administration' by SubhashKashyap
4. 'Indian Constitution' by D.D.Basu.
5. 'Indian Administration' by Avasti andAvasti

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J6226) STATIC DRIVES

B.Tech. IIIYearII-Sem:EEE

L	T	P	C
2	1	0	3

Pre-requisites:
Basics of semiconductor devices and power electronics converter,Awareness of all type of machines V-I Characteristics, torque - speed Characteristics and Speed control techniques,Control system design basics,Awareness about traction systems

Course Objectives:

1. To Analyze the operation of DC motors controlled by Single phaseconverter.
2. To study the converter control of DC motors in variousquadrants.
3. To study Control of DC, Motor drives byChoppers
4. To understand the operation of Induction Motor by AC voltagecontrollers.
5. To understand the Control of Synchronous Motors by Cyclo converters, and PWM controltechnique.

UNIT – I: Control of DC motors by Single 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.

Control of DC motors by Three phase Converters
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 operations of DC Drives through Dual converters:
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 excited motors – Continues current operation – Output voltage and current wave forms – Speed 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

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

Control of Induction Motor through Stator Frequency

Variable frequency characteristics-Variable frequency and v/f control of induction motor by Voltage source, 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)

Control of Induction motor of Rotor side

Static rotor resistance control – Slip power recovery – Static Scherbius drive – Static Kramer Drive – their performance and speed torque characteristics – advantages applications – problems

UNIT – V: Control of Synchronous Motors

Separate control & self control of synchronous motors – Operation of self controlled synchronous motors by VSI and CSI cycloconverters. Load commutated CSI fed Synchronous Motor – Operation – Waveforms – speed torque characteristics – Applications – Advantages and Numerical 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 NarosaPublications
2. Power Electronic Circuits, Devices and applications by M.H.Rashid,PHI.
3. Electronic motor drives modeling Analysis and control –R. Krishnan –I Edition Prentice HallIndia

REFERENCE BOOKS:

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

Course Outcomes: At the end of this course, students will demonstrate the ability to

1. Explain the fundamentals of electric drive and different electric braking methods. Analyze the operation of three phase converter controlled dc motors and four quadrant operation ofdc motors using dualconverters.
2. Explain the converter control of DC motors in variousquadrants.
3. Explain the concept of speed control of induction motor by using AC voltage controllersand voltage sourceinverters.
4. Explain the principles of static rotor resistance control and various slip powerrecovery schemes.
5. Explain the speed control mechanism of synchronous motors

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J6227)SWITCH GEAR AND PROTECTION

B.Tech. III YearII-SemEEE

L	T	P	C
2	1	0	3

Prerequisites: To learn this course student should have the concepts on the following subjects: Power systems-I & II

Course Objective:

1. To introduce all kinds of circuit breakers forprotection.
2. To introduce all kinds of relays forprotection.
3. To describe overall protection of Generators, Transformers and feeder bus barsagainst faults
4. To describe neutral grounding for overallprotection
5. To understand the phenomenon of Over Voltages and it'sclassification

UNIT – I: INTRODUCTION TO CIRCUIT BREAKERS

Circuit Breakers: Elementary principles of arc interruption, Arc Phenomena, Restriking Voltage and Recovery voltages. - Restriking Phenomenon, Average and Max. RRRV, Numerical Problems - Current Chopping and Resistance Switching - CB ratings and Specifications: Types 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 circuitbreakers.

UNIT – II: ELECTROMAGNETIC AND STATIC RELAYS

Principle of Operation and Construction of Attracted armature, Balanced Beam, induction Disc and Induction Cup relays. Types of Over Current Relays: 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. Introduction to Numerical Relays.

UNIT – III: PROTECTION OF POWER EQUIPMENT

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 – Differentialprotection.

UNIT – IV NEUTRAL GROUNDING

Grounded and Ungrounded Neutral Systems:- Effects of Ungrounded Neutral on system performance, Arcing Grounds Methods of Neutral Grounding: Solid, Resistance, Reactance – Peterson Coil, voltage Transformer Earthing and Grounding Practices, Grounding Transformers(Star-Deltaand Zig-Zag)

UNIT – V PROTECTION AGAINST OVERVOLTAGES

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. Badri Ram, D.N Viswakarma, Power System Protection and Switchgear, TMH Publications 2nd editon
2. Sunil S Rao, Switchgear and Protection – KhannaPubllishers.
3. C.L.Wadhwa, Electrical Power Systems –New Age international (P) Limited,Publishers, 3rd editon.

REFERENCE BOOKS:

1. Paithankar and S.R.Bhide, Fundamentals of Power System Protection, PHI,2003.
2. C R Mason, Art & Science of Protective Relaying – Wiley Eastern Ltd.
3. B.L.Soni, Gupta, Bhatnagar, Chakrabarthy, A Text book on Power SystemEngineering, Dhanpat Rai &Co.

Course Outcomes: At the end of this course,

1. Students are knowledgeable in the field of power system protection, and circuitbreakers.
2. Students are knowledgeable in the field of instrument transformers andrelays.
3. Students will demonstrate and ability to design the relevant protection systems for the main elements of a powersystem
4. Students are knowledgeable in the field ofswitchgear
5. Students are knowledgeable in the field of over- voltage protection and the basics ofdata transmission.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J6228) COMPUTER METHODS IN POWER SYSTEMS

B.Tech. III YearII-Sem:EEE **L T P C**

2 1 0 3

Pre- Requisites: To learn this course students should have the concepts on the following subjects: Power systems-II, Switch gear and protection, Mathematics-II

Course Objectives:

1. To Study the Power System NetworkMatrices
2. To understand the load flow studies
3. To Study the Per-Unit impedances and Symmetrical faultAnalysis
4. To study the various methods to improve steady statestability.
5. To Derive the Swing equation by Equal AreaCriterion

UNIT -I

Power System Network Matrices: Graph Theory: Definitions, Bus Incidence Matrix, Y_{bus} formation by Direct and Singular Transformation Methods, Numerical Problems.

Formation of Z_{Bus}: Partial network, Algorithm for the Modification of ZBus 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 ZBus for the changes in network (Problems)

UNIT-II

Power flow Studies: load Flows: Necessity of Power Flow Studies – Data for Power Flow Studies – Derivation of Static load flow equations.

Load flow solutions using Gauss Seidel Method: Acceleration Factor, Load flow solution with and without P-V buses, Algorithm and Flowchart. Numerical Load flow Solution for Simple Power Systems (Max. 3-Buses): 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 with or without PV Busses- Derivation of Jacobian Elements, Algorithm and Flowchart.
Decoupled and Fast Decoupled Methods: Comparison of Different Methods – DC load Flow

UNIT-III

Short Circuit Analysis: **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 with and without fault impedance Numerical Problems.

UNIT-IV:
Steady State Stability Analysis: Elementary concepts of Steady State, Dynamic and Transient Stabilities. Description of: 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:
Transient State 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. Power System Analysis-Dr.N.V.Ramana M/s Pearson Education (P)Ltd
2. Modern Power system Analysis – by I.J.Nagrath & D.P.Kothari: Tata McGraw-Hill Publishing Company, 2ndedition.

REFERENCE BOOKS:

1. Computer Techniques in Power System Analysis by M.A.Pai, TMHPublications
2. Power System Analysis by Grainger and Stevenson, Tata McGrawHill.
3. Computer techniques and models in power systems, By K.Uma rao,I.K.International
4. Power System Analysis by Hadi Saadat – TMH Edition.
5. Power System Analysis,PSR Murthy,BSPublications
6. Power system Analysis, T.K.Nagasarkar, M.S.Sukhija,Oxford UniversityPress.

Course Outcomes:

After going through this course the student gets a thorough knowledge on,

1. power system network matrices through graphtheory
2. power flow studies (load-flow) through various computer methods, short-circuit analysis, per-unit system ofrepresentation
3. concept of sequence impedance, symmetrical and unsymmetrical faultanalysis
4. steady-state, dynamic-state and transient- state stabilityanalysis
5. Determination of Transient Stability by Equal Area Criterion, With which he/she can able to apply the above conceptual things to real-world electrical power systems problems and applications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

III B.Tech. IISem:EEE **L T P C**
3 0 0 3

(J6424) MICRO PROCESSORS AND MICRO CONTROLLERS

COURSE OBJECTIVES:

1. Understanding the importance of micro processors and microcontrollers
2. Understanding the application development skills by using variousinstructions
3. Understanding the interfacing of devices with processors andcontrollers
4. Understanding the development of basic Real Time OperatingSystem.
5. Understanding the advanced micro processors andcontrollers

UNIT-I

Introduction to 8085 Architecture

8086 Architecture: 8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical Memory Organization, Pin Configuration of 8086.

UNIT-II

Instruction Set and Assembly Language Programming of 8086: Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Macros, and Simple Programs involving Logical, Branch and Call Instructions, Sorting, String Manipulations.

UNIT -III:

I/O Interface : 8255PPI, Various modes of operation and Interfacing to 8086(Keyboard, Display, ADC & DAC).

Interrupt structure of 8086 :8259 PICU, Vector Interrupt Table, Interrupt Service Routine.

Communication Interface: Serial Communication Standards, Serial Data Transfer Schemes, 8251 USART architecture and interfacing

UNIT –IV:

Introduction to Microcontrollers: Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of 8051.

8051 Real Time Control: Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters

UNIT –V:

ARM Architecture: ARM Processor fundamentals, ARM Architecture – Register, CPSR, Pipeline, exceptions and interrupts interrupt vector table, ARM instruction set – Data processing, Branch instructions, load store instructions, Software interrupt instructions, Program status register instructions, loading constants, Conditional execution, Introduction to Thumb instructions.

TEXT BOOKS:

1. Micro Processor Architecture Programming and Applications with the 8085-Ramesh Goankar, 5th Edition,Penram InternationalPublishing.
2. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, TMH, 2nd Edition 2006.
3. The 8051 Microcontroller, Kenneth. J. Ayala, Cengage Learning, 3rdEd.
4. ARM System Developers guide, Andrew N SLOSS, Dominic SYMES, Chris WRIGHT, Elsevier,2012

REFERENCE BOOKS:

1. Microprocessors and Interfacing, D. V. Hall, TMGH, 2nd Edition2006.
2. Introduction to Embedded Systems, Shibu K.V, TMH,2009
3. The 8051Microcontrollers, Architecture and Programming and Applications -K.Uma Rao, Andhe Pallavi, Pearson,2009.
4. ARM ReferenceManuals

Course Outcomes:

upon completion of this course :

1. The student will learn internal architecture and organization of 8085 and8086.
2. The student will learn instruction set, Addressing Modes and Assembly level language programming
3. The student understands how to interface the various I/O and Communication interface modules.
4. The student will learn the internal Architecture, Register Organization and instruction set of 8051 microcontrollers and theirinterfacing.
5. Understands advance microcontrollers and their importance in the field of Embedded systems andIOT.And improve the employability in field of electronic industry

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

PROFESSIONAL ELECTIVE-II

(J6230) ELECTRICAL DISTRIBUTION SYSTEMS

B.Tech IV YearII-SemesterEEE **L T P C**

3 0 0 3

Pre- Requisites: To learn this course student should have the concepts on the following subjects: Power system-I, Switch gear and protection

Course objectives:

1. To study electrical distributionsystems,
2. To study the design of feeders, substations, and optimal location ofsubstations
3. To study conceptual knowledge on how to determine the performance of a distribution system through its important parameters i.e. voltage drops and powerlosses.
4. To Study the protection of the system by means of protective devices and their co-ordination during the several faultconditions.
5. To study voltage profiles and power factor of the system with compensationtechniques.

UNIT – I

Introduction & General Concepts: Introduction to distribution systems: Load modeling and characteristics. Coincidence factor, contribution factor loss factor – Relationship between the load factor and loss factor. Classification of loads: Residential, commercial, Agricultural and Industrial loads and their characteristics.

UNIT – II

Distribution Feeders & 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: 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

Protective Devices & Co Ordination: Objectives of distribution system protection, types of common faults and procedure for fault calculations. Protective Devices: Principle of operation of Fuses, Circuit Reclosures, and line sectionalizes, and circuit breakers. Coordination of Protective Devices: General coordination procedure.

UNIT – V

Voltage Control & P.F Improvement: Equipment for voltage control, effect of series capacitors, line drop Compensation, effect of AVB/AVR. Power- factor control using different types of power capacitors, shunt and series capacitors, effect of shunt capacitors (Fixed and Switched), capacitor allocation – Economic justification —Procedure to determine the best capacitor location.

TEXT BOOKS:

1. Electrical Power Distribution Systems, V.KamarJu,TMH.
2. Electrical Distribution Systems, Dr. S. Siva nagarJu, Dr. K.Shankar. Danapathi Ral Publications.

REFERENCE BOOKS:

1. Electric Power Distribution System Engineering, Turan Gonen, CRCPress.
2. Electric Power Generation, Transmission and Distribution, SN. Singh, PHIPublishers.

Course Outcomes:

After going through this course the student gets a thorough knowledge on,

1. general aspects of electrical distributionsystems,
2. design and analysis of distribution feeders andsubstations,
3. distribution systems analysis through voltage-drop and power losscalculations,
4. operation of protective devices used in distribution systems and their co-ordination voltage control and power factor improvement through capacitorcompensation
5. Voltage Control & P.F Improvement of system. Faults analysis, with which he/she can able to apply the above conceptual things to real-world electrical power system and its applications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

PROFESSIONAL ELECTIVE-II

(J6231) ELECTRICAL ESTIMATION AND COSTING

B.Tech. III YearII-Sem:EEE **L T P C**

3 0 0 3

Pre-requisites: learn this course student should have the concepts on the following subjects: Power system-I, Power system-II

Course Objective:

1. To study the Indian Electricity rules, Service connections andInstallations
2. To estimate and costing of material, Electrical installations for commercial buildings Emphasize the estimating and costing aspects of all electrical equipment,installation
3. To Designs to analyze the cost viability of underground cables and overheadlines, Exposure to design and estimation ofwiring
4. To Designs to analyze the cost viability of various types of substation.
5. To Design of IlluminationSchemes.

UNIT-I

Design Considerations of Electrical Installations: Electric Supply System, Three phase four wire distribution system, Protection of Electric Installation against over load, short circuit and Earth fault, Earthing, General requirements of electrical installations, testing of installations, Indian Electricity rules, Neutral and Earth wire, Types of loads, Systems of wiring, Service connections, Service Mains, Sub-Circuits, Location of Outlets, Location of Control Switches, Location of Main Board and Distribution board, Guide lines for Installation of Fittings, Load Assessment, Permissible voltage drops and sizes of wires, estimating and costing of Electric installations.

UNIT —II

Electrical Installation for Different Types of Buildings and Small Industries: Electrical installations for residential buildings — estimating and costing of material, Electrical installations for commercial buildings, Electrical installations for smallindustries.

UNIT—III

Overhead and Underground Transmission and Distribution Lines: Introduction, Supports for transmission lines, Distribution lines — Materials used, Underground cables, Mechanical Design of overhead lines, Design of undergroundcables.

UNIT-IV

Substations: Introduction, Types of substations, Outdoor substation — Pole mounted type, Indoor substations — Floor mounted type.

UNIT-V

Design of Illumination Schemes: Introduction, Terminology in illumination, laws of illumination, various types of light sources, Practical lighting schemes.

TEXT BOOKS

1. Electrical Design Estimating and Costing, K. B. Raina, S. K. BhattAcharya, New Age InternationalPublisher.
2. Design of Electrical Installations, Er. V. K. Jam, Er. Amitabh BJJ, University Science Press.
3. Electricity Pricing Engineering Principles and Methodologies, Lawrence J. Vogt, P. E., CRCPress.

REFERENCE BOOKS

1. Code of practice for Electrical wiring installations,(System voltage not exceeding 650 volts), Indian Standard Institution, IS: 732-1983.
2. Guide for Electrical layout in residential buildings, Indian Standard Institution, IS: 4648-1968.
3. Electrical Installation buildings Indian Standard Institution, IS:2032.
4. Code of Practice for selection, Installation of Maintenance of fuse (voltage not exceeding 650V), Indian Standard Institution, IS: 3106-1966.
5. Code of Practice for earthling, Indian Standard Institution, lS:3043-1966.
6. Code of Practice for Installation and Maintenance of induction motors, Indian Standard Institution, IS:900-1965.
7. Code of Practice for electrical wiring, Installations (system voltage not exceeding 650 Volts), Indian Standard Institution, IS: 2274-1963.
8. Electrical Installation, estimating and costing, Gupta J. B., Katson,Ludhiana.

Course Outcome:

After going through this course the student gets a thorough knowledge on,

1. Electric Supply System Design Considerations, Indian Electricity rules, Service connections, ServiceMains
2. estimating costing aspects of all electrical equipment, installation for residential buildings and designs to analyze the costviability,
3. exposure to design and estimation of wiring, design of overhead and underground distribution lines
4. Installation and Estimation analyze of various types of substation
5. Design of Illumination Schemes, with which he/she can able to apply the above conceptual things to real-world electrical power system and itsapplications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

PROFESSIONAL ELECTIVE-II

(J6232) POWER QUALITY

B.Tech. III YearII-Sem EEE **L T P C 3 0**

0 3

Pre- Requisites: To learn this course student should have the concepts on the following subject: Power systems-II, Power system operation and control.

OBJECTIVES:

1. To study power quality in supplies of domestic and industrialapplications.
2. To study different types interruptions intransmissions
3. To study single phase and three phase supplies sags swellsCharacterization**.**
4. To study Power Quality Considerations in Industrial PowerSystems
5. To study mitigation methods**.**

UNIT-I:

Introduction : Introduction of the Power Quality (PQ) problem, Terms used in PQ: Voltage, Sag, Swell, Surges, Harmonics, over voltages, spikes, Voltage fluctuations, Transients, Interruption, overview of power quality phenomenon, Remedies to improve power quality, power qualitymonitoring.

UNIT-II:

Long & Short Interruptions: Interruptions – Definition – Difference between failures, outage, Interruptions – causes of Long Interruptions – Origin of Interruptions – Limits for the Interruption frequency – Limits for the interruption duration – costs of Interruption – Overview of Reliability evaluation to power quality, comparison of observations and reliability evaluation. **Short interruptions**: definition, origin of short interruptions, basic principle, fuse saving, voltage magnitude events due to re-closing, voltage during the interruption, monitoring of short interruptions, difference between medium and low voltage systems. Multiple events, single phase tripping – voltage and current during fault period, voltage and current at post fault period, stochastic prediction of shortinterruptions.

UNIT III:

1 & 3-Phase Voltage SAG Characterization: Voltage sag – definition, causes of voltage sag, voltage sag magnitude, and monitoring, theoretical calculation of voltage sag magnitude, voltage sag calculation in non-radial systems, meshed systems, and voltage sag duration.

Three phase faults, phase angle jumps, magnitude and phase angle jumps for three phase unbalanced sags, load influence on voltage sags.

UNIT-IV:

Power Quality Considerations in Industrial Power Systems: Voltage sag – equipment behavior of Power electronic loads, induction motors, synchronous motors, computers, consumer electronics, adjustable speed AC drives and its operation. Mitigation of AC Drives, adjustable speed DC drives and its operation, mitigation methods of DC drives.

UNIT-V:

Mitigation of Interruptions & Voltage Sags: Overview of mitigation methods – from fault to trip, reducing the number of faults, reducing the fault clearing time changing the power system, installing mitigation equipment, improving equipment immunity, different events and mitigation methods. System equipment interface – voltage source converter, series voltage controller, shunt controller, combined shunt and series controller.
Power Quality and EMC Standards: Introduction to standardization, IEC Electromagnetic compatibility standards, European voltage characteristics standards, PQ surveys.

TEXTBOOKS:

1. Math H J Bollen "Understanding Power Quality Problems", IEEEPress.
2. R.C. Dugan, M.F. McGranaghan and H.W. Beaty, "Electric Power Systems Quality." New York:McGraw-Hill.1996

REFERENCES:

1. G.T. Heydt, „Electric Power Quality", 2nd Edition. (West Lafayette, IN, Stars in aCircle Publications,1994).
2. Power Quality VAR Compensation in Power Systems, R. SastryVedamMulukutla S. Sarma,CRCPress.
3. A Ghosh, G. Ledwich, Power Quality Enhancement Using Custom Power Devices. Kluwer

Course Outcomes:

After going through this course the student gets a thorough knowledge on,

1. Power quality in supplies of domestic and industrialapplications.
2. Different types of Interruptions and sags and swellsapplications.
3. 1-Phase and 3-Phase Voltage SAGCharacterization
4. Power quality issues in Industrial PowerSystems.
5. Mitigation of Interruptions & Voltage Sags, current Harmonics andfrequency harmonics ofsupply.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

(J6229)SIMULATION OF ELECTRICAL SYSTEMS LAB

B.Tech. III YearII-SemesterEEE **L T P C**

0 0 3 1.5

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

1. PSPICEsimulationoftransientresponseofRLCcircuits.
    a) ResponsetoPulseinput
    b) Responsetostepinput
    c) Responsetosinusoidalinput
2. PSPICEsimulationofsingle-phasefullconverterusingRLEloadsandsingle-phaseACvoltage controllerusingRL&Eloads.
3. PSPICEsimulationofresonantpulsecommutationcircuitandBuckchopper.
4. PSPICEsimulationofsinglephaseInverterwithPWMcontrol
5. PSPICEsimulationofOp-AmpbasedintegratorandDifferentiatorcircuits.
6. Linearsystemanalysis(Timedomainanalysis,Erroranalysis)usingMATLAB
7. Stabilityanalysis(Bode,RootLocus,Nyquist)ofLinearTimeInvariantSystemUsingMATLAB
8. StateSpacemodelforclassicaltransferfunctionusingMATLAB-verification

In addition to the above eight experiments, at least and two of the experiments from the following list are required to be conducted:

1. TransferfunctionanalysisofDCcircuitusingPSPICE.
2. ModelingatransformerandsimulationoflosstransmissionlineinPSPICE.
3. Short circuitstudies.
4. PowerflowsolutionandTransientstabilityevaluationofPowersystem.

Reference Books/Software:

1. PSPICEforcircuitsandelectronicsusingPSPICE–M.H.Rashid,M/s.PHIPublications.

2. PSPICEA/Duser'smanual–MICROSIM,USA.

3. PSPICEreferenceguide–MICROSIM,USA.

4. MATLABuser'smanual–Mathworks,USA.

5. MATLAB–ControlSystemtoolbox–Mathworks,USA.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(J6430) MICRO PROCESSORS AND MICRO CONTROLLERS LAB

III B.Tech.IISem:EEE **L T PC**
0 0 3 1.5

Cycle 1: Using 8086 Processor Kits and/or Assembler (10 Weeks)

1. Write and execute an Assembly language Program (ALP) to 8086 processor to add, subtract andmultiplication.
2. Write and execute an Assembly language Program (ALP) to 8086 processor to divide a 32 bit unsignedNumber.
3. Write and execute an Assembly language Program (ALP) to 8086 processor to sort the given array ofNumbers.
4. Write and execute an Assembly language Program (ALP) to 8086 processor to Bit level Logical Operations, Rotate, Shift, Swap and BranchOperations.
5. Write and execute an Assembly language Program (ALP) to 8086 processor to pick the median from the givenString.
6. Write and execute an Assembly language Program (ALP) to 8086 processor to find the length of a givenstring.
7. Write and execute an Assembly language Program (ALP) to 8086 processor to reverse the givenstring.
8. Write and execute an Assembly language Program (ALP) to 8086 processor to verify thepassword.
9. Write and execute an Assembly language Program (ALP) to 8086 processor to insert or delete acharacter?
10. Write and execute an Assembly language Program (ALP) to 8086 processor to call a delay subroutine and display the character on the LEDdisplay.
11. Interface a keypad to 8086 microprocessor and display the key number pressed on the 7- segment display which is also interfaced to8086.
12. Write an interrupt service routine to 8086 whenever there is an interrupt request on interrupt pin, which displays "hello" on aLCD.
13. Interface an 8086 microprocessor trainer kit to PC and establish a communication between them through RS232.
14. Interface DMA controller to 8086 and transfer bulk data from memory to I/Odevice.
15. Interface a stepper motor to 8086 and operate it in clockwise and anti-clock wise by choosing variablestep-size.
16. Interface an 8 bit ADC to 8086 and generate digital output and store it in memory for the given square/ ramp/ triangle wave forminputs.

Cycle 2: Using 8051 Microcontroller Kit (6 weeks)

Introduction to Keil IDE

1. Assembly Language Programs to Perform Arithmetic (Both Signed and Unsigned) 16 Bit Data Operations, Logical Operations (Byte and Bit Level Operations), Rotate, Shift, Swap and BranchInstructions
2. Time delay Generation Using Timers of8051.
3. Serial Communication from / to 8051 to / from I/Odevices.
4. Program Using Interrupts to Generate Square Wave 10 KHZ Frequency on P2.1 Using Timer0 8051 in 8bit Auto reload Mode and Connect a 1HZ Pulse to INT1 pin and Display on Port0.Assume Crystal Frequency as11.0592MHZ

Equipment Required:

1.8086 Microprocessor Trainer Kits
2.8051 Microcontroller Trainer Kits
3. Interfacing Modules : ADC,DAC,Temparature Controllersetc.
4. Interfacing Cards : 8255, 8529,8257.

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B.TECH

IV YEAR
I & II SEMESTER
SYLLABUS

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

(J7233)POWER SYSTEM OPERATION & CONTROL

B.Tech IV YearI-Semester:EEE **L T P C**

2 1 0 3

Pre- Requisites: To learn this course student should have the concepts on the following subjects: Power system-I & Control systems

Course Objective:

1. To study the Economic operation of PowerSystems,
2. To study the Hydro and thermalscheduling
3. To study the Modeling of turbines, generators and automatic controllers. Itemphasizes on singlearea
4. To study the Two area load frequency control
5. To study the reactive powercontrol.

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. 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.

UNIT –III

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

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

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

UNIT – IV

Single Area & Two-Area Load Frequency Control: Necessity of keeping frequency constant. Definitions of Control area – Single area control – Block diagram representation of an isolated power system – Steady state analysis – Dynamic response – Uncontrolled case.

Load Frequency Control of Two-Area: Load frequency control of 2-area system – uncontrolled case and controlled case, tie-line bias control

Load Frequency Controllers: Proportional plus Integral control of single area and its block diagram representation, steady state response – Load Frequency Control and Economic dispatch control.

UNIT – V

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. Power Systems Analysis by C.L.Wadhwa, Newage International-3rdEdition
2. Modern Power System Analysis – by I.J.Nagrath & D.P.Kothari Tata M Graw – Hill Publishing Company Ltd, 2nd edition.

REFERENCE BOOKS:

1. Power System Analysis and Design by J.Duncan Glover and M.S.Sarma.,THOMPSON, 3rdEdition.
2. Power System stability and control,Prabha kundur,The McGraw-Hillcompanies
3. Electric Energy systems Theory – by O.I.Elgerd, Tata Mc Graw-hill Publishing Company Ltd., Secondedition.
4. Power System Analysis by Grainger and Stevenson, Tata McGrawHill.
5. Power System Analysis by Hadi Saadat – TMHEdition.

Course Outcomes:

After going through this course the student gets a thorough knowledge on,

1. Economic operation of powersystems,
2. Scheduling of hydro-thermal powerplants,
3. modeling of the power system components like turbine, generator, governor and Excitationsystems
4. necessity of keeping the frequency of the power system constant , load frequency control in single and two area systems, operation of load frequencycontrollers,
5. reactive power control, uncompensated transmission line Compensation in transmission systems.improve the employability in field of power generations

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

(J7235)UTILIZATION OF ELECTRICAL ENERGY

B.Tech. IV YearI-Sem EEE

L	T	P	C
2	1	0	3

Pre-requisites: learn this course student should have the concepts on the following subjects: Power Electronics, Electrical Machines –I & II

Course Objectives:

1. To Study The types of Electricdrives
2. To Study the various types of electric heating and welding.
3. To Study the fundamentals of illumination andits.
4. To understand the operation of electrical tractionsystems.
5. To calculate tractive effort, power, specific energy consumption in electrical traction systems.
6.

UNIT – I: ELECTRIC DRIVES

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

UNIT – II: ELECTRIC HEATING & WELDING

Advantages and methods of electric heating, resistance heating induction heating and dielectric heating.

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

UNIT – III: ILLUMINATION

Introduction, terms used in illumination, laws of illumination, polar curves, photometry, integrating sphere, sources of light. Various Illumination Methods. Discharge lamps, MV and SV lamps – comparison between tungsten filament lamps and fluorescent tubes, Basic principles of light control, Types and design of lighting and flood lighting.

UNIT –IV: ELECTRIC TRACTION – I

System of electric traction and track electrification. Review of existing electric traction systems in India. Special features of traction motor, methods of electric braking-plugging rheostat braking and regenerative braking**.**

Mechanics of train movement. Speed-time curves for different services – trapezoidal and quadrilateral speed time curves.

UNIT – V: ELECTRIC TRACTION-II

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

TEXT BOOK:

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

REFERENCE BOOKS:

1. N.V.Suryanarayana, Utilization of Electrical Power including Electric drives and Electric traction, New Age International (P) Limited, Publishers, 1996.
2. C.L. Wadhwa, Generation, Distribution and Utilization of electrical Energy, New Age International (P) Limited, Publishers,1997.

Course Outcomes: At the end of this course, students will have

1. Knowledge of drives with real worldproblems.
2. An ability to function effectively in industry related todrives.
3. Ability to work in industry related tolightening
4. Ability to apply the technical knowledge in electrictraction
5. Ability to work in electric traction and application involved in motioncontrol.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

PROFESSIONAL ELECTIVE-III

(J7236) HIGH VOLTAGE ENGINEERING

B.Tech. IV YearI-Sem EEE

L	T	P	C
3	0	0	3

Pre- Requisites: To learn this course students should have the concepts on the following subjects: Electrical Measurements& power Systems-II

Course Objectives:

1. To study the detailed analysis of Electric field stresses in various insulatingmaterials
2. To study the detailed analysis of Breakdown occurring in gaseous,liquids
3. To study Solid dielectrics, information about generation and measurement of High voltage andcurrent.
4. To study the Lightning phenomenon, over Voltage surges,& systemsfaults.
5. To Study the High voltage testingmethods.

UNIT- I

Introduction to High Voltage Engineering: Electric Field Stresses, Gas / Vacuum as Insulator, Liquid D electrics, Solids and Compotes, Estimation and Control of Electric Stress, Numerical methods for electric field Computation, Surge voltages, their distribution and control, Applications of insulating materials in transformer, rotating machines, circuit breakers, cable power capacitors and bushings.

UNIT- II

Break Down in Dielectric Materials: Gases as insulating media, collision process, Ionization process, Tow 'send's criteria of breakdown in gases, Paschen's law. Liquid as Insulator, pure and commercial liquids, breakdown in pure and commercial liquids. Intrinsic breakdown, elector mechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice.

UNIT-III

Generation & Measurement of High Voltages & 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. 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.

UNIT-IV

Over Voltages & Insulation Co-Ordination: Natural causes for over voltages — Lightning phenomenon, over Voltage due to switching surges, systems faults and other abnormal conditions, Principals of insulation Coordination voltage and Extra High Voltage power systems.

UNIT-V

Testing Of Materials & Electrical Apparatus: Measurement of D.C Resistivity, Measurement of Dielectric Constant and loss factor, Partial discharge measurements. Testing of Insulators and bushings, Testing of Isolators and circuit breakers, testing of cables, Testing of Transformers, Testing of Surge Arresters, and Radio Interference measurements.

TEXT BOOKS

1. High Voltage Engineering, M.S.Naidu and V. KamarJu, TMHPublications.
2. High Voltage Engineering, C.L.Wadhwa, New Age Internationals (P)Limited.

REFERENCE BOOKS

1. High Voltage Engineering: Fundamentals, E.Kuffel, W.S.Zaengi, J.Kuffel byElsevier.
2. High Voltage Insulation Engineering, Ravindra Arora, Wolfgang Mosch, New Age International (P)Limited.
3. High Voltage Engineering, Theory and Practice, Mazen Abdel Salam, Hussein Anis, Ahdan El-Morshedy, Roshdy Radwan, MarcelDekker

Course Outcome:

After going through this course the student gets a thorough knowledge on,

1. Basics of high voltageengineering,
2. Break-down phenomenon in different types of dielectrics,generation
3. Measurement of high voltages and currents, the phenomenon ofover-voltages,
4. Concept of insulationcoordination,
5. Testing of various materials and electrical apparatus used in high voltage engineering, With which he/she can able to apply the above conceptual things to real-world electrical power system and its applications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

PROFESSIONAL ELECTIVE-III

(J7237) ADVANCED POWER SYSTEM PROTECTION

B.Tech. IV YearI-Sem EEE

L	T	P	C
3	0	0	3

Pre-requisites: learn this course student should have the concepts on the following subjects: switch gear and protection

Course Objectives:

1. To Study The StaticRelays
2. To Study Phase Comparators and Static Over CurrentRelays
3. To study the Analysis of Static Differential Relays and Static DistanceRelays
4. To study the Multi-Input Comparators and Effect of power swings on the performanceof distancerelays
5. To study the Microprocessor based ProtectiveRelays

UNIT-I:

Static Relays: Advantages of static relays-Basic construction of static relays-Level detectors-Replica impedance –Mixing circuits-General equation for two input phase and amplitude comparators-Duality between amplitude and phase comparators.

Amplitude Comparators: Circulating current type and opposed voltage type- rectifier bridge comparators, Direct and Instantaneous comparators.

UNIT-II:

Phase Comparators: Coincidence circuit type- block spike phase comparator, techniques to measure the period of coincidence-Integrating type-Rectifier and Vector product type- Phase comparators.

Static Over Current Relays: Instantaneous over-current relay-Time over-current relays-basic principles –definite time and Inverse definite time over-current relays.

UNIT-III:

Static Differential Relays: Analysis of Static Differential Relays –Static Relay schemes –Duo bias transformer differential protection –Harmonic restraint relay.

Static Distance Relays: Static impedance-reactance–MHO and angle impedance relay-sampling comparator –realization of reactance and MHO relay using sampling comparator.

UNIT-IV:

Multi-Input Comparators: Conic section characteristics-Three input amplitude comparator – Hybrid comparator-switched distance schemes –Poly phase distance schemes- phase fault scheme –three phase scheme – combined and ground fault scheme.

Power Swings: Effect of power swings on the performance of distance relays –Power swing analysis-Principle of out of step tripping and blocking relays-effect of line and length and source impedance on distance relays.

UNIT-V:

Microprocessor based Protective Relays: (Block diagram and flowchart approach only)-Over current relays–impedance relays-directional relay-reactance relay .Generalized mathematical expressions for distance relays-measurement of resistance and reactance –MHO and offset MHO relays-Realization of MHO characteristics- Realization of offset MHO characteristics -Basic principle of Digital computer relaying.

TEXT BOOKS:

1. Badri Ram and D.N.Vishwakarma, "Power system protection and Switch gear ", TMH publication New Delhi1995.
2. T.S.Madhava Rao , "Static relays", TMH publication, second edition1989.

REFERENCE:

1. Protection and Switchgear, Bhavesh Bhalja, R. P. Maheshwari, Nilesh G. Chothani, Oxford UniversityPress.
2. Electrical Power System Protection, C. Christopoulos and A. Wright, Springer International.

Course Outcomes:

After going through this course the student gets a thorough knowledge on,

1. Basic construction of staticrelays
2. Phase Comparators and Static Over Current Relays characteristics
3. Static Differential Relays and Static Distance Relayscharacteristics
4. Multi-Input Comparatorscharacteristics
5. Basic principle of Digital computer relaying and Realization of MHOcharacteristics

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

PROFESSIONAL ELECTIVE-III

(J7238)INDUSTRIAL ELECTRICAL SYSTEMS

B.Tech. IV YearI-Sem EEE **L T P C**
3 0 0 3

Pre-requisites: To learn this course student should have the concepts on the following subjects: Electrical Machines and Power Systems

Course Objectives:

1. Introduce to the Electrical SystemComponents
2. Learn about the Types of residential and commercial wiring systemComponents
3. To design of a lighting scheme for a residential and commercialpremises
4. To Study the Power factor correction and earthingDesign
5. To Study of basic PLC and SCADA system for distribution automation.

UNIT-I: Electrical System Components
LT system wiring components, selection of cables, wires, switches, distribution box, metering system, Tariff structure, protection components- Fuse, MCB, MCCB, ELCB, inverse current characteristics, symbols, single line diagram (SLD) of a wiring system, Contactor, Isolator, Relays, MPCB, Electric shock and Electrical safetypractices

UNIT-II: Residential and Commercial ElectricalSystems
Types of residential and commercial wiring systems, general rules and guidelines for installation, load calculation and sizing of wire, rating of main switch, distribution board and protection devices, earthing system calculations, requirements of commercial installation, deciding lighting scheme and number of lamps, earthling of commercial installation, selection and sizing of components.

UNIT-III: Illumination Systems
Understanding various terms regarding light, lumen, intensity, candle power, lamp efficiency, specific consumption, glare, space to height ratio, waste light factor, depreciation factor, various illumination schemes, Incandescent lamps and modern luminaries like CFL, LED and their operation, energy saving in illumination systems, design of a lighting scheme for a residential and commercial premises, flood lighting.

UNIT-IV: Industrial Electrical Systems I
HT connection, industrial substation, Transformer selection, Industrial loads, motors, starting of motors, SLD, Cable and Switchgear selection, Lightning Protection, Earthling design, Power factor correction – kVAR calculations, type of compensation, Introduction to PCC, MCC panels. Specifications of LT Breakers, MCB and other LT panel components.

UNIT-V: Industrial Electrical Systems II

DG Systems, UPS System, Electrical Systems for the elevators, Battery banks, Sizing the DG, UPS and Battery Banks, Selection of UPS and Battery Banks.

Industrial Electrical System Automation

Study of basic PLC, Role of in automation, advantages of process automation, PLC based control system design, Panel Metering and Introduction to SCADA system for distribution automation.

Text/Reference Books:

1. S. L. Uppal and G. C. Garg, "Electrical Wiring, Estimating & Costing",Khannpublishers, 2008.
2. K. B. Raina, "Electrical Design, Estimating & Costing", New age International,2007.
3. S. Singh and R. D. Singh, "Electrical estimating and costing", Dhanpat Rai andCo.,1997.
4. Web site for IS Standards.
5. H. Joshi, "Residential Commercial and Industrial Systems", McGraw HillEducation, 2008.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the electrical systemsComponents
2. Understand the electrical wiring systems for residential, commercial andindustrial
3. Consumers, representing the systems with standard symbols and drawings,SLD
4. Understand various components of industrial electricalsystems..
5. Analyze and select the proper size of various electrical systemcomponents

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

PROFESSIONAL ELE CTIVE-IV

(J7239) ADVANCED CONTROL SYSTEMS

B.Tech. IV YearI-Sem EEE	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

Pre- Requisites: To learn this course student should have the concepts on the following subject: Control Systems

Course Objectives:

1. To study the system performance using frequency domain analysis compensators to improve systemperformance
2. To study the system performance using . Lyapunov's stability and Lypanov's instability theorems.
3. To study the analysis of nonlinear control systems Using describingfunction,
4. To study the analysis of nonlinear control systems phaseplane
5. To study the Concepts of state, state variables and state model stability analysis including controllability andobservabilty.

UNIT–I

Stability Analysis-I: Frequency Domain: Polar Plots-Nyquist Plots-Stability Analysis. Lag, Lead, Lead-Lag Compensators design in frequency Domain.

UNIT —II

Stability Analysis-II: 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 —III

Describing Function Analysis: Introduction to nonlinear systems, Types of nonlinearities, describing functions, describing function analysis of nonlinear control systems.

UNIT —IV

Phase—Plane Analysis: Introduction to phase-plane analysis, Method of Isoclines for Constructing Trajectories, singular points, phase-plane analysis of nonlinear control systems.

UNIT — V

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

TEXT BOOKS:

1. Advanced Control Systems, B. N. Sarkar, PHI Learning PrivateLimited.
2. Modern Control System Theory, M. Gopal, New Age InternationalPublishers

REFERENCE BOOKS

1. Control Systems theory and applications, S.K Bhattacharya,Pearson.
2. Control Systems, N.C.Jagan, BSPublications.
3. Control Systems Engineering, I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers.
4. Control Systems, N.K.Sinha, New Age International (P) LimitedPublishers.
5. Modern Control Engineering, K. Ogata, Prentice Hall of India, 3d edition,1998.
6. Advanced Control Theory, Somanath MJhi, CengageLearning.
7. Modern Control Engineering, D. Roy Choudhury, PHILearning.
8. Digital Control and State Variable Methods, M. Gopal, Tata Mc Graw HillCompanies.

Course Outcomes:

After going through this course the student gets a thorough knowledge on,

1. Stability Analysis of Frequency Domain, design of Lag, Lead, Lead-Lag Compensators in frequencyDomain
2. stability analysis through Lypanov stability, phase-plane analysis, non-linearsystems
3. Describing functions o**f** non-linearsystems
4. Phase-Plane Analysis o**f** non-linearsystems
5. State space analysis of continuous systems and concept of controllability and observably With which he/she can able to apply the above conceptual things to real-world electrical and electronics engineering problems and itsapplications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

PROFESSIONAL ELECTIVE-IV

(J7240)POWER SYSTEM DYNAMICS

B.Tech. IV YearI-Sem EEE **L T P C**

3 0 0 3

Prerequisite: Computer Methods in Power Systems

Course objectives:

1. To make aware of modeling aspects of different power systemelements.
2. To analyze the dynamic performance of single machine connected to infinitepower systems.
3. To illustrate the system stability issues and requisite controlstrategies.
4. To analyze single machinesystem
5. To know the applications of power stabilizers

UNIT-I: BASIC CONCEPTS

Power system stability states of operation and system security - system dynamics - problems system model analysis of steady State stability and transient stability - simplified representation of Excitation control.

UNIT-II: MODELING OF SYNCHRONOUS MACHINE

Synchronous machine - park's Transformation-analysis of steady state performance per - unit quantities-Equivalent circuits of synchronous machine-determination of parameters of equivalent circuits.

UNIT-III: EXCITATION SYSTEM

Excitation system modeling-excitation systems block Diagram - system representation by state equations- Dynamics of a synchronous generator connected to infinite bus - system model Synchronous machine model-stator equations rotor equations - Synchronous machine model with field circuit - one equivalent damper winding on q axis (model 1.1) - calculation of Initial conditions.

UNIT-IV: ANALYSIS OF SINGLE MACHINE SYSTEM

Small signal analysis with block diagram - Representation Characteristic equation and application of Routh Hurwitz criterion- synchronizing and damping torque analysis-small signal model - Stateequations.

UNIT-V: APPLICATION OF POWER SYSTEM STABILIZERS

Basic concepts in applying PSS - Control signals - Structure and tuning of PSS - Washout circuit - Dynamic compensator analysis of single machine infinite bus system with and without PSS.

TEXT BOOK:

1. K.R. PADIYAR," Power system dynamics "- B.S. Publications.

REFERENCE BOOKS:

1. P.M. Anderson and A.A. Fouad,"Power system control and stability ",IEEEPresss
2. R. Ramanujam, "Power Systems Dynamics"- PHIPublications.

Course Outcomes:

Upon the completion of the subject, the student will be able to

1. Choose the fundamental dynamic behavior and controls of power systems to perform basic stabilityanalysis.
2. Comprehend concepts in modeling and simulating the dynamic phenomena ofpower systems
3. Interpret results of system stabilitystudies
4. Analyze theory and practice of modeling main power system components, such as synchronous machines, excitation systems andgovernors
5. The applications of powerstabilizers

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

PROFESSIONAL ELECTIVE –IV
(J7241) LINEAR SYSTEMS ANALYSIS

B.Tech. IV YearI-Sem EEE **L T P C**

3 0 0 3

Pre- Requisites: To learn this course student should have the concepts on the followingsubject: Electrical circuit-I,II and Controlsystems

Course Objectives:

1. To provide students with the modeling of electricalsystems.
2. To familiarize the students with the state space analysis of dynamic systems and Fourier seriesrepresentation.
3. To make students understand the concepts forurier transforms and Laplace transforms approach To have the different methods of representation of networksynthesis
4. Testing of polynomials. To familiarize the students with the concepts of sampling and z-transformations

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 Representation

Introduction, Trigonometric form of Fourier series, Exponential form of Fourier series, Wave symmetry, Fourier integrals and transforms, Fourier transform of a periodic function , Properties of Fourier Transform , Parseval's theorem , Fourier transform of some common signals, Fourier transform relationship with Laplace Transform.

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

UNIT-IV Testing ofPolynomials

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

Network Sysnthesis

Synthesis of one port LC networks-Foster and Cauer methods-Synthesis of RL and RC one port networks-Foster and Cauer methods.

UNIT-V Sampling

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.

Z-Transforms

Fundamental difference between continuous 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 Publications2003.
2. Network Analysis and Synthesis – Umesh Sinha- Satya PrakashanPublications

REFERENCE BOOKS:

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

Course Outcomes:

1. Learn students with the modeling of electrical systems.
2. To familiarize the students with the state space analysis of dynamic systems and Fourier seriesrepresentation.
3. To make students understand the concepts forurier transforms and Laplace transforms approach to have the different methods of representation of networksynthesis.
4. Testing ofpolynomials.
5. To familiarize the students with the concepts of sampling andz-transformations.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

(J7234)POWER SYSTEMS SIMULATION LAB

B.Tech. IV YearI-Sem EEE **L T P C**

0 0 3 1.5

Any Ten of the following are to be conducted:

1. Computation of power system components in Per Units
2. Develop Program for Y_{BUS}formation.
3. Develop Program for G-S Load FlowAnalysis.
4. Develop Program for N-R Load FlowAnalysis.
5. Develop Program for FDLF Load FlowAnalysis.
6. Develop Program for Symmetrical Short Circuit Analysis.
7. Develop Program for Unsymmetrical Short CircuitAnalysis
8. Symmetrical Components for different casestudies
9. Numerical integration of Swing equation.
10. The Equal AreaCriteria.
11. The economical / optimal Loaddispatch.
12. Load frequencycontrol

Reference Books/Software:

1. IntroductiontoMATLABProgrammingbyProfessorKathleenOssman
2. MATLAB user'smanual
3. MATLAB–ControlSystemtoolbox

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(J8242)FUNDAMENTALS OF HVDC AND FACTS

B.Tech. IV YearII-Sem EEE **L T P C**

3 0 0 3

Pre- Requisites: To learn this course student should have the concepts on the followingsubject: Power systems-II, Power Electronics

Course Objectives:

1. To study the importance of HVDCtransmission
2. To study Analysis of HVDCconverters
3. To study Analysis of Harmonics Filters and Reactive PowerControl
4. To study basic FACTSconcepts
5. To study Static shunt and series compensation. Combined compensationtechniques.

UNIT—I

Introduction: Comparison of AC and DC transmission systems, application of DC transmission, types of DC links, typical layout of a HVDC converter station. HVDC converters, pulse number, analysis of Gratez circuit with and without overlap, converter bridge characteristics, equivalent circuits or rectifier and inverter configurations of twelve pulse converters.

UNIT—II

Converter & HVDC System Control: Principles of DC Link Control — Converters Control Characteristics — system control hierarchy, firing angle control, current and extinction angle control, starting and stopping of DC link.

UNIT-III

Harmonics, Filters and Reactive Power Control: Introduction, generation of harmonics, AC and DC filters. Reactive Power Requirements in steady state, sources of reactive power, static VAR systems.

Power Flow Analysis in AC/DC Systems: Modeling of DC/AC converters, Controller Equations-Solutions of AC/DC load flow —Simultaneous method-Sequential method.

UNIT-IV

Introduction to FACTS: Flow of power in AC parallel paths and meshed systems, basic types of FACTS controllers, brief description and definitions of FACTScontrollers.

Static Shunt Compensators: Objectives of shunt compensation, methods of controllable VAR generation, static VAR compensators, SVC and STATCOM, comparison between SVC and STATCOM.

UNIT-V

Static Series Compensators: Objectives of series compensation, variable impedance type-thyristor switched series capacitors (TCSC), and switching converter type series compensators, static series synchronous compensator (SSSC)-power angle characteristics-basic operating control schemes.

Combined Compensators: Introduction, unified power flow controller (UPFC), basic operating principle, independent real and reactive power flow controller, control structure.

TEXT BOOKS:

1. HVDC Transmission, S. Kamakshaiah, V. KamarJu, The Mc — Graw HillCompanies.
2. Understanding FACTS, Concepts and Technology of Flexible AC Transmission Systems, Narain. G. Hingorani, Laszlo Gyugyi, IEEE Press, WileyIndia.

REFERENCE BOOKS:

1. HVDCandFactsControllersApplicationsofStaticConvertersinPowerSystems,Vijay K. Sood, Kiuwer Academic Publishers.
2. HVDC Power Transmission Systems: Technology and system Interactions, K.R.Padiyar, New Age International (P) Limited.
3. Thyristor — Based Conrollers for Electrical Transmission Systems, R.Mohan Mathur, RJiv K. Varma.WileyIndia.
4. FACTS Modeling and Simulation in Power Networks, Enrique Acha, Wiley India Distributed by BSP Books Pvt.Ltd.

Course Outcomes:

After going through this course the student gets a thorough knowledge on:

1. Basics of HVDC system. and comparison of AC and DC transmissionSystem
2. Operation of Converters controlschemes
3. Harmonics filters reactive power control and power flow analysis in HVDCsystems
4. Basic concepts of FACTS, necessity of FACTS controllers and theiroperation,
5. Shunt and series compensation through various static compensators Withwhichhe/shecanabletoapplytheaboveconceptualthingstoreal-world electrical power system and its applications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

PROFESSIONAL ELECTIVE-V

(J8243) SMART GRID

B.Tech. IV YearII-Sem EEE

L	T	P	C
3	0	0	3

Pre- Requisites: To learn this course student should have the concepts on the following subject: Power Systems Renewable Energy sources and switch gear and protection

CourseObjectives:

1. To study the concepts of smart grid- Electricity network
2. To Study the DC Distribution and SmartGrid
3. To Study The Concept Of Dynamic EnergySystems
4. To Study The Concept of energy–Port
5. To Study The Industrial energy management programs and Manufacturingprocess

UNIT–I: INTRODUCTION

Introduction to smart grid- Electricity network-Local energy networks- Electric transportation-Low carbon central generation-Attributes of the smart grid- Alternate views of a smart grid.

SMART GRID TO EVOLVE A PERFECT POWER SYSTEM: Introduction- Overview of the perfect power system configurations- Device level power system- Building integrated power systems- Distributed power systems- Fully integrated power system-Nodes of innovation.

UNIT–II: DC DISTRIBUTION AND SMART GRID

AC vs DC sources-Benefits of and drives of DC power delivery systems-Powering equipment and appliances with DC-Data centers and information technology loads-Future neighborhood-Potential future work and research.

INTELLIGRID ARCHITECTURE FOR THE SMARTGRID: Introduction- Launching intelligrid-Intelligrid today- Smart grid vision based on the intelligrid architecture-Barriers and enabling technologies.

UNIT–III: DYNAMIC ENERGY SYSTEMS CONCEPT

Smart energy efficient end use devices-Smart distributed energy resources-Advanced whole building control systems- Integrated communications architecture-Energy management-Role of technology in demand response- Current limitations to dynamic energy management-Distributed energy resources-Overview of a dynamic energy management-Key characteristics of smart devices- Key characteristics of advanced whole building control systems-Key characteristics of dynamic energy management system.

UNIT–IV: ENERGY PORT AS PART OF THE SMART GRID:

Concept of energy -Port, generic features of the energy port.

POLICIES AND PROGRAMS TO ENCOURAGE END – USE ENERGY EFFICIENCY: Policies and programs in action -multinational - national-state-city and corporate levels.

MARKET IMPLEMENTATION: Framework-factors influencing customer acceptance and response - program planning-monitoring and evaluation.

UNIT–V: EFFICIENT ELECTRIC END – USE TECHNOLOGY ALTERNATIVES

Existing technologies – lighting - Space conditioning - Indoor air quality - Domestic water heating - hyper efficient appliances - Ductless residential heat pumps and air conditioners - Variable refrigerant flow air conditioning-Heat pump water heating - Hyper efficient residential appliances - Data center energy efficiency- LED street and area lighting - Industrial motors and drives - Equipment retrofit and replacement - Process heating - Cogeneration, Thermal energy storage - Industrial energy management programs - Manufacturing process-Electro-technologies, Residential, Commercial and industrial sectors.

TEXT BOOKS:

1. Clark W Gellings, "The Smart Grid, Enabling Energy Efficiency and Demand Side Response"- CRC Press,2009.
2. Janaka Ekanayake, Kithsiri Liyanage,Jianzhong.Wu,Akihiko Yokoyama, Nick Jenkins, "Smart Grid: Technology and Applications"- Wiley, 2012.
3. James Momoh, "Smart Grid :Fundamentals of Design and Analysis"- Wiley, IEEE Press, 2012.

Course Outcomes:

After going through this course the student gets a thorough knowledge on,

1. Basic concepts of smart grid and Local energynetworks
2. Benefits of DC power delivery systems and Smart grid vision based on the intelligent gridarchitecture
3. Energy management and Distributed energyresources
4. Concept of energy-Port
5. The Industrial energy management programs, Manufacturing process andEfficient ElectricEnd

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

PROFESSIONAL ELECTIVE –V
(J8244) MODERN POWER ELECTRONIC CONVERTERS

B.Tech. IV YearII-SemesterEEE **L T PC**

3 0 0 3

Pre- Requisites: To learn this course students should have the concepts on the following subjects Power Electronics

Course Objectives :

1. To study basics of modern power semiconductor devices
2. To Study the Resonant pulse inverters operation andapplications.
3. To Study the Resonant converters and applications.
4. To Study principle of operation of multilevel inverter applications and reactive power compensation
5. To Study bidirectional DC power supplies and uninterruptible AC power supplies applications

UNIT -I:
Modern power semiconductor devices Modern power semiconductor devices- MOS Turn Off Thyristor (MTO) – Emitter Turn Off Thyristor (ETO) – Integrated Gate – Commutated thyristor (IGCTs) – MOS – controlled thyristors (MCTs) – Static induction Thyristors (SITHs) – Power integrated circuits (PICs) – Symbol, structure and equivalent circuit- comparison of their features.

UNIT-II:
Resonant pulse inverters: Resonant pulse inverters – series resonant inverters- series resonant inverters with unidirectional switches – series resonant inverters with bidirectional switches- analysis of half bride resonant inverter- evaluation of currents and Voltages of a simple resonant inverter – analysis of half bridge and full bridge resonant inverter with bidirectional switches – Frequency response of series resonant inverter- for series loaded inverter – for parallel resonant inverters – Voltage control of resonant inverters-class E resonant inverter – class E resonant rectifier- evaluation of values of C‟s and L‟s for class E inverter and Class E rectifier –numerical problems.

UNIT-III:
Resonant Converters: Resonant converters- zero current switching resonant converters – L type ZCS resonant converter M type ZCS resonant converter – zero voltage Switching resonant converters – comparison between ZCS and ZVS resonant converters- Two quadrant ZVS

resonant converters – resonant dc – link inverters- evaluation of L and C for zero current switching inverter – Numerical problems

. Multilevel Inverters: Multilevel concept- Classification of multilevel inverters – Diode clamped multilevel inverter Principle of operation – main features- improved diode clamped inverter – principle of operation – Flying capacitors multilevel inverter – principle of operation – main features.

UNIT-IV:

Multilevel inverters (continued) Cascaded multilevel inverter – principle of operation – main features- multilevel inverter applications – reactive power compensation – back to back intertie system – adjustable drives – switching device currents – dc link capacitor voltage balancing – features of Multilevel inverters – comparisons of multilevel converters.

UNIT-V:

DC Power supplies: DC power supplies – classification- switched mode dc power supplies – fly back Converter forward converter- push –pull converter –half bridge converter –Full bridge converter – Resonant DC power supplies- bidirectional power supplies- Application.

AC Power Supples: AC power supplies – classification – switched mode ac power supplies Resonant AC power supplies-bidirectional ac power supplies – multistage conversions- control circuits- applications. Power conditioners and Uninterruptible Power Supplies: Introduction- power line disturbances – power conditioners- uninterruptible power supplies applications.

TEXT BOOKS:

1. Power Electronics: Mohammed H.Rashid-Pearson Education- Third Edition –first Indian reprint-2004
2. Power Electronics – Ned Mohan, Tore M.Undeland and William P.Robbind – John wiley & Sons – SecondEdition

REFERENCES:

1. Power Electronics andconverters—M.D.Singh
2. Power Electronics – Ned Mohan, Tore M.Undeland and William P.Robbind – John wiley & Sons – SecondEdition

COURSE OUTCOMES:

After going through this course the student gets a thorough knowledgeon,

1. Modern power semiconductor devices structures and applications.
2. Operation and design of Resonant pulseinverters
3. Operation and design of Flying capacitors multilevelinverter.
4. Operation and design of Cascaded multilevelinverter.
5. Design of AC and DC power supplies Multileveloperations

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

PROFESSIONAL ELECTIVE –V

(J8245)POWER SYSTEM RELIABILITY

B.Tech. IV YearII-SemesterEEE **L T PC**

3 0 0 3

Pre-requisites: learn this course student should have the concepts on the following subjects: Power system-I

Course Objectives:

1. This subject introduces the concept of probability, reliability, distributionfunctions,
2. Various methods and techniques to calculate and estimate the reliability of different engineering problems andmodels.
3. Operating Reserve Evaluation, Bulk Power System ReliabilityEvaluation
4. Inter Connected System ReliabilityAnalysis
5. Distribution System Reliability. Analysis Substations and SwitchingStations

UNIT-I: Generating System Reliability Analysis – I

Generation system model – capacity outage probability tables – Recursive relation for capacitive model building – sequential addition method – unit removal – Evaluation of loss of load and energy indices – Examples.

UNIT-II: Generating System Reliability Analysis – II

Frequency and Duration methods – Evaluation of equivalent transitional rates of identical and non-identical units – Evaluation of cumulative probability and cumulative frequency of non-identical generating units – 2- level daily load representation - merging generation and load models – Examples.

UNIT-III: Operating Reserve Evaluation

Basic concepts - risk indices – PJM methods – security function approach – rapid start and hot reserve units – Modeling using STPM approach.

Bulk Power System Reliability Evaluation

Basic configuration – conditional probability approach – system and load point reliability indices – weather effects on transmission lines – Weighted average rate and Markov model – Common modefailures.

UNIT-IV: Inter Connected System Reliability Analysis

Probability array method – Two inter connected systems with independent loads – effects of limited and unlimited tie capacity - imperfect tie – Two connected Systems with correlatedloads – Expression for cumulative probability and cumulativefrequency.

Distribution System Reliability Analysis – I (Radial configuration):

Basic Techniques – Radial networks –Evaluation of Basic reliability indices, performance indices– load point and system reliability indices – customer oriented, loss and energy oriented indices – Examples.

UNIT-V: Distribution System Reliability Analysis-II(Parallel Configuration)

Basic techniques – inclusion of bus bar failures, scheduled maintenance – temporary and transient failures – weather effects – common mode failures –Evaluation of various indices – Examples

Substations and Switching Stations

Effects of short-circuits - breaker operation – Open and Short-circuit failures – Active and Passive failures – switching after faults – circuit breaker model – preventive maintenance – exponential maintenance times.

TEXT BOOK

1. Reliability Evaluation of Power systems — R. Billinton, R.N.Allan, Pitman Advance Publishing Program, New York, reprinted in India by B.S.Publications,2007.
2. Assessment of Power System Reliability Methods and Applications—MarkoCepin

REFERENCE BOOKS:

1. Reliability Evaluation of Power Systems by Roy Billinton and Ronald N. Allan, Plenum press, New York and London (Second Edition), 1996.
2. Reliability Modeling in Electric Power Systems by J. Endrenyi, John Wiley and Sons, 1978. (FirstEdition)

Course Outcomes: After going through this course the student gets a thorough knowledge on

1. Basic probabilitytheory,
2. Distribution functions, reliability analysis of various models through different n,ethics, reliabilityfunctions,
3. Repairable irreparable systems reliability through markov modelingfrequency
4. Duration techniques, with which he/she can able to apply the above conceptualthings
5. Real-world electrical and electronics problems andapplications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

PROFESSIONAL ELECTIVE –VI

(J8246)SOFT COMPUTING TECHNIQUES

B.Tech. IV YearII-SemesterEEE **L T PC**

3 0 0 3

COURSE OBJECTIVES:

1. To study basics of artificial neuralnetwork.
2. To learn Concepts of modelling and control of neural networkschemes.
3. To expose the ideas about modelling fuzzy controlschemes
4. To teach about the concept of fuzziness involved in varioussystems
5. To understand the Features of hybrid controlschemes.

UNIT I
ARTIFICIAL NEURAL NETWORK
Review of fundamentals–Biological neuron, artificial neuron, activation function, single layer perceptron–Limitation–Multi layer perceptron–Back Propagation Algorithm(BPA)–Recurrent Neural Network (RNN)–Adaptive Resonance Theory (ART) based network–Radial basis function network–online learning algorithms, BP through time–RTRL algorithms–Reinforcement learning

UNIT II
NEURAL NETWORKS FOR MODELING AND CONTROL
Modelling of non-linear systems using ANN–Generation of training data–Optimal architecture–Model validation–Control of non-linear systems using ANN–Direct and indirect neuro control schemes–Adaptive neuro controller–Familiarization with neural network toolbox.

UNIT III
FUZZY SET THEORY
Fuzzy set theory–Fuzzy sets–Operation on fuzzy sets–Scalar cardinality, fuzzy cardinality, union and intersection, complement (Yager and Sugeno), equilibrium points, aggregation, projection, composition, cylindrical extension, fuzzy relation–Fuzzy membership functions.

UNIT IV
FUZZY LOGIC FOR MODELING AND CONTROL
Modelling of non-linear systems using fuzzy models–TSK model–Fuzzy logic controller–Fuzzification–Knowledge base–Decision making logic–Defuzzification–Adaptive fuzzy systems–Familiarization with fuzzy logic toolbox.

UNIT V
HYBRID CONTROL SCHEMES
Fuzzification and rule base using ANN–Neuro fuzzy systems–ANFIS–Fuzzy neuron–GA–Optimization of membership function and rule base using Genetic Algorithm–Introduction to other evolutionary optimization techniques, support vector machine–Case study–Familiarization with ANFIS toolbox.

TEXT BOOKS:

1. Laurence Fausett, “Fundamentals of Neural Networks”, Prentice Hall, Englewood Cliffs, N.J., 1992
2. Timothy J. Ross, “Fuzzy Logic with Engineering Applications”, McGraw HillInc.,2000.

REFERENCES

1. Goldberg, “Genetic Algorithm in Search, Optimization and Machinelearning”,Addison Wesley Publishing Company Inc.1989
2. Millon W.T., Sutton R.S. and Webrose P.J., “Neural Networks for Control”, MITpress, 1992
3. Ethem Alpaydin, “Introduction to Machine learning (Adaptive Computation andMachine Learning series)’, MIT Press, Second Edition,2010.
4. Zhang Huaguang and Liu Derong, “Fuzzy Modeling and Fuzzy Control Series: Control Engineering”,2006

COURSE OUT COMES:

1. Ability to understand the concepts of ANN, different features of fuzzy logic andtheir modeling, control aspects and different hybrid controlschemes.
2. Ability to understand the basics of artificial neuralnetwork.
3. Ability to get knowledge on modelling and Fuzzycontrol.
4. Ability to get knowledge on fuzziness involved in various controlschemes.
5. Ability to acquire knowledge on hybrid controlschemes.And improve employability in field of software industry

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

PROFESSIONAL ELECTIVE –VI

(J8247) DIGITL CONTROL SYSTEMS

B.Tech. IV YearII-SemesterEEE **L T PC**

3 0 0 3

Pre- Requisites: To learn this course student should have the concepts on the followingsubject: Control systems

COURSE OBJECTIVES:

1. This course gives fundamentals digital controlsystems,
2. z-transforms, state space representation of the controlsystems,
3. concepts of controllability andobservably.
4. Estimation of stability in different domains, design of discrete time controlsystems,
5. compensators, state feedback controllers, state observers through varioustransformations.

UNIT-I

Introduction: Introduction, Examples of Data control systems — Digital to Analog conversion and Analog to Digital conversion, sample and hold operations. Z — TRANSFORMS: Introduction, Linear difference equations, pulse response, Z — transforms, Theorems of Z — Transforms, the inverse Z — transforms, Modified Z- Transforms. Z-Transform method for solving difference equations; Pulse transforms function) block diagram analysis of sampled — data systems, mapping between s-plane and z-plane.

UNIT — II

State Space Analysis: State Space Representation of discrete time systems, Pulse Transfer Function Matrix solving discrete time state space equations, State transition matrix and its Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state — space equations. Concepts of Controllability and Observability, Tests for controllability and Observability. Duality between Controllability and Observability, Controllability and Observability conditions for Pulse Transfer Function.

UNIT —III

Stability Analysis: Mapping between the S-Plane and the Z-Plane — Primary strips and Complementary Strips — Constant frequency loci, Constant damping ratio loci, Stability Analysis of closed loop systems in the Z-Plane. Jury stability test — Stability Analysis by use of the Bilinear Transformation and Routh Stability criterion.

UNIT-IV

Design of Discrete Time Control System: Transient and steady — State response Analysis — Design based on the frequency response method — Bilinear Transformation and Design procedure in the w-plane, Lead, Lag and Lead-Lag compensators and digital PID controllers.

UNIT-V

State Feedback Controllers & Observers: Design of state feedback controller through pole placement — Necessary and sufficient conditions, Ackerman's formula. State Observers — Full order and Reduced order observers.

TEXT BOOK

1. Discrete-Time Control systems – K. Ogata, Pearson Education/PHI, 2Edition.
2. Digital Control Systems, Kuo, Oxford University Press, 2 Edition, 2003.Digital Control and State Variable Methods by M.Gopal,TMH.

REFERENCE BOOKS

1. Digital Control Engineering Analysis and Design M. Sami Fadali Antonio Visioli, AP AcademicPress.
2. Digital Control Systems , V. I. George, C. P. Kurian, CengageLearning

COURSE OUTCOMES:

1. After going through this course the student gets a thorough knowledge on, basics of digital controlsystems,
2. z-transforms, mapping between S-plane and Z-plane, state-space analysis, concept of controllability andobservabilty,
3. derivation of pulse-transfer function, stability analysis in S-domain and Z domains, stability through jury-stability test, stability through bilineartransformation
4. R-H criteria, design of discrete-time control systems, design of lag, lead, lead-lag compensators, design of PID controllers and design of state feedbackcontrollers
5. Observers, with which he/she can able to apply the above conceptual things to real-world electrical and electronics problems andapplications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

PROFESSIONAL ELECTIVE –VI

(J8248) EXTRA HIGH VOLTAGE AC TRANSMISSION

B.Tech. IV YearII-Sem EEE **L T P C**

3 0 0 3

Pre- Requisites: To learn this course student should have the concepts on the following subject: Power systems-II.

Course Objectives:

1. To study the concepts of extra high voltage ACtransmission.
2. To study the behavior of the line parameters for extra high voltages, voltage gradients of the transmission line conductorsgradients
3. To study the effect ofcorona
4. To study the Electrostatic field calculations& travelling wave theoryconcept
5. To study the control of Extra high voltages in transmissionlines.

UNIT — I

Introduction: 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 and ground reactive parameters: Line inductance and capacitances — sequence inductances and capacitances — modes of propagation — ground return — Examples

UNIT — II

Voltage Gradients of Conductors: Electrostatics — field of sphere gap — held 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.

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 — Examples.

UNIT — IV

Electro Static Field: Electrostatic field: calculation of electrostatic field of EHV/AC lines — effect on humans, animals and plants — electrostatic induction un-energized circuit of double-circuit line — electromagnetic interference- Examples.

Traveling wave theory: Traveling 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. EHVAC Transmission Engineering by R. D. Begamudre, New Age International (p)Ltd.
2. HVAC and DC Transmission by S.Rao.
3. REFERENCEBOOKS
4. Rokosh Das Begamudre,"Extra High Voltage AC Transmission Engineering"— Wiley EasternLTD.
5. Edison,"EHV Transmission line"- ElectricInstitution.

REFERENCES :

1. Rokosh Das Begamudre,"Extra High Voltage AC Transmission Engineering"— Wiley EasternLTD.
2. Edison,"EHV Transmission line"- ElectricInstitution

Course Outcomes: After going through this course the student gets a thorough knowledge on:

1. General aspects EHV ACtransmission
2. Necessity of extra high voltage (EHVAC) transmission, advantages and disadvantages of EHVAC,
3. concepts of voltage gradient, effects ofcorona,
4. electro static field calculations, theory of travellingwaves
5. voltage control of EHVAC transmission, with which he/she can able to apply the above conceptual things to real-world electricalsystem.

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