R19

B.Tech – EEE

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY::PUTTUR
(AUTONOMOUS)
Department of Electrical and Electronics Engineering

INDUCTION PROGRAM (MANDATORY)	3 WEEKS DURATION
Induction program for students to be offered right at the start of the first year.	• Physical activity • Creative Arts • Universal Human Values • Literary • Proficiency Modules • Lectures by Eminent People • Visits to local Areas • Familiarization to Dept./Branch & Innovations

I B. Tech. – I Semester (EEE)

S No.	Course code	Subject	L	T	P/Drg	C
1	19HS0801	Applied Chemistry	3	1	-	4
2	19HS0830	Algebra and Calculus	3	-	-	3
3	19HS0810	Communicative English	3	-	-	3
4	19ME0361	Thermal and Fluid Engineering	3	-	-	3
5	19HS0803	Applied Chemistry Lab	-	-	3	1.5
6	19HS0811	Communicative English Lab	-	-	3	1.5
7	19ME0301	Workshop Practice Lab	-	-	4	2
Contact Periods/Week			12	1	10	**18**
			Total/Week **23**			

I B. Tech. – II Semester (EEE)

S No.	Course code	Subject	L	T	P/Drg	C
1	19HS0849	Applied Physics	3	1	-	4
2	19HS0831	Differential Equations and vector Calculus	3	1	-	4
3	19ME0302	Engineering Graphics	1	-	4	3
4	19CS0501	Python Programming	3	-	-	3
5	19EE0201	Electrical circuits - I	3	-	-	3
6	19HS0853	Applied Physics Lab	-	-	3	1.5
7	19CS0502	Python Programming Lab	-	-	3	1.5
Audit Course						
8	19HS0816	Indian Constitution	3	-	-	-
Contact Periods/Week			16	2	10	**20**
			Total/Week **28**			

II B. Tech. – I Semester (EEE)

S No.	Course code	Subject	L	T	P	C
1	19HS0832	Probability, Numerical Methods and Transforms	3	-	-	3
2	19EC0402	Electronic Devices and Circuits	3	-	-	3
3	19EE0202	Electrical circuits-II	3	-	-	3
4	19EE0203	Electrical Machines-I	3	-	-	3
Open Elective-I						
5	19CE0136	Water Technology	3	-	-	3
	19ME0349	Fundamentals of Mechanical Engineering				
	19EC0448	Introduction to Communication Systems				
	19CS0550	Relational Data Base Management Systems				
	19HS0813	Management Science				
6	19EC0405	Electronic Devices and Circuits Lab	-	-	3	1.5
7	19EE0204	Electrical Machines-I Lab	-	-	4	2
8	19EE0205	Electrical Circuits Lab			3	1.5
Non-Credit Course						
9	19HS0805	Environmental Science	3	-	-	0
Contact Periods/Week			18	-	10	**20**
			Total/Week **28**			

II B. Tech. – II Semester (EEE)

S No.	Course code	Subject	L	T	P	C
1	19EC0401	Switching Theory and Logic Design	3	-	-	3
2	19EC0446	Analog Electronic Circuits	3	-	-	3
3	19EE0207	Electromagnetic Fields	3	-	-	3
4	19EE0208	Electrical Machines-II	3	-	-	3
Open Elective-II						
5	19CE0143	Fundamentals of Urban Planning	3	-	-	3
	19ME0350	Mechanical Measurements & Control Systems				
	19EC0449	Elements of Embedded Systems				
	19CS0551	Java Programming				
	19HS0814	Intellectual Property Rights				
6	19EC0404	Switching Theory and Logic Design Lab	-	-	3	1.5
7	19EC0447	Analog Electronic Circuits Lab	-	-	3	1.5
8	19EE0209	Electrical Machines-II Lab	-	-	4	2
Non-Credit Course						
9	19HS0817	Essence of Indian Traditional Knowledge	3	-	-	0
Contact Periods/Week			18	-	10	**20**
			Total/Week **28**			

III B. Tech. – I Semester (EEE)

S.No.	Course Code	Subject	L	T	P/Drg	C
1.	19EE0210	Power Electronics	3	-	-	3
2.	19EE0211	Electrical Power Generation &Transmission systems	3	-	-	3
3.	19EE0212	Control Systems	3	-	-	3
4.	19EE0213	Electrical Measurements	3	-	-	3
Open Elective-III						
5.	19CE0129	Elements of Road Traffic Safety	3	-	-	3
	19ME0321	Non-Conventional Energy Resources				
	19EC0450	Introduction to IOT				
	19CS0545	Software Development and Testing				
	19HS0861	Business Ethics				
6.	19EE0214	Power Electronics and Simulation Lab	-	-	4	2
7.	19EE0215	Control Systems and Simulation Lab	-	-	3	1.5
8.	19EE0216	Electrical Measurements Lab	-	-	3	1.5
Non -Credit Course						
9.	19HS0858	Human Values and Professional Ethics	3	-	-	0
Contact Periods / Week			18	0	10	20
			Total/Week 28			

III B. Tech. – II Semester (EEE)

S.No.	Course Code	Subject	L	T	P/Drg	C
1.	19EC0421	Microprocessors and Microcontrollers	3	-	-	3
2.	19EE0217	Power System Operation and Control	3	-	-	3
3.	19EE0218	Power System Analysis	3	-	-	3
4.	19EE0219	Switch Gear and Protection	3	-	-	3
Open Elective-IV						
5.	19CE0147	Project Planning and Control	3	-	-	3
	19ME0337	Mechatronics & Robotics				
	19EC0451	MATLAB Programming				
	19CS0546	Introduction to Cyber Security				
	19HS0862	Strategic Management				
6.	19EC0424	Microcontroller and its Applications Lab	-	-	3	1.5
7.	19EE0220	Power Systems and Simulation Lab	-	-	4	2
8	19EE0221	Substation Automation Lab (Virtual Lab)	-	-	3	1.5
Non -Credit Courses						
9.	19HS0859	English for Corporate Communications	3	-	-	0
Contact Periods / Week			18	-	10	20
			Total/Week 28			

IVB. Tech – I Semester (EEE)

S.No.	Course Code	Subject	L	T	P/Drg	C
1	19HS0860	Supply Chain Management	3	-	-	3
2	19EE0222	Utilization of Electrical Energy	3	-	-	3
3	19EE0223	Electrical Distribution Systems	3	-	-	3
Professional Elective Course (PEC) –I						
4	19EE0224	Power Quality	3	-	-	3
	19EE0225	Flexible AC Transmission Systems				
	19EE0226	Electrical Energy Conservation and Auditing				
Professional Elective Course (PEC) –II						
5	19EE0227	Power Semiconductor Drives	3	-	-	3
	19EE0228	Solar and Wind Energy Systems				
	19EE0229	Generation of Energy through Waste				
Professional Elective Course (PEC) –III						
6	19EE0230	HVDC Transmission Systems	3	-	-	3
	19EE0231	Neural Networks and Fuzzy Logic				
	19EE0232	Reactive Power Compensation and Management				
7	19EE0233	Internship (60 Hours)	-	-	-	3
8	19EE0234	Project Phase-I	-	-	4	2
Contact Periods / Week			18	-	4	23
			Total/Week 22			

IVB. Tech – II Semester (EEE)

S.No.	Course Code	Subject	L	T	P	C
1		**MOOCS**	**3**	**-**	**-**	3
2	19EE0235	Seminar	-	-	6	3
3	19EE0236	Comprehensive Viva Voce	-	-	-	2
4	19EE0237	Project Phase-II	-	-	22	11
Contact Periods / Week			3	-	28	19
			Total/Week 31			

Note: L – Lecture hours, T – Tutorial, P – Practical, Drg. – Drawing, C – Credits

Year	I Year		II Year		III Year		IV Year		Total
Semester	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	
Credits	18	20	20	20	20	20	23	19	160

Total Credits: 160

R19 **B.Tech – EEE**

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I B.Tech – I Sem.

L	T	P	C
3	1	-	4

(19HS0801) APPLIED CHEMISTRY

COURSE OBJECTIVES

1. *To familiarize engineering chemistry and its applications*
2. *To train the students on the principles and applications of electrochemistry and polymers*
3. *To introduce instrumental methods, molecular machines and switches*

COURSE OUTCOMES

1. *Apply Nernst equation for calculating electrode and cell potentials, differentiate between pH metry, potentiometric and conductometric titrations, explain the theory of construction of battery and fuel cells, solve problems based on cell potential.*
2. *Apply Schrodinger wave equation to hydrogen and particle in a box, illustrate the molecular orbital energy level diagram of different molecular species, semiconductors and insulators discuss the magnetic behavior and colour of complexes.*
3. *Explain the different types of polymers and their applications, explain the preparation, properties and applications of Bakelite, Nylon-66, and carbon fibres, describe the mechanism of conduction in conducting polymers, discuss Buna-S and Buna-N elastomers and their applications.*
4. *Explain the different types of spectral series in electromagnetic spectrum, understand the principles of different analytical instruments, Explain the different applicationsof analytical instruments.*
5. *Explain the band theory of solids for conductors, semiconductors and insulators, explains pramolecular chemistry and self assembly, demonstrate the application of Rotaxanes and Catenanes as artificial molecular machines*

UNIT -I:

ELECTROCHEMISTRY AND APPLICATIONS: Electrochemical cell, Nernst equation, cell potential calculations and Numerical problems, Potentiometry - Potentiometric titrations (Redox titrations), Conductometric titrations (Acid-Base titrations), Photovoltaic cell– working and applications, Photogalvanic cells with specific examples. Electrochemical sensors, Potentiometric sensors with examples.

Primary cells – Zinc-air battery, alkali metal sulphide batteries, Secondary cells – Lead acid, and Lithium ion cells (Rechargeable). Fuel cells - Hydrogen-Oxygen, Methanol-Oxygen fuel cell – working of the cells.

UNIT -II

STRUCTURE AND BONDING MODELS : Planck's quantum theory, dual nature of matter, Schroding er equation, significance of Ψ and Ψ^2, Applications to hydrogen, particle in a box and their applications for conjugated molecules, Molecular Orbital Theory– bonding in Homo and Heteronuclear diatomic molecules – Energy level diagrams of O_2 and CO etc. π-molecular orbitals of Butadiene and Benzene, Calculation of bond order, Crystal field theory –salient features Splitting

in Octahedral and Tetrahedral, geometry, magnetic properties and colour, Band theory of solids – Band diagrams for conductors, Semiconductors and insulators, Role of doping on band structures.

UNIT - III

POLYMER CHEMISTRY: Introduction to Polymers, Functionality of monomers, Nomenclature of polymers. Chain growth and Step growth polymerization, Coordination polymerization, Co-polymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation.

PLASTICS - Thermoplastics and Thermosetting, Preparation, properties and applications of – Bakelite, Nylon-6,6, Carbon fibers, Elastomers – Buna-S, Buna-N –preparation, properties and applications. Conducting polymers – Classification, Synthesis and applications.

UNIT - IV

INSTRUMENTAL METHODS AND APPLICATIONS: Electromagnetic spectrum. Absorption of radiation: Beer-Lambert''s law. Principle and applications of pH Metry, Potentiometry, Conductometry ,UV-spectroscopy, IR and AAS. Principles of Gas Chromatography (GC) and High Performance Liquid Chromatography (HPLC) - Separation of gaseous mixtures and Liquid mixtures.

UNIT -V

ADVANCED ENGINEERING MATERIALS : Concepts and terms of Supra molecular chemistry, Complementarity, Basic Lock and Key principle, examples of Supramolecules, Applications of Supra molecules (sensors, catalysts, gas storage, medical and molecular switches). Semiconducting and Super Conducting materials-Principles and some examples. Electrical Insulators or Dielectric materials: Definition and classification, Characteristics of electrical insulators and applications of electrical insulating materials, Super capacitors. Nanochemistry: Introduction, classification of nanomaterials properties and applications of Fullerenes, Carbon nano tubes.

TEXTBOOKS

1. KNJayaveera, GVSubba Reddy and C. Ramachandraiah, *Engineering Chemistry*, McGraw Hill Higher Education, Forth Edition, New Delhi, 2019.
2. Jain and Jain, *A Text Book of Engineering Chemistry*, Dhanapathi Rai Publications, New Delhi, 2010.

REFERENCES

1. S.S Dhara, *A Text book of Engineering Chemistry,* S. Chand Publications, New Delhi, 2010.
2. K.B.Chandra Sekhar, UN.Das and Sujatha Mishra, *Engineering Chemistry,* SCITECH Pubblications India Pvt Limited, 2015.
3. H.D. Gesser, *Applied Chemistry,* Springer International Edition, 2010.

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I B.Tech – I Sem.

L	T	P	C
3	-	-	3

(19HS0830) ALGEBRA AND CALCULUS

COURSE OBJECTIVES

1. *This course will illuminate the students in the concepts of calculus and linear algebra.*
2. *To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real-world problems and their applications.*
3. *To evaluate multiple integrals in Cartesian, cylindrical and spherical geometries*

COURSE OUTCOMES

1. *Develop the use of matrix algebra techniques that is needed by engineers for practical applications*
2. *Utilize mean value theorems to real life problems*
3. *Familiarize with functions of several variables which is useful in optimization*
4. *Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems*
5. *Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions.*

UNIT – I

Matrices: Rank of a matrix by echelon form - Solutions of system of homogeneous and non-homogeneous linear equations - Eigen values and Eigen vectors and their properties - Cayley-Hamilton theorem (without proof), Finding inverse and power of a matrix by Cayley-Hamilton theorem - Diagonalization of a matrix - Quadratic forms and nature of the quadratic forms, Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT – II

Calculus and Mean Value Theorems: Rolle"s Theorem - Lagrange"s mean value theorem - Cauchy"s mean value theorem - Taylor"s and Maclaurin"s theorems (without proofs).

UNIT – III

Multivariable Calculus: Partial derivatives - Total derivatives - Chain rule - Jacobians - Functional dependence - Maxima and minima of functions of two variables - Method of Lagrange multipliers.

UNIT – IV

Integral Calculus: Evaluation of definite and improper integrals (single variable) **Multiple Integration:** Double integrals (Cartesian) - Change of order of integration in double integrals - Change of variables (Cartesian to polar) - Evaluation of Triple integrals (Cartesian).

UNIT – V

Special Functions: Beta and Gamma functions and their properties - Relation between Beta and Gamma functions - Evaluation of definite integrals using Beta and Gamma functions.

TEXT BOOKS

1. B. S. Grewal, *Higher Engineering Mathematics*, Khanna Publishers, 42nd Edition, 2017
2. B. V. Ramana, *Higher Engineering Mathematics*, Tata Mc Graw Hill Companies, Third Edition

REFERENCES

1. T.K.V. Iyengar, *Engineering Mathematics Volume-I,* S.Chand Publication, 5th Edition, 2010
2. T.K.V. Iyengar, *Engineering Mathematics Volume-II,* S.Chand Publication, 5th Revised Edition, 2011
3. T.K.V. Iyengar, *Engineering Mathematics Volume-III*, S.Chand Publication, 10th Revised Edition, 2015
4. E.Rukmangadachari, *Engineering mathematics, volume-I*, Pearson Publishers, 1st Edition, 2015
5. Dr.C. Sankaraiah, *Mathematical Methods*, Unitech series, First Edition, 2008

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I B.Tech- II Sem.

L	T	P	C
3	0	0	3

(19HS0810) COMMUNICATIVE ENGLISH

COURSE OBJECTIVES

1. *To facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers.*
2. *To focus on appropriate reading strategies for comprehension of various academic texts and authentic materials.*
3. *To help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations.*
4. *To impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information.*
5. *To provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing.*

COURSE OUTCOMES

1. *To understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information.*
2. *To employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information.*
3. *To Participate in informal discussions and speak clearly on a specific topic or in general.*
4. *To Comprehend, discuss and respond to academic texts and use appropriate language for description and interpretation in writing*
5. *To form sentences using proper grammatical structures and correct word forms*

UNIT – I

Part-1

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions. **Speaking:** Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others. **Reading:** Skimming to get the main idea of a text; scanning to look for specific pieces of information. **Writing:** Beginnings and endings of paragraphs - introducing the topic, Letter writing. **Grammar and Vocabulary:** Parts of speech; singular and plural; Basic sentence structures; simple question form - wh-questions; word order in sentences and Content words

Part-2

Half a Rupee Worth by R K Narayan from Engage with English.

UNIT – II

Part-1 Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts. **Speaking:** Discussion in pairs/ small groups on specific topics followed by short structured talks. **Reading:** Identifying sequence of ideas; recognizing verbal techniques that

help to link the ideas in a paragraph together. **Writing: M**echanics of writing - punctuations **Grammar and Vocabulary:** Cohesive devices - linkers, sign posts and transition signals; use of articles and zero article; prepositions and function words

Part-2

The Thakur's Well by Premchand from Paths to Skills in English.

UNIT – III

Part-1 Listening: Listening for global comprehension and summarizing what is listened to. **Speaking:** Discussing specific topics in pairs or small groups and reporting what is discussed **Reading:** Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension. **Writing:** Summarizing Report Writing. **Grammar and Vocabulary:** Verbs - tenses; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes and word forms

Part-2

I am not that Woman by Kishwar Naheed from Engage with English.

UNIT – IV

Part-1

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video. **Speaking:** conversational English in academic contexts (formal and informal). **Reading:** Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data. **Writing:** Information transfer **Grammar and Vocabulary:** Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison; use of synonyms and antonyms.

Part-2

What is my name? By Sathyavathi from Paths to Skills in English.

UNIT – V

Part-1

Listening: Identifying key terms. **Speaking:** Formal oral presentations on topics from academic contexts - without the use of PPT slides. **Reading:** Reading for comprehension. **Writing:** Writing structured essays on specific topics using suitable claims and evidences. **Grammar and Vocabulary:** Editing short texts ~~i~~dentifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement).

Part-2

The Power of Prayer by A P J Abdul Kalam from Paths to Skills in English

TEXTBOOKS

1. Board of Editors *Engage with English* Orient Blackswan First Edition, 2016
2. Prof. G.M. Sundaravalli & A.S.Kamalakar *Paths to Skills in English* Orient Blackswan, First Edition, 2015.

REFERENCES

1. Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.

2. Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
3. Hewings, Martin. *Cambridge Academic English (B2).* CUP, 2012.
4. Eric H.Glendinning & Beverly Holmström *Study Reading: A Course in Reading Skills for Academic Purposes* Cambridge University Press; 2 edition, 14 October 2004.

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I B. Tech – I Sem.

L	T	P	C
3	-	-	3

(19ME0361) THERMAL & FLUID ENGINEERING

COURSE OBJECTIVES

1. *To understand the* working of thermal & hydroelectric power plants.
2. *To understand the* applied thermodynamic concepts
3. *To understand the* construction and the working principles of various engineering devices such as Steam generators, steam nozzles, steam turbine.
4. *To understand the* Fluid properties and their engineering significance
5. *To understand the* different types of pipe flow and the conditions governing them

COURSE OUTCOMES

On successful Completion of this course the student will be able to

1. *Demonstrate the different types of electric power stations.*
2. *Describe the various properties thermodynamic system*
3. *Have a broad knowledge on different types of cycles.*
4. *Knows the different types of fluid flows.*
5. *The different devices used for measurement of fluid flow.*

UNIT – I

Thermal Power Plant: Layout of a Thermal Power Plant, cooling towers, Coal handling, Coal storage, Chimney.

Hydroelectric Power Stations: Elements of hydroelectric power station - concept of pumped storage plants.

UNIT – II

Basic Concepts: Definitions of system, boundary, surrounding control volume – Types of thermodynamic systems - Properties of system, pressure, volume, temperature, enthalpy, internal energy, density, with their units - State, Property, Process and Cycle - Quasi Static Process -Thermodynamic Equilibrium.

Work & Heat Transfer: Concept of Heat &Work transfer - Point and Path Functions - Law of Thermodynamics - Zeroth Law, First Law and Second Law of Thermodynamics.

UNIT – III

Pure Substances: P-V, P-T, T-S diagrams of Pure Substances - Dryness Fraction, Enthalpy and Entropy of Steam using Steam Tables with Problems,

Thermodynamic Cycles : Carnot Cycle & Rankine Cycle with simple problems.

UNIT – IV

Fluid Statics: Properties of fluids – specific gravity, porosity surface tension - vapor pressure–atmospheric, gauge and vacuum pressures - Piezometer, U-tube differential manometers.

Fluid Kinematics: stream line, path line and streak lines and steam tube - classification of flows-steady & unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows-equation of continuity for one dimensional flow.

UNIT – V

Fluid dynamics: surface and body forces – Euler''s and Bernoulli''s equations for flowing stream line, momentum equation and its application on force on pipe bend.

Conduit Flow: Reynolds experiment – Darcy Weisbach equation – Minor losses in pipes – pipes in series and pipes in parallel – total energy line-hydraulic gradient line.

TEXT BOOKS

1. Rajput, *Thermal Engineering*, R. K., Laxmi Publications, 6th Edition, New Delhi, 2010
2. Dr.R.K.Bansal ,*Fluid Mechanics and Hydraulic Machines*, Laxmi Publications (P) Ltd., New Delhi

REFERENCES

1. Domkundwar,A & Dhanpat Rai & Co, *Thermal Engineering*,., New Delhi, 2003
2. Modi & Seth, *Fluid Mechanics, Hydraulic and Hydraulic Machines*, Standard book house
3. Prasanna Kumar, *Thermodynamics*, Pearson Delhi,2018.

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I B.Tech – I Sem.

L	T	P	C
-	-	3	1.5

(19HS0803) APPLIED CHEMISTRY LAB

COURSE OBJECTIVES

Verify the fundamental concepts with experiments.

COURSE OUTCOMES

1. *Determine the cell constant and conductance of solutions .*
2. *Prepare advanced polymer materials .*
3. *Estimate the Iron and Calcium in cement.*
4. *Calculate the hardness of water .*
5. *Determination of conductivity of an Acid.*

List of Experiments

1. Conductometric Titration of Strong acid vs Strong base.
2. Conductometric Titration of Weak acid vs. Strong base.
3. Determination of Hardness of a Groundwater sample.
4. pH metric titration of Strong acid vs. Strong base.
5. Potentiometry - Determination of Redox potentials and emfs.
6. Determination of Strength of an Acid in Pb-Acid battery.
7. Preparation of a Polymer.
8. Determination of viscosity of an oil by Redwood viscometer.
9. Determination of percentage of Iron in Cement sample by Colorimetry.
10. Estimation of Calcium in Port land Cement.
11. Adsorption of Acetic acid by Charcoal.
12. Determination of Percentage Moisture content in a Coal sample.

TEXT BOOKS

1.J. Mendham et al, *Vogel's Text book of Quantitative Chemical Analysis,* Pearson Education, Sixth Edition, 2002.

2. Chandra Sekhar, G.V. Subba Reddy and Jayaveera, *Chemistry Practical – Lab Manual,* McGraw Hill Higher Education, 2015.

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I B.Tech- II Sem.

L	T	P	C
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(19HS0811) COMMUNICATIVE ENGLISH LAB

COURSE OBJECTIVES

1. *Students will be exposed to a variety of self instructional, learner friendly modes of language learning.*
2. *Students will cultivate the habit of reading passages from the computer monitor. Thus providing them with the required facility to face computer based competitive exams like GRE, TOEFL, and GMAT etc.*
3. *Students will learn better pronunciation through stress, intonation and rhythm.*
4. *Students will be trained to use language effectively to face interviews, group discussions, public speaking.*
5. *Students will be initiated into greater use of the computer in resume preparation, report writing, format making etc.*

COURSE OUTCOMES

1. *Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.*
2. *Apply communication skills through various language learning activities.*
3. *Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.*
4. *Evaluate and exhibit acceptable etiquette essential in social and professional Settings.*
5. *Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.*

UNIT – I

Part-1

Introduction to Phonetics

Part-2

Word Stress- Intonation

UNIT – II

Part-1

JAM - Oral Presentation

Part-2

Describing objects/places/persons- Minutes of Meeting

UNIT – III

Part-1

Situational dialogues – Greeting and Introduction - Telephonic Conversations

Part-2

Book Review-Report Writing

UNIT – IV

Part-1

Non-verbal Communication – Dumb Charade

Part-2

Debate/Group Discussion- Movie Review- Reading Comprehension.

UNIT – V

Part-1

Information Transfer

Part-2

Job Application and Resume Writing - Interview Skills

Suggested Software:

Walden InfoTech Software

REFERENCES

1. T. Balasubramanian *A Textbook of English Phonetics for Indian Students* Mcmillian second edition,2012.
2. DhamijaSethi *A Course in Phonetics and spoken English* Prentice-hall of India Pvt. Ltd, 2000.
3. Krishna Mohan & NP Singh *Speaking English Effectively,* Mcmillian, second Edition, 2011.
4. E.Sureshkumar & P.Sreehari *A Hand Book of English Laboratories* Foundation books, 2011.
5. M Ashraf Rizvi *Effective Technical Communication* McGraw Hill Education, Second edition ,27 July 2017.

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I B.Tech – I Sem.

L	T	P	C
-	-	4	2

(19ME0301) WORKSHOP PRACTICE LAB

PART A - ENGINEERING WORKSHOP

COURSE OBJECTIVES

1. *To familiarize with the basic manufacturing processes and to study the various tools and equipment*
2. *The course provides hands-on training in the trades of Carpentry, Fitting, House-wiring, and Tin Smithy.*
3. *Overview of metal cutting processes, plumbing is provided through live demonstrations.*
4. *To know the labour involved, machinery or equipment necessary, time required to fabricate.*
5. *To acquire practical skills by performing the experiments in different shops of workshop*

COURSE OUTCOMES

1. *Apply wood working skills in real world applications.*
2. *Build different parts with metal sheets in real world applications*
3. *Apply fitting operation in various applications*
4. *Apply different types of basic electric circuit connections*
5. *Demonstrate soldering and brazing.*

LIST OF EXPERIMENTS

Carpentry: Familiarity with different types of woods and tools used in wood working and make following joints

1. T-Bridle joint
2. Corner Dovetail joint

Sheet Metal Working: Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job using GI sheets.

1. Tapered tray
2. Conical funnel

Fitting: Familiarity with different types of tools used in fitting and do the following fitting exercises

1. Step Fitting
2. V-Fit

Electrical Wiring:

Familiarity with different types of basic electrical circuits and makes the following connections

1. Parallel and series
2. Two way switch
3. Go down lighting
4. Tube light
5. Three phase motor
6. Soldering of wires

PART B - IT WORKSHOP

COURSE OBJECTIVES

To provide students with hands-on experience in

1. *Basic hardware*
2. *Productivity tools like MS Office*
3. *Basic operating system installations.*

COURSE OUTCOMES

After Completion of this Course the Student would be able to

1. *Identify the basic computer peripherals.*
2. *Gain sufficient knowledge on assembling and disassembling a PC.*
3. *Learn the installation procedure of Windows and Linux OS.*
4. *Acquire knowledge on basic networking infrastructure.*
5. *Learn productivity tools like Word, Excel and Power point.*
6. *Acquire knowledge on basics of internet and worldwide web.*

TASK 1:

Identification of the peripherals of a computer: To prepare a report containing the block diagram of the CPU along with the configuration of each peripheral and its functions. Description of various I/O Devices

TASK 2:

A practice on disassembling the components of a PC and assembling them.

TASK 3:

1. Basic DOS commands, Installation of MS windows.
2. Basic Linux Commands, Installation of Linux.
3.

TASK 4:

Hardware Troubleshooting (Demonstration): Identification of a problem and fixing the solution (improper assembly or defective peripherals). Software Troubleshooting (Demonstration): Identification of a problem and fixing the PC for any software issues

PRODUCTIVITY TOOLS

TASK 5:

1. **MS Word Orientation:** Accessing, overview of toolbars, saving files, Using help and resources, rulers, formatting ,Drop Cap , Applying Text effects, Using Character Spacing, using templates, Borders and Colors, Inserting Header and Footer, Using Date and Time option, security features in word, converting documents while saving
2. **Presentations:** Creating, opening, saving and running the presentations, selecting the style for slides, formatting the slides with different fonts, colors, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyper linking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

3. **Spread sheet:** Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

TASK 6:

Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc. should be done by the student. The entire process has to be documented.

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(19HS0849) APPLIED PHYSICS

COURSE OBJECTIVES

1. *To recognize the various basic terms related to Oscillations.*
2. *The basic concepts and properties of Lasers and Fiber Optics.*
3. *To understand the dual nature of Matter.*
4. *To recognize importance of free electrons theory and semiconductors.*
5. *To understand the fundamentals of Nano Science & Technology.*

COURSE OUTCOMES

After completing this course students will be able to

1. *Explain various terms related to waves and Oscillations.*
2. *Explain the Dual nature of matter and physical significance of Wave function.*
3. *Recognize importance of free electrons theory and semiconductors.*
4. *Apply concepts of lasers and optical Fibers light in various applications.*
5. *Apply the basic properties of nanomaterials in various engineering branches.*

UNIT – I: HARMONIC OSCILLATORS

Simple Harmonic oscillator and solution of differential equation - Damped harmonic motion and solution of differential equation – over damped, critically damped and lightly damped oscillators- Forced oscillations and resonance (qualitative treatment).

UNIT – II: PRINCIPLES OF QUANTUM MECHANICS

Wave nature of Particles Matter waves- Properties - de Broglie hypothesis. Heisenberg's Uncertainty principle. Time-dependent and time - independent Schrodinger equation – physical significance of wave function - Solution of stationary-state Schrodinger equation for one dimensional problems – particle in a box.

UNIT –III: ELECTRON THEORY OF METALS & SEMICONDUCTORS

ELECTRON THEORY OF METALS: Classical free electron theory, postulates, drawbacks, Quantum frees electron theory – Fermi - Dirac distribution – sources of electrical resistance-origin of energy bands. Types of electronic materials: metals, semiconductors, and insulators.

SEMICONDUCTORS : Intrinsic and extrinsic semiconductors- direct and indirect band gap semiconductors- Fermi level – effect of temperature – Life time of charge carriers- diffusion and drift – Einstein Relation- Hall effect and its application.

UNIT – IV: LASERS AND FIBER OPTICS

LASER : Introduction - Characteristics of Laser - Spontaneous and Stimulated emission of radiation - Einstein"s coefficients - Population inversion - Pumping Mechanisms - He-Ne laser, Nd-YAG laser - Applications of laser.

FIBER OPTICS: Introduction to Optical Fibers-Total Internal Reflection-Construction of optical fibers, Critical angle of propagation-Acceptance angle-Numerical Aperture-Classification of fibers based on Refractive index profile & modes–Propagation of electromagnetic wave through optical fiber- Block Diagram of Fiber optic Communication system - Applications.

UNIT-V: PHYSICS OF NANOMATERIALS

Introduction, Nanoscience and Nanotechnology –Surface area to volume ratio and Quantum confinement- Classifications of Nanomaterials –Advantages of nanotechnology, Synthesis of nanomaterials- Top Down Process- Ball Milling; Bottom Up Process: Sol-Gel method - Applications.

TEXT BOOKS

1. H. J. Pain, "*The Physics of vibrations and waves*", Wiley, 6th ed.2006.
2. K.Thyagarajan , "*Engineering Physics*" , Mc Graw Hill Education Private Ltd, New Delhi,2nd ed.2019.

REFERENCES

1. E. Hecht, "*Optics*", Pearson Education, 4th ed.2008.
2. O. Svelto, "*Principles of Lasers*", Springer Science & Business Media, 5th ed.2010.
3. D. J. Griffiths, "*Quantum Mechanics*", Pearson Education, 2nd ed.2015.
4. D. A. Neamen, "*Semiconductor Physics and Devices*", Times Mirror High Education Group, Chicago,4th ed. 2017.
5. B.E.A. Saleh and M.C. Tech, "*Fundamentals of Photonics*", John Wiley & Sons, 2nd ed.2012.

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(19HS0831) DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

COURSE OBJECTIVES

1. *To enlighten the learners in the concept of differential equations and multivariable calculus.*
2. *To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.*
3. *To develop the skill pertinent to the practice of the mathematical concepts including the students abilities to formulate and modeling the problems, to think creatively and to synthesize information*

COURSE OUTCOMES

1. *Solve the differential equations related to various engineering fields*
2. *Identify solution methods for partial differential equations that model physical processes*
3. *Interpret the physical meaning of different operators such as gradient, curl and divergence*
4. *Estimate the work done against a field, circulation using vector calculus*
5. *Students will become familiar with applications of surface and volume integrals*

UNIT – I

First and Higher Order Ordinary Differential Equation: Exact - Linear and Bernoulli"s equations - Second order linear differential equations with constant coefficients with R.H.S term of the types e^{ax} , sinax, cosax, polynomials in x^n ,e^{ax} V(x).

UNIT – II

Equations Reducible to Linear Differential Equations: Method of variation of parameters - Cauchy"s and Legendre"s linear equations - Simultaneous linear equationswith constant coefficients - Applications to L-C-R Circuit problems.

UNIT – III

Partial Differential Equations: Formation of P.D.E by eliminating arbitrary constants and functions.

Solutions of P.D.E: Equations solvable by direct integration - Linear and non-linear equations of first order - Method of separation of variables.

UNIT – IV

Vector Differentiation: Scalar and vector point functions - Vector operator del - Del applies to scalar point functions – Gradient - Del applied to vector point functions - Divergence and Curl - Vector identities.

UNIT – V

Vector Integration: Line integral – Circulation - Work done - Surface and volume integrals.

Integral Theorems: Green"s theorem in the plane (without proof) - Stoke"s theorem (without proof) - Divergence theorem (without proof) - applications of these theorems.

TEXT BOOKS

1. Dr. Shahnaz Bathul, *Engineering Mathematics,* Overseas Publishers PV.L.T,Fourth Edition, 2008.
2. T.K.V. Iyengar, *Engineering Mathematics Volume-I,* S.Chand Publication, 5th Edition, 2010

REFERENCES

1. E.Rukmangadachari & E.Keshava Reddy, *Engineering mathematics volume-I,* Pearson Publishers, 1st edition, 2015.
2. B. S. Grewal, *Higher Engineering Mathematics*, Khanna Publishers, 42nd Edition, 2017
3. Peter V.Oneil, *Advanced Engineering Mathematics*, Thomson Books, 5th Edition, 2003
4. Dr. A Anjauyulu, *Engineering Mathematics-I,* Deepthi Publications.
5. Erwin Kreyszig. *Advanced Engineering Mathematics*, John Wiley Publications,8th Edition, 2000.

R19 **B.Tech – EEE**

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(19ME0302) ENGINEERING GRAPHICS

COURSE OBJECTIVES

1. *Understand the importance graphics in engineering*
2. *To introduce the students to the "universal language of Engineers" for effective Communication through drafting*
3. *Develop the graphical skills for communication of concepts, ideas and design of engineering products through engineering drawings.*
4. *Increase ability to take data and transform it into graphic drawings*
5. *To familiarize the students in basic concept of conic sections, projections and development of objects*

COURSE OUTCOMES

1. *Graphically construct and understand the importance of mathematical curves in engineering applications*
2. *Able to draw the basic views related to projections of Points, Lines and Planes*
3. *Able to draw the projections of geometrical solids and sectional view of solids*
4. *Understand the concept of projection and acquire visualization skills, development of surfaces and interpenetrations of solids*
5. *To draw multi view orthographic and other projections including isometric*

UNIT – I

Introduction To Engineering Drawing: Principles of Engineering Graphics and their significance - usage of Drawing instruments -lettering - Conic sections, Cycloids and Involutes.

UNIT – II

Projections of Points: - Principles of Orthographic Projections - Conventions - Projections of Points
Projections Of Straight Lines: - Inclined to both the planes (Trapezoidal Method & Rotating line method) - simple problems only, Traces
Projections of Planes: Surface inclined to both reference planes

UNIT – III

Projections of Solids: Introduction -Projections of right regular solids-Prisms, Pyramids in different positions. (Inclined to one plane only)
Sections of Solids: Sectional Views of Right regular Solids - Prisms, Pyramids.

UNIT – IV

Development Of Surfaces: - Development of surfaces of Right Regular Solids - Prisms, Pyramids.
Interpenetration of Solids: Cylinder to Cylinder, Prism to Prism, Cone to Cone (simple Problems Only

UNIT – V

Orthographic Projections: - Principles of Orthographic projection, Conversion of objects from 3D to 2D.
Isometric Projections: - Principles of Isometric projection– Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids, Conversion of 2D to 3D.

TEXT BOOKS

1. Basant Agarwal & CM Agarwal, *Engineering Drawing & Graphics*, Mcgraw Hill Education, 2013.
2. N.D.Bhatt, *Engineering Drawing*, Charotar Publishers, 2011.
3. K.L.Narayana, Kannaiah, *A text Book of Engineering Drawing*, Scitech Publishers, 2010.

REFERENCES

1. K.Venugopal *A text Book of Engineering Drawing and Graphic*, New Age Publishing New Delhi, 2008.
2. P.J.Shah, *A Text Book of Engineering Graphics*, S.Chand & Company Ltd., New Delhi,2016
3. R.K.Dhawan, *A text book of Engineering Drawing*, S.Chand & Company Ltd., New Delhi, 2013.

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(19CS0501) PYTHON PROGRAMMING
(Common to ME, CE, EEE and AE)

COURSE OBJECTIVES

1. *Introduction of Scripting Language*
2. *Exposure to various problem solving approaches of computer science*
3. *To introduce function-oriented programming paradigm*
4. *Exposure to solve the problems using object oriented concepts, exceptional handling*
5. *Exposure to solve the problems using Files, Regular Expressions and, Standard Libraries*

COURSE OUTCOMES

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

1. *Making Software easily right out of the box*
2. *Solve the problems using control structures, input and output statements*
3. *Summarize the features of lists, tuples, dictionaries, strings and files*
4. *Experience the usage of standard libraries, objects, and modules*
5. *To build the software for real needs.*

UNIT- I

Introduction: Algorithms - Building blocks of flow-chart design - History of Python - Python features – Applications - Programming Using the REPL (Python Shell) - Running Python Scripts – Variables – Assignment – Keywords - Input-Output - Indentation.

Data Types: Data Type – Types of data: Single Valued and Multi valued data types.

Single Valued: Numbers - Strings and methods - Booleans.

UNIT- II

Data Structures: Lists – Tuples – Sets - Dictionaries and Sequences - Indexing and slicing - Comprehensions -**Type Casting:** Conversion methods.

Operators and Expressions: Operators- Types of operators - Expressions and order of evaluations.

Control Flow: Simple if - if else- nested if - if-elif-else – looping: while and for - Jumping: break – continue – pass

UNIT-III

Functions - Defining Functions - Calling Functions - Passing Arguments - Keyword Arguments – Default Arguments - Variable-length arguments - Anonymous Functions - Fruitful Functions (Function Returning Values) - Nested functions - Recursive functions - Scope of the Variables in a Function - Global and Local Variables.

Object Oriented Programming in Python: Classes - Class diagram – Constructor - Object- 'self variable' - Methods - Magic methods – Inheritance – Polymorphism - Method overloading - Overriding Methods.

UNIT-IV

Modules: Creating modules - Import statement - From Import statement - Name spacing

Python packages: Introduction to PIP - Installing Packages via PIP (Numpy, Pandas, MatPlotlib etc..) - Using Python Packages.

Exception Handling: Introduction - try except block - try else – finally - Raising Exceptions - User Defined Exceptions

Introduction to Regular Expressions – Searching and Matching

UNIT V

Functional Programming: Iterators and Generators - Maps and Filters

Files: Text files- Reading and Writing files - Command line arguments;

Brief Tour of the Standard Library - Dates and Times - Data Compression - Python Runtime Services – Mathematics - Data Management and Object Persistence

GUI Programming - Turtle Graphics

TEXT BOOKS

1. Vamsi Kurama, *Python Programming: A Modern Approach,* Pearson
2. Reema Thareja, *Python Programming - Using Problem Solving Approach,* First Edition (English, Paperback), Oxford University Press.

REFERENCES

1. Mark Lutz, *Learning Python,* Orielly
2. Allen Downey, *Think Python,* Green Tea Press
3. W.Chun, *Core Python Programming,* Pearson.
4. Kenneth A. Lambert, *Introduction to Python,* Cengage
5. Michael T. Goodrich , Roberto Tamassia, Michael H. Goldwasser, *Data Structures and Algorithms in Python,* 1st Edition , kindle Edition .

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(19EE0201)ELECTRICAL CIRCUITS-I

COURSE OBJECTIVES

1. *To understand the nature of different circuit elements, fundamental laws and network Theorems.*
2. *To understand about phasor concepts of single phase and Magnetic circuits.*
3. *To understand the concepts of Locus diagrams and Resonance.*

COURSE OUTCOMES

After completing the course, the student should be able to do the following:

1. *Determine the equivalent impedance of given network by using network reduction techniques.*
2. *Determine the real power, reactive power, power factor etc,.for the given network.*
3. *Determine the current through any element and voltage across any element.*
4. *Apply the network theorems suitably.*
5. *Understand Locus diagrams and resonance*

.

UNIT – I

Circuit concept R,L,C parameters, Voltage and Current sources, Independent and dependent sources, source transformation, Voltage-current relation.
Kirchhoff's laws, network reduction techniques, series, parallel, series parallel, star-delta or delta-star transformation, Nodal analysis, Mesh analysis, Super node and super mesh for DC excitations.

UNIT – II

Magnetic circuits, Faraday"s laws of electromagnetic induction, concept of self and mutual inductance, dot convention, coefficient of coupling, composite magnetic circuit, Analysis of series and parallel magnetic circuits, Ideal Transformer.

UNIT – III

R.M.S , Average values and form factor for different periodic waveforms, phase and phase difference of sinusoidal alternating quantities, steady state analysis of R,L and C (in series, parallel and series parallel combinations) with sinusoidal excitation, concept of reactance, impedance, susceptance and admittance, Power triangle, power factor.

UNIT – IV

Thevenin"s, Norton"s, superposition, Maximum power transfer, Millman"s, Tellegen"s, Reciprocity, Compensation & Substitution theorems for DC and Sinusoidal excitations.

UNIT – V

Series R-L, R-C, R-L-C and parallel combination with variation of various Parameters – Locus diagrams, Resonance, series, parallel circuits, concept of Bandwidth and Q factor.

TEXT BOOKS

1. Van Valkenberg ,"Network analysis", Prentice Hall, 2000
2. William Hayt and Jack E.Kemmerly, "Engineering circuit analysis", McGraw Hill, 2000
3. M Nahvi, Joseph Edminister,K Rao,"Electric Circuits",(Schaum's Outline Series), 2001

REFERENCES

1. A. Sudhakar and Shyammohan SPalli ,"Circuits and networks", Tata McGraw,Hill, 2011
2. "Electric circuits",K.D.V Narasimha Rao,Falcon Publications 2010

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(19HS0853) APPLIED PHYSICS LAB

COURSE OBJECTIVES

1. *To explore the application of Interference and Diffraction by doing concerned experiments.*
2. *Elucidate the concepts of Physics through involvement in the experiment by applying theoretical knowledge.*
3. *To understand the concept of energy gap, B-H curve and resonance phenomena in LCR circuits.*
4. *Develop an ability to apply the knowledge of physics experiments in the later studies.*

COURSE OUTCOMES

The students will be able to

1. *Operate various optical instruments.*
2. *Estimate wavelength of laser and particles size using laser.*
3. *Plot the intensity of the magnetic field of induction along the axis of circular coil carrying current with distance.*
4. *Evaluate the acceptance angle of an optical fiber and numerical aperture.*
5. *Determine energy loss by B-H curve.*

List of experiments from the following: (Perform any TEN experiments from the following)

1. Determination of wavelengths of various colors of Mercury vapor lamp using Diffraction Grating – Normal Incidence method.
2. Determination of Dispersive power of prism.
3. Rigidity Modulus – Torsional Pendulum
4. Determination of thickness of thin object by wedge method.
5. Determination of radius of curvature of Plano convex lens – Newton"s Rings.
6. Determination of wavelength of a given laser source by using diffraction grating.
7. Determination of particle size (Lycopodium particles deposited on glass plates) using Laser source.
8. Determination of energy gap of a semi conductor using p – n junction diode.
9. B- H curve.
10. Magnetic field along the axis of current carrying coil – Stewart & Gee"s Method.
11. Determination of frequency of tuning fork - Melde"s Apparatus.

12. Determination of Spring constant – Coupled Oscillator.
13. Determination of di electric constant of dielectric material using charging and dischargingof capacitor.
14. Determination of Numerical Aperture of an Optical fiber.
15. Measurement of resistance with varying temperature –Thermistor.

REFERENCES

1. S. Balasubramanian, M.N. Srinivasan "*A Text book of Practical Physics*", SChand Publishers,2017
2. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University.

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(19CS0502) PYTHON PROGRAMMING LAB
(Common to ME, CE, EEE and AE)

COURSE OBJECTIVES

1. *The course provides hands-on training in usage of basic concepts, control structures, data structures, object oriented programming, exceptional handling and plotting of graphical entities.*

COURSE OUTCOMES

After completion of this course, a successful student will have

1. *Ability to program on basic concepts, control structures.*
2. *Ability to implement data structures and their operations*
3. *Ability to work on object oriented programming*
4. *Ability to handle exceptional handling and plotting of graphical entities.*
5. *Ability to develop any real world problem*

List of Experiments:

- Implement the following tasks
  - Write a python program to check whether the number is positive or negative.
  - Write a python program to find whether a given number is even or odd.
  - Write a python program to find biggest number among three numbers.
- Implement the following tasks
  - Write a python program to displaying reversal of a number.
  - Write a python program to print factorial of a number
  - Write a python program to generate prime numbers series up to N
- Implement following problems using python script
  - Swapping of two number with and without using temporary variable.
  - If the age of Ram, Sam, and Khan are input through the keyboard, write a python program to determine the eldest and youngest of the three.
  - Arithmetic operations (Addition, Subtraction, Multiplication, and Division) on integers. Input the two integer values and operator for performing arithmetic operation through keyboard.
- Implement the following tasks
  - Implement the python program to generate the multiplication table.
  - Implement Python program to find sum of natural numbers
  - If the first name of a student is input through the keyboard, write a program to display the vowels and consonants present in his/her name.
- Implement the following tasks
  - The marks obtained by a student in 5 different subjects are input through the keyboard. Find the average and print the student grade as per the SIETK examination policy.

- Given a number x, determine whether it is Armstrong number or not.
  Hint: For example, 371 is an Armstrong number since 3**3 + 7**3 + 1**3 = 371.
  Write a program to find all Armstrong number in the range of 0 and 999.

- Implement the following tasks
  - Write a Python script to
    - create a list
    - access elements from a list
    - slice lists
    - change or add elements to a list
    - delete or remove elements from a list
  - Write a Python script to read the values from a list and to display largest and smallest numbers from list.
  - Write a Python script to compute the similarity between two lists.
- Implement the following tasks
  - Write a Python script to read set of values from a Tuple to perform various operations.
  - Write a Python script to perform basic dictionary operations like insert, delete and Display.
  - Write a Python program to count the occurrence of each word in a given sentence.
- Implement the following tasks
  - Write a Python script to create Telephone Directory using dictionary and list to perform basic functions such as Add entry, Search, Delete entry, Update entry, View and Exit.
  - Implement Python script to display power of given numbers using function.
  - Implement a Python program that takes a list of words and returns the length of the longest one using function.
- Implement the following tasks
  - Implement Python program to perform various operations on string using string libraries.
  - Implement Python program to remove punctuations from a given string.
  - Write a Python program to change the case of the given string (convert the string from lower case to upper case). If the entered string is "computer", your program should output "COMPUTER" without using library functions.
- Implement the following tasks
  - Implement Python program to capitalize each word in a string. For example, the entered sentence "god helps only people who work hard" to be converted as "God Helps Only People Who Work Hard"
  - Write a Python script to display file contents.
  - Write a Python script to copy file contents from one file to another.
- Implement the following tasks
  - Write a Python script to combine two text files contents and print the number of lines, sentences, words, characters and file size.

- Write a Python commands to perform the following directory operations.
  - List Directories and Files
  - Making a New Directory
  - Renaming a Directory or a File
  - Removing Directory or File

- Implement the following tasks
  - Create a package named Cars and build three modules in it namely, BMW, Audi and Nissan. Illustrate the modules using class. Finally we create the init .py file. This file will be placed inside Cars directory and can be left blank or we can put the initialization code into it.

  - Write a python script to display following shapes using turtle.

TEXT BOOKS

1. Vamsi Kurama, *Python Programming: A Modern Approach*, Pearson
2. Reema Thareja, *Python Programming - Using Problem Solving Approach,* First Edition (English, Paperback), Oxford University Press.

REFERENCES

1. Mark Lutz, *Learning Python*, Orielly
2. Allen Downey, *Think Python,* Green Tea Press
3. W.Chun, *Core Python Programming,* Pearson.
4. Kenneth A. Lambert, *Introduction to Python,* Cengage
5. Michael T. Goodrich , Roberto Tamassia, Michael H. Goldwasser, *Data Structures and Algorithms in Python,* 1st Edition , kindle Edition .

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(19HS0816) INDIAN CONSTITUTION

COURSE OBJECTIVES

Students will be able to:

1. *Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.*
2. *Address the growth of Indian opinion regarding modern Indian intellectuals „constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.*
3. *Address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.*

COURSE OUTCOMES

Students will be able to:

1. *Explain the key concepts of political economy*
2. *Analyse the significant developments in the political ideologies*
3. *Describe the salient features of the constitution of India interpret, integrate and critically*
4. *Analyse the political economy of Indian international relations and gain knowledge in Judiciary system*
5. *Apply their knowledge and skills acquired to write civil service examinations*

UNIT-I

• Introduction to the Constitution

UNIT-II

• Historical Perspective of the Constitution of India
• Salient features and characteristics of the Constitution of India

UNIT-III

• Scheme of the fundamental rights
• The scheme of the Fundamental Duties and its legal status
• The Directive Principles of State Policy – Its importance and implementation

UNIT-IV

• Parliamentary Form of Government in India – Powers and Functions
• The President of India - Status and Powers
• The historical perspectives of the constitutional amendments in India
• Judiciary system - Powers and Functions

UNIT-V

- Local Self Government – Constitutional Scheme in India
- Election Commission: Role and Functions

TEXT BOOKS

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. B. R. Ambedkar framing of Indian Constitution, 1st sEdition, Dr. S. N. Busi, 2015

REFERENCES

1. Indian Constitution Law, 7th Edition, M. P. Jain, Lexis Nexis, 2014.
2. Introduction to the Constitution of India, D.D. Basu, Lexis Nexis, 2015.

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(19HS0832)PROBABILITY, NUMERICAL METHODS AND TRANSFORMS (EEE)

COURSE OBJECTIVES

1. *To introduce the tools of differentiation and integration of functions of numerical methods that is used in various techniques dealing engineering problems.*
2. *To develop the essential tool of Probability & Statistics in a comprehensive manner.*
3. *To acquaint the student with mathematical tools needed in evaluating Transform Calculus and their usage.*

COURSE OUTCOMES (COs)

Upon Completion of the course the student will be able

1. *A good understanding of the laws of probability and the use of Baye's theorem.*
2. *To develop the mathematical skills of the students in the areas of numerical methods.*
3. *Apply numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of system of algebraic equations.*
4. *Work out numerical differentiation and integration whenever and wherever routine methods are not applicable.*
5. *Calculate the Laplace transform of standard functions both from the definition and by using tables.*
6. *Ability to compute z- transform and inverse z- transform.*

UNIT-I

Probability:

Sample space and events- Probability-Additional theorem, Conditional probability, dependent and independent events, Multiplication theorem, Baye"s theorem.

UNIT II

Numerical solution of Algebraic and Transcendental equations: The Bisection method, Newton-Raphson method and Regula-Falsi method.

Interpolation: Finite differences-Newton"s forward and backward difference formulae.

UNIT III

Numerical solution of Ordinary differential equations:

Taylor"s series, Euler and Runge-Kutta method of fourth order for solving first and second order ordinary differential equations.

Numerical integration:

Trapezoidal rule and Simpson"s 1/3rd and 3/8rules.

UNIT IV

Laplace Transforms: Laplace transforms of standard functions-Properties of Laplace Transform-Inverse transforms-Transforms of derivatives and integrals-Use of partial fractions to find Inverse Laplace transforms-Convolution theorem-Evaluation of integrals by Laplace transforms. Application of Laplace transforms to ordinary differential equations of first and second order.

UNIT-V

Z- Transforms:

Z-transform-Inverse Z-transform-Properties-Damping rule-Shifting rule-Initial and final value theorems-Convolution theorem-Solution of difference equations by Z-transforms.

TEXT BOOKS

1. Grewal B. S, Higher Engineering Mathematics, 44th edition, Khanna Publishers, 2017.
2. Ramana B. V, Higher Engineering Mathematics, Mc Graw Hill Education, 2010.

REFERENCES

1. Iyengar T.K.V, Krishna Gandhi B, Ranganatham S & Prasad M.V.S.S.N, Engineering Mathematics, Volume-I,II&III, 12thEdition, S.Chand publication, 2014.
2. Rukmangadachari. E & Keshava Reddy E, Engineering Mathematics, Volume-I,II&III, Pearson Publishers, 2010.
3. Garg Nishu Gupta R.L, Engineering Mathematics, Volumes-I &II, Pearson Education, 2014.
4. Bali N, Goyal M & Watkins C, Advanced Engineering Mathematics, Infinity science press, 2007.

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***II* B. Tech. – I Sem.**

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(19EC0402) ELECTRONIC DEVICES AND CIRCUITS

COURSE OBJECTIVES

The objectives of this course:

1. *To understand the characteristics and applications of P-N junction diode, special purpose devices in electronic circuits.*
2. *To familiarize working principle of BJT, JFET and MOSFET and to design single stage amplifier circuits using low frequency model.*
3. *To analyze and design various electronic devices and circuits using PN Junction diode, BJT, JFET and MOSFET.*

COURSE OUTCOMES (COs)

On successful completion of this course, the student will be able to

1. *Demonstrate the characteristics of PN Junction Diode, Rectifiers, Filters, BJT, JFET, MOSFET and special purpose electronic devices.*
2. *Analyze numerical and analytical problems in Rectifiers, Filters, Transistor biasing circuits and Transistor amplifiers.*
3. *Design and develop electronic circuits such as Rectifiers with and without filters, Transistor biasing circuits and Transistor amplifiers.*
4. *Solve engineering problems and arrive at solutions relating to electronic devices and circuits.*
5. *Identify a suitable semiconductor device and transistor for any given specification.*
6. *Select suitable technique for transistor modelling.*

UNIT –I

P-N Junction Diode: Open circuited PN Junction, Forward and Reverse Bias of PN Junction, Current Components in a PN diode, Volt - Ampere Characteristic, Temperature dependence of the V-I characteristic, Diode Resistances, Diode Capacitances, Breakdown Mechanisms, Zener Diode - Zener Diode as Voltage Regulator, Diode Clippers and Clampers.

UNIT –II

Rectifiers: Definition and Types, Half wave Rectifier, Full wave Rectifier and Bridge Rectifier, Comparison of Rectifiers, Filter - Definition and Types, Inductor Filter, Capacitor Filter, L-section Filter, CLC or π - section Filter, Comparison of various types of filters.

Special Purpose Devices: Varactor Diode, Tunnel Diode, Uni Junction Transistor, SCR, Solar Cell, LCD, LED.

UNIT – III

Transistor Characteristics: BJT: BJT - Construction, Operation, Transistor Current Components, Transistor as an Amplifier, Transistor Characteristics - CB, CE and CC.

FET: Types, JFET - Construction, Working, Characteristics, MOSFET - types, Construction, Working, Characteristics, Comparison between JFET and MOSFET.

UNIT – IV

Transistor Biasing and Thermal Stabilization: Need for Transistor biasing, Operating point, Load line analysis, Biasing methods - Fixed bias, Collector to Base bias, Self-bias, stability factors, Bias compensation, Thermal Runaway, Thermal stability.

UNIT – V

Small Signal Low Frequency Transistor Amplifier Analysis: Frequency Response of Amplifier, Transistor hybrid model, Generalized analysis of Transistor amplifier using h-parameter model, Simplified Hybrid Model - Analysis of CE, CB and CC amplifiers using Approximate Model, Analysis of CE amplifier with emitter resistance using simplified hybrid model.

FET Amplifier Analysis: Small Signal Model, Analysis of CS and CD Amplifiers at Low frequencies.

TEXT BOOKS

1. J.Millman, C.Halkias, Electronic Devices and Circuits, Tata Mc-Graw Hill, 4th Edition, 2010.
2. S.Salivahanan, N.Suresh Kumar, Electronic Devices and Circuits, McGraw Hill Education (India) Private Limited, 3rd Edition, 2012.

REFERENCES

1. Jacob Millman, C.Halkies, C.D.Parikh, Integrated Electronics, Tata Mc-Graw Hill, 2nd Edition, 2009.
2. Sedra and Smith, Micro Electronic Circuits, Oxford University Press, 4th Edition, 2002.
3. Robert Boylested and Louis Nashelsky, Electron Devices and Circuit Theory, Pearson Prentice Hall, 10th Edition, July 2008.

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II B.Tech. – I Sem.

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(19EE0202) ELECTRICAL CIRCUITS-II

COURSE OBJECTIVES
The objectives of this course:

1. *To understand Magnetic Circuits, Network Topology and Three phase circuits*
2. *To analyze transients in Electrical systems*
3. *To evaluate Network parameters of given Electrical network.*

COURSE OUTCOMES (COs)
On successful completion of this course, the student will be able to

1. *Understand and Evaluate three phase circuits*
2. *Analyze the transient behaviour of electrical networks for various excitations.*
3. *Analyze the Electrical Circuits with the concept of Network topology.*
4. *Analyze the three phase circuits with Star & Delta connected balanced and unbalanced loads.*
5. *Obtain the various network parameters for the given two port networks.*
6. *Represent the transfer function for the given network.*

UNIT-I
THREE PHASE CIRCUITS
Three phase circuits: phase sequence, star and delta connection, relation between line and phase Voltages and currents in balanced systems, analysis of balanced and unbalanced three phase circuits, measurement of active and reactive power.

UNIT-II
TRANSIENT ANALYSIS
Transient response of R-L, R-C, and R-L-C Series circuits for D.C. excitation, initial conditions, solution method using differential equations. response of R-L and R-C networks to pulse excitation. Transient response of R-L, R-C, and R-L-C Series circuits for sinusoidal excitations, initial conditions, solution method using differential equations.

UNIT-III
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 independent voltage and current sources, duality and dual networks.

UNIT-IV

TWO PORT NETWORKS

Definition of two port network, List of various two port network parameters, Determination of Two port network parameters Z, Y, ABCD and Hybrid parameters and their relations, Determination of two port network parameters in the case of cascaded networks.

UNIT-V

ELECTRICAL CIRCUIT ANALYSIS USING LAPLACE TRANSFORMS

Laplace Transform, Analysis of electrical circuits using Laplace Transform for standard inputs, Circuit elements in s-domain, Transfer function and convolution integral, inverse Laplace transform, Transfer function representation-Poles and Zeros.

TEXT BOOKS:

1. A.Sudhakar and Shyamohan S.Palli, "Circuits and Networks", Tata McGraw, Hill
2. Alexander and Sadiku: "Fundamentals of Electric Circuits", McGraw Hill.

REFERENCES:

1. M.E.Van Valkenberg, "Network Analysis", Prentice Hall of India, 3rd edition.
2. C.L.Wadhwa, "Electric Circuit Analysis", New Age International.

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(19EE0203) ELECTRICAL MACHINES -I

COURSE OBJECTIVES

The objectives of this course:

1. *To understand the operation of dc machines.*
2. *Analyse the differences in operation of different dc machine configurations.*
3. *To understand the testing of dc machine.*
4. *Analyse single phase and three phase transformers circuits.*

COURSE OUTCOMES (COs)

On successful completion of this course, the student will be able to

1. *Calculate the e.m.f. generated on open circuit and find terminal voltage on load.*
2. *Diagonise the failure of DC generator to build up voltage.*
3. *Identify suitable method and conditions for obtaining the required speed of DC motor.*
4. *Compute the load shared by each generator when several generators operate in parallel.*
5. *Conduct O.C, S.C tests and predetermine the regulation and efficiency of transformer.*
6. *Compute the load shared by each transformer when several transformers operate in parallel*

UNIT- I

DC GENERATORS : Construction & Principle of operation of dc generator, Emf equation,armature reaction, demagnetizing and cross magnetizing ampere turns, compensating windings, commutation, emf induced in a coil undergoing commutation, methods of improving commutation, noload and load characteristics of different types of generators.

UNIT- II

DC MOTORS : Principle of operation of dc motor, Torque and power developed by armature, speed control of dc motors, starting of dc motors: constructional details of 3-point and 4-point starters, load characteristics of dc motors. Losses in dc machine, condition for maximum efficiency**.**

UNIT- III

PARALLEL OPERATION OF DC GENERATORS: Dc shunt and series generators in parallel, equalizing connections.

TESTING OF DC MACHINES:

Brake test, Swinburne"s test, Hopkinson's test, Fields test, Retardation test, Separation of iron and frictional losses.

UNIT- IV

SINGLE PHASE TRANSFORMERS: Construction & Principle of operation of transformer, emf equation, ideal transformer, leakage flux, and phasor diagram of transformer, equivalent circuit of a Single-phase transformer, losses and efficiency.

UNIT- V

TESTING OF TRANSFORMERS: OC and SC test on Single -phase transformer. Parallel operation of transformer, load sharing. Principle of Auto transformer, saving of copper as compared to two winding transformer.

3- PHASE TRANSFORMERS: Introduction,Types of connections, Scott connection, open delta operation of 3-Phase transformer,Sumpner"s test.

TEXT BOOK

1. I.J.Nagrath ,D.P.Kothari, "Electric Machines", New Age International Ltd.
2. P.S.Bimbhra, "Electrical machinery", Khannna Publishers, 2011.

REFERENCES

1. B.R.Gupta, Vandana Singhal, "Fundamentals of Electrical Machines", New Age International Ltd.
2. Puchstein , Lloyd, Conrad , "Alternating current Machines".
3. Electrical Machines,P.S. Bimbhra., Khanna Publishers, 2011.
4. Electrical Machines,S.K. Battacharya, TMH Edn Pvt. Ltd., 3rd Edition, 2009.
5. Electromechanics, II (transformers and induction motors) S. Kamakshaiah, Hitech Publishers, 2005.

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(19CE0136) WATER TECHNOLOGY

COURSE OBJECTIVES

The objectives of this course:

1. *To develop a student's skill in evaluating the performance of water treatment plants*
2. *Communicate the importance of conserving water*
3. *Outline the strategies for reducing water consumption*
4. *To minimize the risks of floods, droughts and landslides.*
5. *To develop rural areas in the region with clear plans for improving the economy of the regions.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Underline the importance of water and describe the mechanism of hydrological cycle*
2. *Describe various elements associate with public water supply*
3. *Describe water quality criteria and standards, and their relation to public health*
4. *Recognize the cause of water pollution and influence of climatic changes on water resources*
5. *Summarize various water conservation techniques in practice*
6. *Explain need for watershed management and implement various Plans for watershed management*

UNIT-I

Water Demand and Sources of Water: Water demand -Types of water demands- Percapita Demand- Factors affecting the percapita demand–Water cycle-Sources of water-Surface and subsurface sources-Factors governing the selection of source of water - Water deficiency-Water crisis

Introduction to Water Supply: Importance and Necessity of protected water supply systems-Objectives of protected water supply system- Flow chart of public water supply system

UNIT-II

Water Quality: Requirement of water for domestic use-Impurities in water- Characteristics of water-Water quality standards –Flow chart of basic treatment process- Latest treatment process-Membrane filtration-Reverse process- Desalination process

UNIT-III

Water Pollution: Surface water pollution–Causes - Remedial measures–Ground water pollution –Causes - Remedial measures

Climatic Changes on Water Resources: Impact of climatic changes on water resources- Droughts- Extreme Precipitation- Melting Glaciers and Snow Drought- Greenhouse Gas emissions- Algal blooms

UNIT-IV

Water Conservation: Definition–Rain-water harvesting –Advantages of implementing the rain-water harvesting–Components of roof top rain-Water harvesting-Techniques in rain water harvesting– Catchment harvesting-Check dams-Farmponds-Percolation tank-Ground water recharge- Ground water recharge structures

UNIT-V

Watershed Management: Definition –Concept of Watershed Management-Need for watershed management- Objectives of watershed management-Characteristics of watershed–Planning of watershed management

TEXTBOOKS

1. Modi, P.N., Water Supply & Waste Water Engineering, Vol. I & II, Standard Book House, New Delhi, 2010.
2. J.V.S.Murty.,Watershed Management, New Age International Publications, New Delhi,2017.

REFERENCES

1. Garg, S.K., Environmental Engineering Vol.I& II, Khanna Publishers, New Delhi, 2015.
2. Madan Mohan Das, Mimi Das Saikia, Watershed Management, PHI Learning Pvt. Ltd., Delhi, 2012.
3. Ghanshyam Das, Hydrology and Soil Conservation Engineering: Including Watershed Management, PHI Learning Pvt. Ltd., Delhi.
4. https://theberkey.com/pages/a-guide-to-water-conservation
   https://blog.mygov.in/water-conservation-rainwater-harvesting/
   https://theconstructor.org/water-resources/methods-rainwater-harvesting/5420/
5. Links for "Climatic Changes on Water Resources"
   https://ascelibrary.org/doi/10.1061/%28ASCE%29EE.1943-7870.0001394
   https://www.watercalculator.org/footprint/climate-change-water-resources/
   https://19january2017snapshot.epa.gov/climate-impacts/climate-impacts-water-resources.html

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(19ME0349) FUNDAMENTALS OF MECHANICAL ENGINEERING

COURSE OBJECTIVES

Objective of this course is to

1. *Impart knowledge on Engineering materials, alloying and Heat treatment.*
2. *Familiarize student with IC Engines and Air compressors.*
3. *Make the student learn about a Refrigeration& Air conditioning systems and working of various Power plants*
4. *Enable the student to know about Modern Machining processes.*
5. *Make the student understand about Robotics and computer aided drafting, manufacturing, quality control.*

COURSE OUTCOMES

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

1. *List the types of Engineering materials and also describe alloying, Heat treatment Processes.*
2. *Recognize the importance of IC Engines in automobiles and the classification of air compressors*
3. *Distinguish various types of air conditioning systems for house and Industrial applications*
4. *Explicate the working of various Power plants like nuclear, Hydro & thermal power plants*
5. *Classify various types modern machining processes and determine the best suitable process to machine a component.*
6. *Apply the working principles of CAD, CAM and CIM in the operation of Robotic manufacturing and quality control systems*

UNIT-I

Engineering Materials: Classification of Materials - Engineering properties of Materials, Necessity of alloying – Applications.

Heat Treatment of Alloys: Annealing - Normalizing – Hardening- Tempering- Surface hardening methods

UNIT-II

I.C. Engines- Definition of Engine and Heat Engine, I.C Engine Classification Parts of an IC Engine, Working of Two Stroke & Four Stroke Engines.

Air Compressors: Reciprocating & Rotary Compressor - Types Working.

UNIT-III

Refrigeration: Introduction to Refrigeration- Classifications of Refrigeration systems-Vapour compression and Vapour absorption systems.

Air conditioning: Introduction to Air conditioning - Classifications of Air conditioning systems-window air conditioning system, split conditioning system, Central air conditioning system.

UNIT-IV

Modern Machining: Traditional machining versus modern machining methods- Need of modern machining process –Classifications - Process selection, Materials, and applications, Ultrasonic Machining, Water Jet Machining, Abrasive Water Jet Machining.

UNIT-V

CAD/CAM: Role of computers in manufacturing – CAD, CAM, CIM, Computer aided quality control- Inspection Methods-Advantages & Applications.

Robotics: Robot-Necessity of Robot in manufacturing environment-Classification-Principle components-Degrees of freedom-End effectors-Advantages.

TEXT BOOKS

1. R. K. Rajput, *Engineering Materials and Metallurgy*, S. Chand Publishers, 3rd Edition, 2008.
2. C.P. Arora & Domkundwar, *Refrigeration and Air conditioning*, McGraw Hill, 3rd Edition, 2010.
3. M.P. Groover, *Industrial Robotics*, Tata McGraw Hill Publications, 2017.

REFERENCES

1. Dr. Kodgire V.D, *A Text Book of Material Science and Metallurgy for Engineers*, Everest Publishing House, 12th Edition, 2007.
2. Hassan Abdel, *Advanced Machining Processes*, McGraw-Hill, 2005.
3. A Zimmers & P.Groover, *CAD/CAM*, PE Publishing, 5th Edition, 2008.
4. R.K.Rajput, *Thermal Engineering*, Laxmi Publications, 6th Edition, New Delhi, 2010.

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(19EC0448) INTRODUCTION TO COMMUNICATION SYSTEMS

COURSE OBJECTIVES

The objectives of this course:

1. *To study the fundamental concepts of the analog communication system.*
2. *To analyze various analog modulation and demodulation techniques.*
3. *The students to be able to understand, analyze, and design fundamental digital communication systems.*
4. *The course focuses on developing digital communication systems*
5. *To understand basics of various Communication.*

COURSE OUTCOMES (COs)

On successful completion of this course, the student will be able to

1 Demonstrate knowledge in elements of Analog Digital and Wireless Communication Systems.
2. Analyze the analog modulated and demodulated systems.
3. Understand the principle involved in different modulation techniques
4. Understand the basic principles of baseband and pass band digital modulation schemes
5. Analyze probability of error performance of digital systems and are able to design digital communications.
6. Implement various Keying and accessing techniques in real time wireless communication systems

UNIT- I

Communication : Introduction, Elements of communication systems, wired Communications systems, Wireless Communications systems, Modulation, Need of modulation, modulation Methods, difference between Analog and Digital communication

Amplitude Modulation & Demodulation: DSB-FC(AM)modulation& its demodulation, Double sideband suppressed carrier (DSB-SC) modulation & its demodulation, Single sideband (SSB) transmission, Comparison of various amplitude modulation techniques.

UNIT- II

Angle Modulation & Demodulation: Generalized concept of angle modulation, Bandwidth of angle modulated waves –Narrow band frequency modulation (NBFM) and Wide band FM (WBFM), Phase modulation(PM).

UNIT- III

Noise in Communication Systems: Types of noise, Noise figure.

Analog pulse modulation schemes: Pulse amplitude modulation (PAM), Pulse Width modulation(PWM) and Pulse Position modulations (PPM)

UNIT IV

Digital Communication: Introduction-Elements of digital communication systems, sampling process, quantization, quantization noise.

Source Coding Systems: Pulse-Code Modulation (PCM), Differential PCM (DPCM), Delta modulation (DM), Comparison of PCM, DPCM, DM.

Pass band Data Transmission: Introduction, Amplitude shift keying(ASK), binary phase shift keying (BPSK), Binary Frequency shift keying (BFSK) Comparison of ASK, PSK, FSK.

UNIT V

Introduction to Wireless Communication Systems: Evolution of Mobile Radio Communication Systems, Examples of wireless communication Systems–Paging Systems, Cordless Telephone, Cellular Telephone Systems, Overview of generation of cellular systems.

Multiple Access Techniques for Wireless Communications: Introduction to Multiple Access, FDMA, TDMA, CDMA, SDMA.

TEXT BOOKS

3. Simon Haykin, "Communication Systems," Wiley India Edition, 4th Edition, 2011.
4. B.P. Lathi, &Zhi Ding, "Modern Digital & Analog Communication Systems", Oxford University Press, International 4th edition, 2010.

REFERENCES

1. Sam Shanmugam, "Digital and Analog Communication Systems", John Wiley, 2005.
2. Bruce Carlson, & Paul B. Crilly, "Communication Systems – An Introduction to Signals & Noise in Electrical Communication", McGraw-Hill, 5th Edition, 2010
3. Bernard Sklar, "Digital Communications", Prentice-Hall PTR, 2nd edition, 2001.
4. Herbert Taub& Donald L Schilling, "Principles of Communication Systems", Tata McGraw-Hill, 3rd Edition, 2009.
5. J.G.Proakis, M Salehi, Gerhard Bauch, "Modern Communication Systems Using MATLAB," CENGAGE, 3rd Edition, 2013

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II B.Tech. – I Sem.

(19CS0550) RELATIONAL DATABASE MANAGEMENT SYSTEM

OBJECTIVES

The objectives of this course:

1. *Explain different issues involved in the design and implementation of a database system.*
2. *Explain physical and logical database designs, database modelling, relational, hierarchical, and network models*
3. *Introduce data manipulation language to, update, query and manage a database*
4. *Design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling and designing a DBMS.*

COURSE OUTCOMES (COs)

On successful completion of this course, the student will be able to

1. *Develop relational algebra expressions for queries and optimize them.*
2. *Design the databases using E_R method for a given specification of requirements.*
3. *Apply Normalization techniques on given database.*
4. *Determine the transaction atomicity, consistency, isolation, and durability for a given transaction-processing system.*
5. *Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.*
6. *Understand Physical Storage Media and RAID concepts.*

UNIT- I

Introduction: Database System Applications, Purpose of Database Systems, View of Data, Data Abstraction, Data Independence, Data Models, Database Languages, Database Architecture, Database Users and Administrators.

UNIT-II

Introduction to Data base design: ER diagrams, Entities, Attributes and Entity sets, Relationships and Relationship sets.

Relational Algebra and Calculus: Relational Algebra - Selection and Projection,Set operations,Renaming,Joins.

UNIT-III

Form of Basic SQL Query- Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set - Comparison Operators, Aggregate Operators, NULL values - Comparison using Null values.

UNIT-IV

Introduction to Schema Refinement- Problems Caused by redundancy, Normal Forms - FIRST, SECOND, THIRD Normal forms.

Properties of Decompositions: Lossless join Decomposition, Dependency preserving Decomposition - FOURTH Normal Form, FIFTH Normal form.

UNIT- V

Recoverability: System Recovery – Media Recovery –Two Phase locking – Deadlock-Detection, Recovery and Prevention.

Physical Storage and Database Concepts: Overview of Physical Storage Media and RAID.

TEXT BOOK:

1. Abraham Silberschatz, Henry F. Korth and S. Sudharshan, *Database System Concepts*, Sixth Edition, Tata McGraw Hill, 2011.

REFERENCES:

1. Raghurama Krishnan, Johannes Gehrke, *Database Management Systems*, 3rd Edition, McGrawHill Education,2003.
2. J. D. Ullman, *Principles of Database and Knowledge – Base Systems*, Vol 1 Computer Science Press.
3. Peter Rob & Carlos Coronel , *Database Systems Concepts*, Cengage Learning, 2008.
4. C.J. Date, *Introduction to Database Systems*, Pearson Education.
5. G.K. Gupta, *Database Management Systems*, McGrawHillEducation.

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(19HS0813) MANAGEMENT SCIENCE

COURSE OBJECTIVES:

1. *To understand the basic concepts, principles and processes of management*
2. *To help the students gain an understanding of the functions, responsibilities of managers*
3. *To get an awareness about the latest developments and contemporary issues in the field of management*

COURSE OUTCOMES:

1. *Utilize appropriate theoretical frameworks to real life business and managerial problems*
2. *Identify appropriate operational risks and develop appropriate responses to them*
3. *Apply human resource principles to recruit, select and manage employees to achieve organizational goals*
4. *Enact strategy, including contingent plans for the effective management of the organization*
5. *Identify, plan, and implement the projects and evaluate the performance of the projects*
6. *Analyze effective application of latest developments to diagnose and solve organizational problems*

UNIT I
INTRODUCTION TO MANAGEMENT:

Management-Concept and meaning-Nature-Functions-Management as a science and art and both. Schools of management thought-Taylor,,s scientific theory-Henry Fayol,,s principles- Weber,,s Ideal Bureaucracy-Eltan Mayo,,s Human relations-Systems theory-Situational or Contingency theory-Social responsibilities of management.
Organizational structure and design: Features of organizational structure-work specialization-Departmentation-Span of control-Centralization and Decentralization. **Organisational designs**-Line organization-Line & Staff Organization-Functional Organization-Matrix Organization-Project Organization-Committee form of organization.

UNIT II
OPERATIONS MANAGEMENT:

Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study- Statistical Quality Control**:** C chart, P chart, (simple Problems) Deming" s contribution to quality. **Material Management:** Objectives-Inventory-Functions, types, inventory classification techniques-EOQ-ABC Analysis-Purchase Procedure and Stores Management. **Marketing Management:** Concept- Meaning - Nature-Functions of Marketing- Marketing Mix- Channels of distribution -Advertisement and sales promotion- Marketing Strategies based on Product Life Cycle.

UNIT III
HUMAN RESOURCES MANAGEMENT (HRM):

HRM- Definition and meaning–nature-Managerial and Operative functions-Evolution of HRM-Human Resource Planning(HRP)-Employee Recruitment-sources of recruitment-employee selection- process and tests in employee selection- Employee training and development-On- the- job and Off- the- job training methods-Performance Appraisal systems- Concept-MethodsofPerformanceAppraisal-Placement-EmployeeInduction-WageandSalary Administration-Objectives-Essentials of Wage and SalaryAdministration-Job Analysis- Process -Job Evaluation-Employee Grievances-techniques of handlingGrievances.

UNIT IV
STRATEGIC MANAGEMENT:

Definition& meaning-Setting of Vision- Mission- Goals- Corporate Planning Process-Environmental Scanning-Steps in Strategy Formulation and Implementation-SWOT Analysis. **Project Management (PERT/CPM):**Network Analysis- Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying Critical Path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (Simple problems).

UNIT V
CONTEMPORARY ISSUES IN MANAGEMENT:

TheconceptofMIS-MaterialsRequirementPlanning(MRP)-Just-In-Time(JIT)System-Total Quality Management (TQM)- Six Sigma Concept- Supply Chain Management-Enterprise Resource Planning (ERP)- Performance Management- Business Process Outsourcing (BPO), Business Process Re-engineering and Bench Marking -Balanced Score Card-Knowledge Management.

Text Books:

1. A.R Aryasri: Management Science, TMH,2013
2. Stoner, Freeman, Gilbert, Management, Pearson Education,New Delhi,2012.

REFERENCES:

1. Kotler Philip & Keller Kevin Lane: Marketing Mangement ,PHI,2013.
2. Koontz &Weihrich: Essentials of Management, 6/e, TMH,2005.
3. Thomas N.Duening& John M.IvancevichManagementPrinciples and Guidelines,Biztantra.
4. KanishkaBedi, Production and Operations Management, Oxford University Press,2004.
5. Memoria&S.V.Gauker, Personnel Management, Himalaya, 25/e,2005.

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(19EC0405) ELECTRONIC DEVICES AND CIRCUITS LAB

COURSE OBJECTIVES

The objectives of this course:

1. *To understand the working of various Semiconductor devices and plot their characteristics.*
2. *To obtain the frequency response characteristics of BJT and FET amplifiers.*
3. *To apply basic electronic devices and circuits in real time applications.*

COURSE OUTCOMES (COs)

On successful completion of this course the students will be able to

1. *Demonstrate knowledge in different electronic devices and analog circuits.*
2. *Analyze the characteristics of different electronic devices and circuits like Diodes-PN Junction Diode, Zener Diode and Transistors-BJT, FET.*
3. *Design and develop electronic circuits like rectifiers, clippers, clampers, BJT and FET Amplifiers.*
4. *Solve engineering problems with better Electronic circuits.*
5. *Function effectively as an individual and as a member in a group in the area of electronic devices and circuits.*
6. *Develop skills to communicate verbally and in written form in the area of electronic devices and circuits.*

PART - A

Electronic workshop practice (for 2 Lab sessions)

1. Identification, Specifications and Testing of passive & active components

2. Study the working of the electronic equipment used in the lab.

PART - B

List of Experiments (Minimum of TEN experiments to be completed)

1. Forward and Reverse bias characteristics of P-N Junction diode

2. Zener diode characteristics

3. Diode clippers

4. Diode clampers

5. Half Wave Rectifier with and without filter

6. Full Wave Rectifier with and without filter

7. UJT Characteristics

8. Input and Output characteristics of Transistor in CE Configuration
9. Drain and Transfer Characteristics of N-channel JFET
10. Frequency response of CE Amplifier
11. Frequency response of CC Amplifier
12. Frequency response of Common Source FET Amplifier

Additional Experiment:

PCB Design of a simple electronic device application.

R19

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(19EE0204) ELECTRICAL MACHINES-I LAB

COURSE OBJECTIVES:

The student has to learn about:

1. *No load and load characteristics of DC generators.*
2. *Various tests on DC motors.*
3. *The speed control techniques of DC motors.*

COURSE OUTCOMES:

The student should be able to do the following:

1. *Conduct experiments to obtain the no load and load characteristics of D.C. Generators.*
2. *Conduct tests on D.C. motors for predetermination of efficiency.*
3. *Conduct tests on D.C. motors for determination of efficiency.*
4. *Control the speed of D.C. motor in a given range using appropriate method .*
5. *Identify the reason as to why D.C. Generator is not building up voltage.*
6. *Identify the Separation of Losses in DC Shunt Motor*

List of Experiments

CYCLE-1

1. Magnetization Characteristics of DC Shunt Generator. Determination of Critical Field Resistance and Critical Speed.
2. Speed Control of DC Shunt Motor.
3. Load Test on DC Shunt Generator. Determination of Characteristics.
4. Load Test on DC Series Generator. Determination of Characteristics.
5. Load Test on DC Compound Generator. Determination of Characteristics.
6. Brake Test on DC Shunt Motor. Determination of Performance Curves.

CYCLE-2

7. Brake Test on DC Compound Motor. Determination of Performance Curves.
8. Fields Test on DC Series Machines. Determination of Efficiency.
9. Swinburne"s Test on DC Machine.
10. Retardation Test on DC Shunt Motor. Determination of Losses at Rated Speed.
11. Separation of Losses in DC Shunt Motor.
12. Hopkinson"s Test on DC Shunt Machines. Predetermination of Efficiency.

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(19EE0205) ELECTRICAL CIRCUITS LAB

COURSE OBJECTIVES

1. *To study fundamentals of Kirchhoff's current and voltage laws and its practical implementation.*
2. *Measurement of voltage, current, power and impedance of any circuit.*
3. *Analysis of a given circuit depending on types of elements.*
4. *To indentify the basic electrical circuits and observe the characteristics.*

COURSE OUTCOMES (COs)

After completing the course, the student should be able to do the following:

1. *Correctly measure and successfully troubleshoot circuits by taking accurate data and interpret results.*
2. *Study different meters and instruments for measurement of electrical quantities*
3. *Experimentally verify the basic circuit theorems.*
4. *Understand 3 phase balanced, star and delta connected supply and load and to measure power in 3 phase circuits*
5. *Determine the resonant Frequency, quality factor & bandwidth of the RLC circuits*
6. *Draw the locus diagrams of RLC circuits.*
7. *Find the various parameters of two port network.*
8. *Record and document results of lab work using text and graphs.*

LIST OF EXPERIMENTS

1. Verification of KCL & KVL for any network.
2. Verification of Superposition & Reciprocity theorems with analysis.
3. Verification of Thevenin"s & Norton"s theorems with analysis.
4. Verification of Millmann"s theorem with analysis.
5. Verification of Maximum power transfer theorem withanalysis.
6. Verification of compensation theorem with analysis.
7. Determination of self, Mutual inductance & Coefficient of coupling of pair of coils.
8. Series & Parallel Resonance.
9. Locus diagrams of RL and RC series circuits.
10. Determination of Z & Y parameters of two port network.
11. Determination of Transmission and Hybrid parameters.
12. Measurement of Active Power and Reactive Power for Star and Delta Connected Balanced Loads.

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(19HS0805) ENVIRONMENTAL SCIENCE

COURSE OBJECTIVES

1. Identify environmental problems arising due to engineering and technological activities and the science behind those problems.
2. To identify the importance of interlinking of food chains.
3. Learn about various attributes of pollution management and waste management practices.

COURSE OUTCOMES

1. Recognize the physical,chemical and biological components of the earth's systems and show how they function.
2. Characterize and analyze human impacts on the environment.
3. Integrate facts,concepts and methods from multiple disciplines and apply to environmental Problems.
4. Create informed opinions about how to interact with the environment on both a personal and a social level.
5. Perform independent research on human interactions with the environment.
6. Recognize the ecological basis for regional and global environmental issues

UNIT – I

INTRODUCTION:

Definition, Scope and Importance of environmental science,Need for Public Awareness

NATURAL RESOURCES:

Forest resources: Use and over-exploitation, deforestation,Mining, dams and their effects on forests and tribal people.

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

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

Energy resources: Renewable and Non- Renewable sources of energy. Solar energy, Hydro electrical energy, Wind energy, Nuclear energy .

UNIT-II

ECOSYSTEMS:

Concept of an ecosystem,structure and function of an ecosystem.Producers, Consumers and Decomposers. Biogeochemical cycles, Ecological succession,energy flow in an ecosystem,Foodchains, food webs and ecological pyramids.Types of ecosystems (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystem.

UNIT-III

BIODIVERSITY AND ITS CONSERVATION:

Introduction, Definition, genetic, species and ecosystem diversity, Bio-geographical classification of India, India as a Mega diversity Nation, Hot spots of biodiversity, Value of biodiversity, Threats to biodiversity, Endemic, Endangered and Extinct species of India, In-Situ and Ex-situ conservation of biodiversity.

UNIT-IV

ENVIRONMENTAL POLLUTION AND GLOBAL ENVIRONMENTAL ISSUES:

Natural Disasters: Droughts, Floods, Cyclone, Landslides, Earthquake.

Pollution episodes: Air pollution,Waterpollution,Landpollution,Noisepollution,Automobile, Nuclear pollution.Global warming, Acid rain,Ozone layer depletion and controlling measures.
Global Environmental Issues: Population Growth, Urbanizations, Land Management, Water and Waste Water Management. Climate change and impacts on human environment.
Solid Waste Management: causes, effects and control measures of Municipal solid wastes.
E-waste and management, Role of an individual in prevention of pollution .

UNIT-V

ENVIRONMENTAL LEGISLATIONS, LAWS, POLICIES FOR SUSTAINABLE DEVELOPMENT:

Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water Act.

Wildlife protection Act, Forest conservation Act.Municipal Solid Waste management. International conventions/Protocols Earth summit, Kyoto protocol and Montreal Protocol.

Unsustainable to sustainable development, Role of NGO"s for Sustainable development. Role of IT in Environment, GIS methods for Sustainable development.

Field work- visit to a local area to document environmental assets, river ,forest, grassland/hill, mountain and polluted sites (urban/rural/industrial/Agriculture).study simple ecosystems.

TEXT BOOKS:

1. A.Kaushik and C.P.Kaushik, Environmental Sciences, 5th edition,New age international publishers, 2015.
2. M.Anji Reddy, Text Book of Environmental Science and Technology, BS Publications, 2016.

REFERENCES:

1. Anil Kumar and Arnab Kumar De, Environmental Studies, New Age International Publishers, New Delhi, 3rd Edition 2015.
2. R.K. Trivedi, "Handbook of Environmental Laws, Rules, Guidelines, Compliances andStandards", Vol.I and II, Enviro Media, 2016.
3. Rajagopalan.R, "Environmental Studies-From Crisis to Cure", Oxford University Press, 2005.

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(19EC0401) SWITCHING THEORY AND LOGIC DESIGN

COURSE OBJECTIVES

The objectives of this course are:

1. *Familiarize the student with fundamental principles of digital design.*
2. *Acquire the skills to manipulate and examine Boolean algebraic expressions, logical operations, Boolean functions and their simplifications.*
3. *Acquaint with classical hardware design and software implementation for both combinational and sequential logic circuits.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Define different Number systems, Binary Codes and perform Number base conversions.*
2. *Simplify the Boolean functions, design and implement using Logic gates.*
3. *Understand the methods for gate-level minimization techniques.*
4. *Design and implement Sequential and Combinational circuits.*
5. *Apply the state reduction methods in design of FSMs.*
6. *Understand and design memory systems like RAM, ROM, PLA, PAL.*

UNIT – I

Binary Systems: Digital Systems– Binary Numbers–Octaland Hexadecimal Numbers, Number Base Conversions–Complements –Signed Binary Numbers –Binary Codes.

Boolean Algebra and Logic Gates: Basic Definitions, Axiomatic Definition of Boolean Algebra–Basic Properties of Boolean Algebra –Boolean Functions, Canonical and Standard Forms–Other Logic Operations –Digital Logic Gates –Integrated circuits.

UNIT – II

Gate – Level Minimization: The Map Method, Four Variable K-Map, Five Variable K-Map– Product of Sums Simplification– Don„t–Care Conditions– NAND and NOR implementation, Other Two Level Implementations, EX-OR Function–Tabular Minimization method.

UNIT – III

Combinational Logic: Combinational Circuits– Analysis Procedure– Design Procedure– Binary Adder–Subtractor–Decimal Adder– Binary Multiplier– Magnitude Comparator – Decoders – Encoders – Multiplexers–De-Multiplexers.

UNIT – IV

Synchronous Sequential Logic: Sequential Circuits– Latches, Flip Flops– Analysis of Clocked Sequential Circuits– Registers, Shift Registers, Ripple counters, Synchronous counters, Ring Counter and Johnson Counter.

UNIT – V

Finite State Machines And Programmable Memories: Introduction to FSM– Mealy and Moore models– State Reduction and State Assignment– Design procedure – Random access memory, memory decoding– Error Detection and Correction– Read –only Memory– Programmable Logic Array– Programmable Array Logic.

TEXTBOOKS

1. Morris Mano, Digital Design, PHI, 3rd Edition, 2006.
2. ZviKohavi, Switching & Finite Automata theory, TMH, 2nd Edition.
3. A.Anand kumar, Switching Theory and Logic Design, PHI, 2008.

REFERENCES

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

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(19EC0446) ANALOG ELECTRONIC CIRCUITS

COURSE OBJECTIVES

The objectives of this course:

1. *Familiarize the student with the analysis of Feedback amplifiers, Oscillators and Operational Amplifiers.*
2. *Study the applications of operational amplifiers.*
3. *Design circuits for various applications of operational amplifiers.*

COURSE OUTCOMES

On successful completion of the course, the student will be able to

1. *Demonstrate knowledge in Feedback amplifiers, Oscillators and Operational Amplifiers.*
2. *Perform analysis of analog electronic circuits for meeting defined specifications.*
3. *Design and develop analog electronic circuits such as Feedback Amplifiers, Oscillators and various applications of operational amplifier with given specifications.*
4. *Solve problems relating to analog electronic circuit design.*
5. *Select an Amplifier circuit suitable for a specific electronic subsystem.*
6. *Apply course knowledge to assess societal issues and understand the consequent responsibilities relevant to the professional engineering practice using analog electronic circuits.*

UNIT – I

Feedback Amplifiers: Feedback concept, Classification of basic amplifiers - Voltage amplifier, Current Amplifier, Transresistance Amplifier and Transconductance Amplifier, Feedback amplifier topologies, Characteristics of negative feedback amplifiers, Analysis of feedback amplifiers, Performance comparison of feedback amplifiers.

UNIT – II

Oscillators: Principle of operation of oscillator, Barkhausen Criterion, Types of oscillators, Analysis of RC-phase shift and Wien bridge oscillators using BJT, Generalized analysis of LC Oscillators, Hartley and Colpitts"s oscillators with BJT, Crystal oscillators, Frequency stability of oscillators.

UNIT – III

Operational Amplifier: Basic Information of Op-Amp, Ideal Op-Amp, Inverting Amplifier, Non-Inverting Amplifier, Voltage Follower, Differential Amplifier, Difference and Common Mode gains, CMRR, DC Characteristics–Input Bias Current, Input Offset Current, Input and Output Offset Voltage, Thermal Drift, AC Characteristics – Frequency Response, Frequency Compensation, Slew rate.

UNIT – IV

Applications of Op-Amp: Summing Amplifier, Subtractor, Differentiator, Integrator, Sample and Hold Circuit, Astable Multivibrator, Monostable Multivibrator, Triangular wave generator.

UNIT – V

Active Filters and Converters using Op=Amp: Active Filters - Low pass active filter, High pass active filter, DAC – Weighted Resistor DAC, R-2R ladder DAC, Inverted R-2R Ladder DAC, ADC–Flash Type ADC, Dual Slope ADC, DAC/ADC Specifications.

TEXT BOOKS

1. S.Salivahanan, N.Suresh Kumar, Electronic Devices and Circuits, McGraw Hill Education (India) Private Limited, Third Edition, 2012.
2. D.Roy Choudhury, Shail B.Jain, Linear Integrated Circuits, New Age International Publishers, Fourth Edition, 2010.

REFERENCES

1. J.Millman, C.Halkias, Electronic Devices and Circuits, Tata Mc-Graw Hill, 4th Edition, 2010.
2. Sedra and Smith, Micro Electronic Circuits, Oxford University Press, Fourth Edition, 2002.
3. Ramakanth A. Gayakwad, Op-Amps & Linear ICs, PHI, 3rd & 4th edition, 1987.

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(19EE0207) ELECTROMAGNETIC FIELDS

COURSE OBJECTIVES

The objectives of this course:

1. *To learn the laws concerning static electric fields: Coulomb's law, Gauss law; the laws concerning static magnetic fields: Biot, savart law, Ampere circuital law*
2. *To learn the equations concerned with static electric fields*
3. *To learn the equations concerned with static magnetic fields*
4. *To find the difference between the behaviors of conductors and dielectrics in electric fields*
5. *To determine the energy stored and energy density in (i) static electric field (ii) magnetic field, Electric dipole and dipole moment, magnetic dipole and dipolemoment*

COURSE OUTCOMES (COs)

On successful completion of this course, the student will be able to

1. *Acquires mathematical foundation on vector calculus*
2. *Analyse and estimate Electric field quantities with charge distribution*
3. *Study the behaviour of electric fields in conductor and dielectric materials*
4. *Estimate the magnetic field strengths due to different current carrying elements*
5. *Evaluate the magnetic forces generated due to interaction of electric and magnetic fields*
6. *Understand the electromagnetic wave propagation in free space*

UNIT-I
INTRODUCTION TO VECTOR CALCULUS

Three orthogonal coordinate systems (rectangular, cylindrical and spherical)- Representation of a point and a vector in three coordinates, Conversion of point and vector from one coordinate system to another.

Vector algebra- Vector addition, subtraction and multiplications; vector operators gradient, divergence and curl; integral theorems of vectors. Representation of differential length, surface and volume.

UNIT-II
STATIC ELECTRIC FIELD

Coulomb"s law, Electric field intensity, Electrical field due to point charges. Line, Surface and Volume charge distributions. Gauss law and its applications. Divergence theorem and Maxwell"s First equation, Absolute Electric potential, Potential difference, Calculation of potential differences for different configurations. Electric dipole, Electrostatic Energy and Energy density,

UNIT-III

CONDUCTORS, DIELECTRICS AND CAPACITANCE

Current and current density, Ohms Law in Point form, Continuity of current, Boundary conditions of perfect dielectric materials. Permittivity of dielectric materials, Capacitance, Capacitance of a two wire line, Poisson s" equation, Laplace s' equation, Solution of Laplace and Poisson's equation, Application of Laplace s and Poiss equations.

UNIT-IV

STATIC MAGNETIC FIELDS

Biot-Savart Law, Amperes Law, Stokes theorem and Maxwell"s second equation. Magnetic flux and magnetic flux density, Maxwell s' third equation. Scalar and Vector Magnetic potentials. Steady magnetic fields produced by current carrying conductors.

MAGNETIC FORCES, MATERIALS AND INDUCTANCE

Force on a moving charge in a magnetic field, Force on a differential current element and straight current carrying conductor in a magnetic field, Force between differential current elements, Force between two parallel current carrying conductors. Torque on a rectangular loop carrying current in a magnetic field. S e l f inductance of solenoid, toroid and coaxial cable. Definition of Mutual Inductance, Mutual inductance between a loop and straight conductor.

UNIT-V

TIME VARYING FIELDS AND MAXWELL'S EQUATIONS

Faraday"s law of Electromagnetic induction, Maxwell"s fourth equation Displacement current, Modification of Maxwell's third equation for time varying fields. Point and integral form of Maxwell"s equations for time varying fields.

TEXT BOOKS:

1. William.H.Hayt, "Engineering Electromagnetics" Mc.Graw,Hill, 2010.
2. Gangadhar,"Field Theory", Khanna Publications, 2003.

REFERENCE BOOKS:

1. Griffith,"Electrodynamics" PHI, 3rd Edition, 1999.
2. Sadiku,"Electromagnetic Fields" Oxford University Press, 5th Edition, 2010.
3. Joseph Edminister, "Electromagnetics" Tata Mc Graw Hill, 2006.
4. J.D.Kraus, "Electromagnetics" Mc.Graw,Hill Inc,5th edition,1999.

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(19EE0208) ELECTRICAL MACHINES-II

COURSE OBJECTIVES

The objectives of this course:

1. *To understand different types induction motors*
2. *To learn testing and speed control of induction machines*
3. *To understand construction of synchronous generators*
4. *To learn principle of operation of synchronous motor and synchronous condenser*

COURSE OUTCOMES (COs)

On successful completion of this course, the student will be able to

1. *Understand construction of 3 phase induction motor and toque parameter calculation.*
2. *Conduct No-load and Blocked rotor tests on 3phase induction motors*
3. *Understand various types speed control methods of 3 phase induction motors*
4. *Understand construction of synchronous generator and parallel operation*
5. *Understand methods of starting of synchronous motors and equivalent circuit*
6. *Understand variation of current and power factor with excitation*

UNIT- I

3 Phase Induction Motors: Construction and principle of operation details of 3 phase induction motor- 3 phase armature windings–types of induction motors – production of rotating magnetic field -slip,torque,slip-torque Characteristics- equivalent circuit.

UNIT- II

Testing of 3 phase Induction Motors: Brake test – no load and blocked rotor tests – circle diagram – methods of starting.

Speed Control of 3 Phase Induction Motors: Pole changing- Cascade connection – Injection of emf into rotor circuit – Introduction to V/f control of 3-phase Induction motor.

UNIT- III

Synchronous Machines-I: Constructional details of synchronous machines- emf equation – synchronous reactance – equivalent circuit – phasor diagram – voltage equation – Determination of regulation by synchronous impedance method – MMF method.

Theory of salient pole machines – Phasor diagram – Determination of Xd and Xq from slip test

UNIT- IV

Synchronous Machines-II: Principle of operation of synchronous motor–method of starting – phasor diagram of synchronous motor- variation of current and power factor with excitation – Pre-determination of V and inverted V curves – Hunting and use of damper bars- Synchronous Condenser and power factor correction.

UNIT- V

Special Motors: Principle of operation of AC Series Motor–Universal Motor- Permanent Magnet and reluctance motors.

TEXT BOOKS

1. Electrical Machines – I. J. Nagrath, D. P. Kothari New Age International Ltd. .
2. Electrical Machinery – P.S.Bimbhra, Khanna Publishers, 2011

REFERENCES

1. Fundamentals of Electrical Machines – B. R. Gupta, Vandana Singhal, New Age International Ltd.
2. Performance and Design of AC Machines, M. G. Say, CBS Publishers, 2002
3. Electrical Machines-S.K. Battacharya, TMH Publications, 3rd Edition, 2009

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(19CE0143) FUNDAMENTALS OF URBAN PLANNING

COURSE OBJECTIVES

The objectives of this course:

1. *To understand the concept of balanced town by ensuring that new and existing facilities are complimentary to each other*
2. *To provide sustainable buildings by considering the environmental, social and economic conditions*
3. *To create awareness about the traffic management within the town*

COURSE OUTCOMES (COs)

On successful completion of this course, the student will be able to

1. *Recognize issues related to town planning and discuss the objectives, necessity and stages of town planning*
2. *Summarize importance of zoning, can classify various town planning practices and can conduct surveys for town planning*
3. *Classify the residential building, list the agencies involved in improving house and review the problems associated with residential housing*
4. *Discuss the issues associated with slums and recognize the methods to improve condition of slums*
5. *Interpret norms laid down for public and industrial building and can summarize building bye-laws*
6. *List and discuss various urban roads and the concepts of traffic management in a town*

UNIT – I

Introduction to Town Planning: Objects of town planning -Necessity of town planning - Principles of town planning -Stages of Town Planning - Origin and growth of towns - Development of towns - Modern townplanning in India - Socio - Economic aspects of town planning - Selection of site for an ideal town -Cost of town planning.

UNIT – II

Surveys & Planning: Various types of surveys to be conducted for town planning project - Data to be collected in different types of town planning survey - Types of planning -A brief note on urban, rural and regional planning.

Zoning: Definition - Objects and principles of zoning - Advantages of zoning - Special Economic Zone (SEZ) - Maps for zoning.

UNIT – III

Housing: Classification of residential building as per HUDCO norms - Low Cost Housing - Housing policy - Different types of housing agencies involved in housing - Investment in

Housing - Housing Problems in India.
Slums: Causes - growth - Characteristics -Effects - Slum clearance and re-housing - Prevention of slum formation - Financial assistance for slum clearance.

UNIT – IV
Public Buildings & Industries: Classification - Location - Design Principles of public building - Grouping of public buildings - Effects of Industries on towns and cities - Classification of industries –Requirements of an industry - Regulation of their location.
Building Bye-Laws: Objectives of bye-laws - Importance of bye-laws - Function of local authority - Responsibility of owner - Applicability of bye-laws - Principles underlying building bye-laws.

UNIT – V
Urban Roads: Objectives – Requirements - Classification - Types of street systems - Through and bypass roads - Outer and inner ringroads - Expressways - Freeways.
Traffic Management: Objectives - Traffic surveys - Traffic congestion - Traffic control - Parking - Road accidents - Traffic capacity of roads - Road intersections - Traffic islands - Roundabouts - Traffic signals - Road signs - Road markings - Street lighting in a town.

TEXT BOOKS

1. Rangwala, Town Planning, Charotar Publishing,30th edition, 2018.
2. G K Hiraskar, Fundamentals of Town Planning, DhanpatRai Publications, New Delhi,17th edition, 2018.

REFERENCES

1. Abirbandyopadhyay, Text book of Town Planning,Books & Allied(P) Ltd, 2000.
2. Peter Hall and Mark Tewdwr-Jones, Urban and Regional Planning,RoutledgePublications, 5th edition, 2010.
3. Catanese A J, Urban Planning, McGraw Hill Publications, 2nd edition, 2014.

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(19ME0350) MECHANICAL MEASUREMENTS & CONTROL SYSTEMS
(Common to all branches)

COURSE OBJECTIVES

Objective of this course is to:

1. Impart brief knowledge on basic principles and performance characteristics of measurement.
2. Familiarize student with basic principles to measure the temperature, pressure with the help of Thermocouple and different pressure gauges.
3. Make the student learn measurement of Speed, Acceleration and Vibration with the help of various instruments.
4. Enable the student to understand the measurement of Fuel level, measurement of Flow and Humidity, parameters like Force, Torque, Power and also learn about the basic principles, and applications of various control systems.
5. Make the student to Select appropriate device for the measurement of parameters like temperature, pressure, speed, stress, humidity, flow velocity etc., and justify its use through characteristics and performance.

COURSE OUTCOMES

On successful completion of this course, the student will be able to:

1. *State the basic principles of measurement systems and explain its performance characteristics*
2. *Distinguish the types of various temperature and pressure measurement instruments and finds the best one for the industrial applications*
3. *Explicate the principle of measurement of Speed, Acceleration and Vibration instruments and describe its working*
4. *Illustrate the operation of Fuel level, measurement of Flow and Humidity Measurement instruments and also state the applications of various control systems*
5. *Identify the appropriate device for the measurement of temperature, pressure, speed, stress, humidity, flow velocity etc., and justify its use through characteristics and performance.*
6. *Classify the various types of control systems for the measurement of temperature, speed and position*

UNIT-I

Definition - Basic principles of Measurement systems, configuration and functional descriptions of measuring instruments. Sources of error, Classification and elimination of error.
Measurement of Displacement: Types & Working - Piezo electric, Inductive, capacitance, resistance, ionization and Photo electric transducers, Calibration procedures.

UNIT-II

Measurement of Temperature: Classification of temperature measuring instruments, Principles - Types - Expansion, Electrical Resistance - Thermistor - Thermocouple - Pyrometers - Temperature Indicators.

Measurement of Pressure: Classification of pressure measuring devices – Principles - Manometers, Bourdon pressure gauges, Bellows - Diaphragm gauges. Low pressure measurement – Thermal Conductivity gauges - ionization pressure gauges, Mcleod pressure gauge.

UNIT - III

Measurement of Speed, Acceleration and Vibration: Tachometers, Seismic instruments - Vibrometer and accelerometer.

Stress & Strain Measurements: Electrical strain gauge, Resistance strain gauge , compressive and tensile strains, Strain gauge Rosettes.

UNIT -IV

Measurement of Level: Direct method - Indirect methods - capacitative, ultrasonic, magnetic, cryogenic fuel level indicators - Bubler level indicators.

Flow Measurement: Rotameter, magnetic, Ultrasonic, Turbine flow meter, Hot - wire anemometer Laser Doppler Anemometer (LDA).

UNIT - V

Measurement of Force, Torque and Power- Elastic force meters, load cells, Torsion meters, Dynamometers.

Elements of Control Systems: Classification - Open and closed systems Servo mechanisms- Temperature, speed & position control systems

TEXT BOOKS

1. D.S.Kumar, Mechanical Measurements & Control, Metropolitan Book Co Pvt. Ltd, 5th Revised Edition,2012.
2. Thomas G.Beckwith, Roy D.Marangoni & John H.Lienhard, Mechanical Measurements, Pearson Publishers,6th Edition.

REFERENCES

1. B.C.Nakra & KKChaudhry, Instrumentation, measurement & analysis, TMH Publishers, 3rd Edition.
2. R.K. Jain, Mechanical and Industrial Measurements, Khanna Publishers,11th Edition.
3. AK. Tayal, Instrumentation & mech. Measurements, Galgotia Publication, 2nd Edition.

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(19EC0449) ELEMENTS OF EMBEDDED SYSTEMS

COURSE OBJECTIVES

The objectives of this course:

1. *Able to understand the fundamental concepts of embedded systems.*
2. *Able to learn the core of embedded systems.*
3. *Able to learn to program the open source electronics.*
4. *Able to understand the principles of Internet of Things (IoT).*
5. *Able to understand the concepts of Internet of Things (IoT).*

COURSE OUTCOMES

On successful completion of this course, students will be able to

1. *Differentiate between general computing system and the embedded system, also recognize the classification of embedded systems.*
2. *Enumerate and describe the components of an embedded system.*
3. *Learn about open source electronics platform.*
4. *Program an embedded system by interfacing sensors & actuators.*
5. *Identify the basic building blocks of Internet of Things and characteristics.*
6. *Implement their own ideas in various application areas of Embedded systems and IoT.*

UNIT – I

Introduction to Embedded Systems: Definition –Embedded systems vs General computing systems – History – Classification – Purpose - Major application areas – Characteristics – Architecture of embedded system – CPU, RAM & ROM, timers, clocks, address bus& data bus – overview of design process of embedded systems – programming languages and tools for embedded design.

UNIT – II

Typical Embedded System: Core of the embedded system RISC vs CISC design philosophy – Memory – Harvard and Von-Neuman architecture–sensors and actuators– Other system components – reset, brownout protection, oscillator, RTC, Watch dog timer. Embedded firmware.

UNIT – III

Communication: Communication Interfaces –Onboard (I2C, SPI, UART, 1-wire interface, parallel interface), External (RS-232 & RS-485, USB, IEEE 1394, IrDA, Bluetooth, Wi-Fi, ZigBee, GPRS.

UNIT – IV

Designing of Embedded Systems With Arduino Microcontrollers: Introduction to Arduino platform– Overview of Arduino UNO board AŦMega328/P Block diagram Pin–functions – Introduction to Arduino programming –Interfacing & programming sensors –Interfacing & programming actuators Interfacing & programming serial communication devices.

UNIT – V

Introduction to IoT: Introduction to Internet of Things– reference architecture of IoT– Internet principles – IP addresses, MAC addresses, TCP and UDP ports– Application layer protocols – Data protocols– MQTT, XMPP, CoAP– challenges of IoT, Case studies demonstrating IoT – Home automation, cities, Environment, Agriculture.

TEXT BOOKS

1. Shibu K V, Introduction to Embedded systems, Tata McGraw-Hill Education, 1st Edition, 2009.
2. Raj Kamal, Embedded systems, Tata McGraw-Hill Education, 2ndEdition, 2011.
3. Arshdeep Bahga, Vijay Madisetti, Internet of Things: A Hands-On Approach, Universities Press/Orient Black Swan Pvt. Ltd, 1st Edition, 2015.

REFERENCES

1. https://store.arduino.cc/arduino-uno-rev3
2. https://www.arduino.cc/reference/en/
3. https://wso2.com/whitepapers/a-reference-architecture-for-the-internet-of-things/
4. Adrian McEwen & Hakim Cassimally, Designing of Internet of Things, John Wiley and sons Ltd, 1st Edition, 2014,

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II B.Tech-II semester

(19CS0551) JAVA PROGRAMMING

COURSE OBJECTIVES

The objectives of this course

1. *Introduce standard tools and techniques for software development.*
2. *Understand the object oriented approach for automated software build process.*
3. *Introduce the concepts of AWT framework.*

COURSE OUTCOMES (COs)

On successful completion of this course, the student will be able to

1. *Implement simple abstract data types and design abstraction functions.*
2. *Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.*
3. *Apply object-oriented design patterns for problem solving.*
4. *Implement Exception handling with synchronization.*
5. *Execute programs on Multithreading and String handling concepts.*
6. *Design applications with an event-driven graphical user interface.*

UNIT- I

The Java Language -Importance of Java -Programming Paradigms -The History and Evolution of Java -Java Byte Code .

Introduction of OOP -Abstraction, Encapsulation, Inheritance, Polymorphism-Understanding static -Varargs -Data Types -Type Casting -Java Tokens - Java Statements -Arrays.

UNIT- II

Introducing Classes -Class Fundamentals -Declaring Objects -Introducing Methods Introduction to Constructors -Garbage Collection-Introducing final -Inheritance - Method Overriding -abstract classes -Packages and Interfaces.

UNIT- III

Exception Handling - Exception Fundamentals - Exception Types -Uncaught Exceptions - Using try and catch - Nested try Statements -throw -throws –finally -Creating Your Own Exception Subclasses - Chained Exceptions.

UNIT-IV

Multithreaded Programming - The Java Thread Model -Thread Priorities -The Thread Class and the Runnable Interface - Creating Multiple Threads -Using isAlive( ) and join( ) -Synchronization-String Handling.

UNIT- V

Generics-A simple Generic Example-General form of Generic class -Generic Interfaces Collection Framework-Collections overview, Collection class, Collection interfaces.

Introducing the AWT - Using AWT Controls-Layout Managers -Introducing Swing -Exploring Swing.

TEXT BOOKS:

1. Herbert Schildt, *The Complete Reference (Fully updated for jdk7*), Oracle press Ninth Edition,2014.

2. Y Daniel Liang, *Introduction to Java programming*, 2nd Edition, Que E & T Series in Programming and Development.

REFERENCES:

1. Cay S. Horstmann, *Core Java Volume I-Fundamentals*, Prentice Hall , 10th Edition, 2015.
2. Deitel&Deitel, *Java How to Program*, Prentice Hall, 10th Edition, 2016.
3. Herbert Schildt ,*Java: A Beginner's Guide*, Sixth Edition, Oracle Press, 2014.

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(19HS0814) INTELLECTUAL PROPERTY RIGHTS

COURSE OBJECTIVES:

1. *To provide an understanding of the concept and significance of intellectual property rights*
2. *To understand the concept of trademarks, copy rights, patents and the need for their protection*
3. *To comprehend the concept of competition, unfair competition and the latest developments in the laws pertaining to intellectual property rights*

COURSE OUTCOMES:

1. *Become aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights*
2. *Identify different types of intellectual properties, ownership rights and the scope of the protection*
3. *Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work*
4. *Able to identify, apply, and assess ownership rights, registration processes for IP rights*
5. *To discern the approaches for intellectual property management and intellectual property audits*
6. *Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at international level*

UNIT-I

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

UNIT-II

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

UNIT-III

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

LAW OF PATENTS: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT-IV

TRADE SECRETS: Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secretelitigation.
UNFAIR COMPETITION: Misappropriation right of publicity, Falseadvertising.

UNIT-V

NEW DEVELOPMENT OF INTELLECTUAL PROPERTY: new developments in trade mark law; copy right law, patent law, intellectual property audits.
International overview on intellectual property, international - trade mark law, copy right law, international patent law, international development in trade secrets law.

TEXT BOOKS:

1. Intellectual property right, Deborah, E. Bouchoux, cengage learning
2. Intellectual property rights: Protection and Management. India, Nityananda KV, Cengage Learning India Private Limited.

REFERENCES:

1. Intellectual property right - Unleashing the knowledge economy, Prabuddha ganguli, Tata McGraw Hill Publishing CompanyLtd.
2. Law relating to Intellectual Property rights. India. Ahuja VK IN: Lexis Nexis
3. Intellectual Property Rights, India. Neeraj P &Khushdeep D, PHI learning pvt limited.

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(19EC0404) SWITCHING THEORY AND LOGIC DESIGN LAB

COURSE OBJECTIVES

The objectives of this course:

1. *To understand the Basics of logic Gates.*
2. *To know the concepts of Combinational circuits.*
3. *To understand the concepts of flipflops, registers and counters.*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Verify the operation of Logic gates, combinational and Sequential circuits*
2. *Construct basic combinational circuits and verify their functionalities.*
3. *Apply the design procedures in designing basic sequential circuits.*
4. *Understand the functionality of counters.*
5. *Understand the sequencing of Shift registers.*
6. *Construct various digital circuits and verify their operation.*

LIST OF EXPERIMENTS:

1. Verify the truth tables of Basic Logic gates.
2. Verify the truth tables of Universal Logic Gates
3. Design & Verify the truth tables of Half /Full Adder/Subtractor using logic gates.
4. Design & Verify the truth tables of 4- bit binary adder / subtractor using logic gates.
5. Design & Verify the truth tables of Multiplexer and De-Multiplexer.
6. Design & Verify the truth tables of Encoder and Decoder using logic gates.
7. Verify the truth table of Magnitude comparator.
8. Verify the functionality of RS & JK FF using NAND gates.
9. Design & Realize Shift Register.
10. Design & Realize Synchronous counters.

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(19EC0447) ANALOG ELECTRONIC CIRCUITS LAB

COURSE OBJECTIVES

The objectives of this course:

1. *Understand the student about feedback amplifiers, oscillators and applications of operational amplifiers.*
2. *Obtain the characteristics and design of feedback amplifiers, oscillators and applications of operational amplifiers.*

COURSE OUTCOMES

On successful completion of the course, students will be able to

1. *Demonstrate basic knowledge and perform analysis of analog electronic circuits for meeting defined specifications.*
2. *Design and identify the applications of feedback amplifiers, sinusoidal oscillators and applications of operational amplifiers in different electronic circuits.*
3. *Develop analog electronic circuits for various applications with given specifications.*
4. *Find suitable analog to digital and digital to converters using operational amplifiers to apply for real time applications.*
5. *Function effectively as an individual and as a member in a group in the area of electronic devices and circuits.*
6. *Develop skills to communicate verbally and in written form in the area of electronic devices and circuits.*

List of Experiments (Minimum of TEN experiments to be completed)

1. Voltage series feedback amplifier
2. Current series feedback amplifier
3. RC phase shift oscillator using BJT
4. Colpitts oscillator using BJT
5. Inverting Amplifier using OpAmp
6. Non Inverting Amplifier using OpAmp
7. Differentiator using OpAmp
8. Integrator using OpAmp
9. Active Low pass filter using OpAmp
10. Active High pass filter using OpAmp.
11. Weighted Resistor DAC using OpAmp

12. R-2R Ladder DAC using OpAmp

Additional Experiment:

13. PCB Design of a simple electronic device application

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(19EE0209) ELECTRICAL MACHINES-II LAB

COURSEOBJECTIVES:

The objectives of the course:

1. *To deal with the detailed analysis of polyphase induction motors & Synchronous generators and motors*
2. *To understand operation, construction and types of single phase motors and their applications in house hold appliances and control systems.*
3. *To introduce the concept of parallel operation of synchronous generators.*
4. *To introduce the concept of regulation and its calculations*

COURSE OUTCOMES:

1. *Identify different parts of transformers and induction motors and specify their functions.*
2. *Determination of losses and efficiency of transformer.*
3. *Understand the operation of transformers and induction motors.*
4. *Carry out different testing methods and assess the performance of transformers. and induction motors*
5. *Start and control the induction motor*
6. *Determination of regulation of synchronous machine*

LISTOFEXPERIMENTS

1.O.C. &S.C.Testson Single phase Transformer.

2.Sumpner"sTestonaPairofidentical Single Phase Transformers

3.Scott Connection of Transformers

4. No-Load& Blocked Rotor Tests on Three Phase Induction Motor

5. Regulation of Three-Phase Alternator by Synchronous Impedance & M.M.F Methods

6. V and Inverted V Curves of 3Phase Synchronous Motor.

7.Equivalent Circuit of Single Phase Induction Motor

8.Determination of X_d and X_q of Salient Pole Synchronous Machine

9.Separation of Core Losses of Single Phase Transformer

10. Brake Test on Three Phase Induction Motor

11. Regulation of Three-Phase Alternator by Z.P.F. and A.S.A Methods

12.Load Test on Single Phase Transformer

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(19HS0817) ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

COURSE OBJECTIVES

The objectives of this course:

1. *To impart basic principles of thought process, reasoning and inference.*
2. *To connect society and nature through sustainability.*
3. *To know Holistic life style of yogic science and wisdom capsules in Sanskrit literature.*
4. *To introduce Indian knowledge system and Indian perspective of modern scientific world-view*
5. *To learn the basic principles of Yoga and holistic health care system.*

COURSE OUTCOMES (COs)

On successful completion of this course, the student will be able to

1. *Connect up the basic principles of thought process.*
2. *Understand Holistic life style of yogic science and wisdom capsules in Sanskrit literature.*
3. *Analyze the society and nature through sustainability.*
4. *Explain Indian knowledge system and Indian perspective of modern science.*
5. *Use the basic principles of Yoga and holistic health care system.*
6. *Apply the holistic health care system.*

UNIT – I

Basic structure of Indian Knowledge System: 4 ved- 4 Upaved (Ayurved, Dhanurved, Gandharva Ved & Sthapthya Adi.,)

UNIT – II

6 Vedanga (Shisha, Kalppa, Nirukha, VYkaran, Jyothish & Chand)-4 Upanga (Dharma Shastra, Meemamsa, Purana & Tharka Shastra)

UNIT – III

Modern Science and Indian Knowledge System-Yoga and Holistic Health care

UNIT – IV

Philosophical Tradition (Nyaya, ,Sankhya, Yog, Jain & Boudha)-Indian Linguistic Tradition -(Phonology, morphology, syntax and semantics)

UNIT – V

Indian Artistic Tradition - Chitra kala,Vasthu kala, Sangeetha, Nruthya Sahithya -Case studies

Text Books:

1. V. Sivaramakrishnan (Ed.), *Cultural Heritage of India-course material*, Bharatiya Vidya Bhavan, Mumbai. 5th Edition, 2014
2. S.C. Chaterjee & D.M. Datta, *An Introduction to Indian Philosophy*, University of Calcutta, 1984

REFERENCES

1. VN Jha (Eng. Trans.), *Tarkasangraha of Annam Bhatta*, International Chinmay Foundation, Velliarnad, Arnakulam
2. Ramakrishna Mission *Yoga Sutra of Patanjali*, Kolkata GN Jha (Eng. Trans.), Ed. RN Jha, *Yoga-darshanam with Vyasa Bhashya*, Vidyanidhi Prakashan, Delhi 2016
3. RN Jha, *Science of Consciousness Psychotherapyand Yoga Practices*, Vidyanidh Prakashan, Delhi 2016
4. Krishna Chaitanya, *Arts of India*, Abhinav Publications, 1987

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(19EE0210) POWER ELECTRONICS

COURSE OBJECTIVES:

The objectives of this course:

1. *To provide the students a deep insight in to the working of different switching devices with respect to their characteristics.*
2. *To analyze different converters and control with their applications.*
3. *To study advanced converters and switching techniques implemented in recent Technology*
4. *To study the applications of Power electronic conversion to domestic, industrial, aerospace, commercial and utility systems etc.*
5. *To study the various power conversion methods, controlling and designing of power converters.*

COURSE OUTCOMES:

After completing the course, the student should be able to do the following:

1. *Design of power electronic converters in power control applications.*
2. *Basic operating principles of power semiconductor switching devices*
3. *Ability to express characteristics of SCR, BJT, MOSFET and IGBT.*
4. *Ability design AC voltage controller and Cyclo Converter.*
5. *Ability to design Chopper circuits.*
6. *Ability to know the operation of power electronic converters, choppers, inverters, AC voltage controllers, and cyclo converters, and their control.*

UNIT-I

SWITCHING DEVICES

Diode, Thyristor, MOSFET, IGBT: I-V Characteristics; Firing circuit for thyristor; Voltage and current commutation of a thyristor.

UNIT-II

RECTIFIERS

Single-phase half-wave and full-wave rectifiers with R-load, and inductive load; Single-phase and three phase fully controlled-bridge rectifier with R-load and inductive load;

UNIT-III

CHOPPERSDC-DC Buck converter: Elementary chopper with an active switch and a diode, concepts of duty ratio and average voltage, power circuit of a buck converter, analysis and waveforms at steady state, duty ratio control of output voltage

DC-DC Boost converter

Power circuit of a boost converter, analysis and waveforms at steady state, relation between duty ratio and average output voltage.

UNIT-IV

CYCLO CONVERTERS

Cyclo Converters – Single Phase Mid-Point Cycloconverters with Resistive and Inductive Load (Principle of Operation only) – Bridge Configuration of Single Phase Cycloconverter (Principle of Operation only) – Waveforms

UNIT V

AC VOLTAGE CONTROLLERS

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–Firing Circuit.

TEXT BOOKS:

1. M.H. Rashid *Power electronics: circuits devices, and applications*, Fourth edition
   Pearson Education India, 2017.
2. N. Mohan and T. M. Undeland, *Power Electronics: Converters, Applications and Design*, Third edition, John Wiley & Sons, 2007.

REFERENCES:

1. R. W. Erickson and D.Maksimovic, *Fundamentals of Power Electronics* , springer Science & Business Media, 2020.
2. L. Umanand, *Power Electronics: Essentials and Applications*, Wiley India,2000

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(19EE0211) ELECTRICAL POWER GENERATION & TRANSMISSION SYSTEMS

COURSE OBJECTIVES:

The objectives of the course are to make the students learn about:

1. *Structure, essential components and their layout in thermal power station*
2. *Selection of site for thermal power station and hydro power generation*
3. *Types of conductors and calculation of inductance and capacitance of transmission lines*
4. *Concepts of short, medium and long transmission lines performance*
5. *Concepts of corona, sag and tension of transmission lines*

COURSE OUTCOMES:

After completing the course, the student should be able to

1. *Understand generation of electrical power in thermal power stations*
2. *Understand generation of electrical power through hydro and nuclear with neat sketches*
3. *Calculate inductance and capacitances of various types of transmission lines for symmetrical and asymmetrical spacing*
4. *4.Determine regulation and efficiency of short, medium and long transmission lines*
5. *5.Understand various types of insulators and materials for transmission lines*
6. *Understand the effects of corona, sag and tension in the transmission lines*

UNIT I

THERMAL POWER GENERATING SYSTEMS: Block Diagram of Thermal Power Station (TPS) showing paths of Coal, Steam, Water, Air, Ash and Flue Gasses, Brief Description of TPS Components: Economizers, Boilers, Super Heaters, Turbines, Condensers, Chimney and Cooling Towers.

Hydro Power: Selection of Site, Classification, Layout, Description of Main Components.

UNIT II

NUCLEAR POWER GENERATING SYSTEMS:

Nuclear Fission and Chain Reaction, Nuclear Fuels, Principle of Operation of Nuclear Reactor, Reactor Components: Moderators, Control Rods, Reflectors and Coolants, Radiation Hazards: Shielding and Safety Precautions, Types of Nuclear Reactors and Brief Description of PWR, BWR and FBR.

UNIT III

TRANSMISSION LINE PARAMETERS

Types of Conductors: ACSR, Bundled and Standard Conductors, Resistance for solid conductors Skin effect, Calculation of Inductance for Single Phase and Three Phase, Single and Double Circuit Lines, Concept of GMR and GMD, Symmetrical and Asymmetrical Conductor Configuration with and without Transposition, Capacitance Calculations for Symmetrical and Asymmetrical Single and Three Phase, Single and Double Circuit Lines, Effect of Ground on Capacitance.

UNIT IV

TRANSMISSION LINES

Classification of Transmission Lines-Short, medium and long transmission line and their model representations - Nominal-T, Nominal-Pie and A, B, C, D Constants. Mathematical Solutions to estimate regulation and efficiency of all types of lines, long transmission line-rigorous method-evaluation of A, B, C, D Constants-surge Impedance and surge Impedance loading Ferranti effect.

UNIT V

OVERHEAD LINE INSULATORS, SAG & TENSION

OVERHEAD LINE INSULATORS: Types of Insulators, String Efficiency and its Improvement Methods. **Corona**: Corona Phenomenon, Electric stress, Corona Discharge, Factors Affecting Corona, Critical Voltages and Power Loss, Radio Interference, Advantages and disadvantages of corona.

SAG AND TENSION

Introduction to Sag and Tension, Definitions of Sag and Tension, Calculations with Equal and Unequal Heights of Towers, Effect of Wind and Ice on Weight of Conductor.

TEXT BOOKS:

1. .L.Soni, P.V.Gupta, U.S.Bhatnagar and A.Chakraborti *A Text Book on Power System Engineering* , Dhanpat Rai & Co. Pvt. Ltd., 1999.
2. C.L Wadhwa *Electric Power Generation Distribution and Utilization,* New Age International (P) Ltd., 2005.

REFERENCES:

1. S.N.Singh *Electrical Power Generation, Transmission and Distribution*., PHI, 2003.
2. V.K Mehta and Rohit Mehta *Principles of Power Systems by* S.Chand & Company Ltd,2004
3. Turan Gonen *Electric Power Transmission System Engineering: Analysis and Design,,* 2nd Edition, CRC Press, Taylor & Francis group, 2009, 1st Indian Reprint 2010

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(19EE0212) CONTROL SYSTEMS

COURSE OBJECTIVES:

The objectives of the course are to make the students learn about:

1. *To make the students familiarize various representations of systems.*
2. *To make the students analyze the stability of linear systems in time domain and frequency domain.*
3. *To make the students analyze the stability of linear systems in frequency domain.*
4. *To make the students design compensator based on the time and frequency domain Specifications.*
5. *To develop linear models mainly state variable model and Transfer function model*

COURSE OUTCOMES:

After completing the course, the student should be able to

1. *Identify open and closed loop control system*
2. *Represent simple systems in transfer function and state variable forms.*
3. *Analyse simple systems in time domain.*
4. *Analyse simple systems in frequency domain.*
5. *Infer the stability of systems in time and frequency domain.*
6. *Interpret characteristics of the system and find out solution for simple control problems*

UNIT I
SYSTEMS AND REPRESENTATION

Control systems: –Open and closed loop systems –First principle modeling: Mechanical, Electrical and Electromechanical systems - Transfer function representations: Block diagram –Signal flow graph

UNIT II
TIME DOMAIN ANALYSIS

Time Response Analysis - Standard test input signals–Time response - Time domain specifications, Transient and steady state response of first and second order systems- Error constants, Steady state error and generalized error constants–– Proportional, integral and derivative Controllers.

UNIT III
STABILITY ANALYSIS

Stability analysis: Concept of stability– Routh Hurwitz stability criterion– Root locus: Construction and Interpretation. Effect of adding poles and zeros

UNIT IV

FREQUENCY DOMAIN ANALYSIS

Frequency Response Analysis: Frequency domain specifications, Frequency response plots - Bode Plots, Polar plots, Nyquist Plots, Gain margin and Phase margin – Stability Analysis. Lead, Lag and Lag-lead compensators.

UNIT V

STATE SPACE ANALYSIS

State, state variables and state model, diagonalization, solution of state equations- State transition matrix and its properties. Concept of controllability and observability.

TEXT BOOKS:

1. Benjamin C. Kuo, *"Automatic Control Systems"*, 7th edition PHI Learning Private Ltd, 2010.
2. Nagarath, I.J. and Gopal, M., *"Control Systems Engineering"*, New Age International Publishers 2010.

REFERENCES:

1. Richard C.Dorf and Bishop, R.H., *"Modern Control Systems"*, Education Pearson, 3 Impression 2009.
2. John J.D., Azzo Constantine, H. and Houpis Sttuart, N Sheldon , *"Linear Control System Analysis and Design with MATLAB"*, CRC Taylor& Francis Reprint 2009.
3. Katsuhiko Ogata, *"Modern Control Engineering"*, PHI Learning Private Ltd, 5thEdition, 2010
4. NPTEL Video Lecture Notes on *"Control Engineering" by Prof.S.D.Agashe*, IIT Bombay

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(19EE0213) ELECTRICAL MEASUREMENTS

COURSE OBJECTIVES:

The objectives of this course are to make the students learn:

1. *The basic principles of all measuring instruments, different types of torques in measuring instruments.*
2. *How to deal with the measurement of voltage, current, extension of range of ammeters and voltmeters.*
3. *The construction and working of different AC and DC bridges and its applications*
4. *How to measure large currents and voltages, power and energy.*

COURSE OUTCOMES:

After successful completion of the course, student will be

1. *Able to develop an understanding of construction and working of different measuring instruments*
2. *Able to develop an understanding of construction and working of different AC and DC bridges and its applications*
3. *Familiar with C.T and P.T and its applications*
4. *Familiar with various measuring instruments used to detect electrical quantities such as power and energy.*
5. *Able to measure magnetic measurements.*
6. *Able to measure Phase, Frequency, Current and Voltage by using CRO.*

UNIT I

MEASURING INSTRUMENTS: Classification – Ammeters and Voltmeters – PMMC, Dynamometer type, Moving Iron Type Instruments – Expression for the Deflecting Torque and Control Torque – Errors and Compensations, Range Extension of Ammeters and Voltmeters, Aryton Shunt. Electrostatic instruments- Principle of operation, Quadrant type electrostatic voltmeter, attracted disc type Kelvin absolute Electrometer.

UNIT II

DC BRIDGES & AC BRIDGES: DC BRIDGES: Bridge Balance condition, Methods of Measuring Low, Medium and High Resistance – Sensitivity of Wheatstone Bridge – kelvin and Kelvins double bridge, Loss of Charge Method, Problems.

AC BRIDGES: Measurement of Inductance – Maxwell's Bridge, Anderson Bridge. Measurement of Capacitance and Loss Angle - De Sauty Bridge. Wien's Bridge – Schering Bridge, Problems.

UNIT III

MEASUREMENT OF POWER AND ENERGY: Single Phase Dynamometer Wattmeter, Double Element and Three Element dynamometer type Wattmeter, Expression for Deflecting and Control Torques. Single Phase Induction Type Energy Meter–Driving and Braking Torques –Errors and Compensations. Three Phase Energy Meter.

UNIT IV

INSTRUMENT TRANSFORMERS & TRANSDUCERS:

Current Transformers & Potential Transformers: Construction, Principle of operation and characteristics.

TRANSDUCERS: Definition of Transducers, Classification of Transducers, Advantages of Electrical Transducers, Characteristics and Choice of Transducers; Principle of Operation of Resistive, Inductive, Capacitive Transducers, LVDT, Strain Gauge and its Principle of Operation, Gauge Factor, Thermistors, Thermocouples, Piezo electric Transducers, Photovoltaic, Photo Conductive Cells, Photo Diodes.

UNIT V

MAGNETIC MEASUREMENTS:

Ballistic Galvanometer – Equation of Motion – Flux Meter – Constructional Details, Comparison with Ballistic Galvanometer. Cathode Ray Oscilloscope- Cathode Ray tube- – Application of CRO -Measurement of Phase, Frequency, Current & Voltage- Lissajous Patterns.

TEXT BOOKS:

1. A.K. Sawhney *Electrical & Electronic Measurement & Instruments*, Dhanpat Rai & Co. Publications, 2007.
2. E.W. Golding and F.C. Widdis *Electrical Measurements and measuring Instruments*, 5th Edition, Reem Publications, 2011.

REFERENCES:

1. U.A. Bakshi, A.V. Bakshi& K.A. Bakshi *Electrical measurements*, Technical publications, Pune.
2. R. K. Rajput *Electrical & Electronic Measurement & Instrumentation*, 2nd Edition, S. Chand & Co., 2nd Edition, 2013.
3. Reissland, M.U *Electrical Measurements: Fundamentals, Concepts, Applications*, New Age International (P) Limited, 2010.
4. Buckingham and Price *Electrical Measurements*, Prentice – Hall, 3rd Edition, 1970.

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(19CE0129) ELEMENTS OF ROAD TRAFFIC SAFETY
(Open Elective-III)

COURSE OBJECTIVES

The objectives of this course are to make the students learn:

1. *To understand the accident statistics globally and in India specifically, its causes and measures to overcome the situation.*
2. *The traffic regulation, parking problems, understanding of road signs, signals and marking are also taught; so that the student is well informed about all safety measures that a traffic engineer need to understand*
3. *To understand the various aspects of street lighting*

COURSE OUTCOMES (COs)

On successful completion of this course, the student will be able to

1. *Identify the causes for road accidents and can implement measures to prevent road accidents*
2. *Describe traffic regulations and implement parking methods*
3. *Classify different traffic signal and can design traffic signal system*
4. *List and illustrate various traffic signs*
5. *List and discuss various road markings*
6. *Discuss importance of street lighting and classify various street lighting system*

UNIT – I

Road Accidents – Causes & Prevention: Road Accidents & Traffic Engineering – Accident Situation in India – International Comparison of Road Accidents – Road & its Effects on Accidents – The Vehicle – The Driven – Skidding – Speed in Relation of Safety – Weather & its Effects on Accidents – Pedestrian Safety -Cyclists – Motor Cycle & Scooter Rider – Parking & Its Influence on Accident – Legislation, Enforcement, Education & Propaganda – Cost of Road Accidents

UNIT – II

Regulations of Traffic: Basic Principals of Regulation – Regulation of Speed – Regulation of Vehicles – Regulations Concerning the Driver – Regulations Concerning Traffic – Parking Regulations – Enforcement of Regulations.

Parking: Traffic & Parking Problems – Ill-Effects of Parking – Zoning & Parking Space Requirement Standards – Design Standards for On-Street Parking Facilities – Traffic Regulatory Measures for On-Street Parking – Off-Street Parking Facilities – Peripheral Parking Schemes – Loading & Unloading Facilities – Truck Terminals – Long Distance Bus Terminals

UNIT – III

Traffic Signs: Importance of Traffic Signs – Need for International Standardization – The Situation in India – General Principals of Traffic Signing – Types of Traffic Signs – Danger Signs (Warning Signs or Cautionary Signs) – Prohibitory Signs – Mandatory Signs – Informatory Sings – Indication Signs – Direction Signs, Advance Direction Signs & Place Identification Signs – Overhead Sings – Route Marker Sings – Location, Height& Maintenance of Traffic Sings

UNIT – IV

Traffic Signals: Advantages & Disadvantages of Traffic Signals – Signal Indications – Signal Face – Illustration of the Signals – Number & Location of Signals Faces – Amber Period, Red/Amber Period & Inter Green Period – Fixed Time Signals & Vehicle Actuated Signals – Determination of Optimum Cycle Length & Signal Settings for an Intersection with Fixed Time Signals – Warrants for Signals – Co-ordinated Control of Signals – Signal Approach Dimensions – Area Traffic Control – Delay at Signalized Intersection

UNIT – V

Road Markings: Function – Types of Road Marking – General Principals of Longitudinal Pavement Markings – Material &Colour – Centre Lines – Traffic Lane Lines – No Overtaking Zone Markings – Pavement Edge Lines – Carriageway Width Reduction Transition Marking – Obstruction Approach Markings – Stop Lines – Pedestrian Crossings – Cyclist Crossings – Route Direction Arrows – Word Messages – Markings at Approaches to Intersections – Parking Space Limits – Object Markings

Street Lighting: Need for Street Lighting – Definition of Common Terms – Some Laws of Illumination – Mounting Height – Spacing – Lantern Arrangements – Type of Lamps – Lamp Installation of 'T' Junctions & Cross Roads – Illumination of Traffic Rotaries – Lighting of Bends – Lighting of Dual Carriageways – Lighting of Roads Carrying Only Local Traffic – Lighting Bridges – Tunnel Lighting – Maintenance of Lighting Installation

TEXTBOOKS

1. L.R.Kadiyali and Lal, *Traffic Engineering and Transportation Planning*, Khanna Publications, 9th edition, 1999
2. S.K.Khanna &C.E.G. Justo, *Highway Engineering*, Published by Nemchand & Bros,10th edition, 2012

REFERENCES

1. L.R.Kadiyali and Lal, *Principles and Practice of Highway Engineering Design*, Khanna Publications, 7th edition, 2013
2. R.Srinivasa Kumar,*Text book of Highway Engineering*, Universities Press
3. James H Banks, *Introduction to Transportation Engineering*, Tata McGraw hill Publications, 2nd edition.

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(19ME0321) NON-CONVENTIONAL ENERGY RESOURCES
(Open Elective-III)

COURSE OBJECTIVES

The objective of the course is to

1. *To Know the importance of energy, resources of renewable energy, their usage and impact on environment.*
2. *Recognize the significance of Solar energy, its harnessing technologies& its applications*
3. *Identify the method of exploiting energy from wind and parameters to be considered for the selection of site for wind turbine installation*
4. *Explain the concept of bio energy and its conversion devices*
5. *Differentiate various renewable energies such as tidal energy, geothermal energy, fuel cells etc.*

COURSE OUTCOMES

On successful completion of the course, the student will be able to

1. *State various sources of Energies, its availability and explain the importance of them by observing the global energy scenario.*
2. *Distinguish the types of solar energy tapping devices and describe the method of harnessing the solar energy.*
3. *Summarize the Wind energy systems and elucidate the impact of it in environmental aspects.*
4. *Describe the Biomass conversion process and list out various bioenergy applications.*
5. *Interpret the knowledge of renewable energies such as tidal energy, OTEC, Fuel cell, etc. for effective construction of Hybrid systems.*
6. *Identify numerous applications renewable energy resources and illustrate its harnessing technologies*

UNIT-I

Introduction: Energy- World Energy use – Classification of Energy's- Reserves of Energy Resources–Environmental Aspects of Energy Utilization

Renewable energy: Need Of Renewable Energy–Renewable Energy Scenario in Andhra Pradesh, India and Around the World.

UNIT-II

Solar thermal conversion: Flat Plate and Concentrating Collectors – Solar direct Thermal Applications–Solar thermal Power Generation

Photo voltaic Conversion: Fundamentals of Solar Photo Voltaic Conversion – Solar Cells – Solar PV Power Generation – Solar PV Applications, Solar Radiation Measurements

UNIT-III

Wind Energy: Wind Formation -Site Selection For Wind Turbine - Working Principle of Wind Turbine

Wind Energy System: Types of Wind Energy Systems – Performance – Details of Wind Turbine–Wind Energy Measurement, Safety and Environmental Aspects.

UNIT-IV

Bio – Energy: Biomass direct combustion – Biomass gasifiers – Biogas plants

Bio Fuel: Ethanol production – Biodiesel – Cogeneration - Biomass Applications

UNIT-V

Other Sources of Energy: Tidal energy – Wave Energy – Open and Closed OTEC Cycles, Geothermal Energy

Hydrogen Fuel: Hydrogen production and Storage - Fuel Cell Systems – Hybrid Systems.

TEXT BOOKS

1. R.K.Rajput , *Non-conventional Energy Sources and Utilization,*S. Chand Publishers, 2nd Edition, 2014.
2. G. D Rai,*Non-Conventional Energy Sources*,Khanna Publishers, 1st Edition, 2010.
3. Nicholas Jenkins &JanakaEkanayake, *Renewable Energy Engineering*, Cambridge University Press; 1st Edition, 2017.

REFERENCES

1. Dr. R K Singal, *Non-Conventional Energy Resources*, S.K Kataria& Sons,4thEdition, 2014.
2. John Twidell& Tony Weir, *Renewable Energy Sources*, Routledge publisher, 3rd Edition, 2015.
3. Sukhatme. S.P, *Solar Energy, Principles of Thermal Collection and Storage*, Tata McGraw Hill Publishing Company Limited, 6thEdition, 1990.

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(19EC0450) INTRODUCTION TO IOT
(Open Elective-III)

COURSE OBJECTIVES

The objective of the course is to

1. *To provide an overview on the ICT ecosystem and enabling environment to foster Internet of Things (including technology, standards, system management and applications) deployments.*
2. *Define the infrastructure for supporting IoT deployments.*
3. *To provide an understanding of the technologies and the standards relating to the Internet of Things.*
4. *Understand various case studies related to IoT domain.*

COURSE OUTCOMES

On successful completion of this course, student will be able to

1. *Understand the technology and standards relating to IoTs.*
2. *Understand where the IoT concept fits within the broader ICT industry and possible future trends.*
3. *Understand the key components that make up an IoT system.*
4. *Differentiate between the levels of the IoT stack and be familiar with the key technologies and protocols employed at each layer of the stack.*
5. *Configure Raspberry Pi, Understand Sensors, Actuators & get started with python on Raspberry Pi.*
6. *Apply the knowledge and skills acquired during the course to design, build and test a complete, working IoT system involving prototyping, programming and data analysis*

UNIT –I

IOT INTRODUCTION & CONCEPTS: Introduction to Internet of Things - Physical Design of IoT - Logical Design of IoT - IoT Enabling Technologies - IoT Levels & Deployment Templates.

UNIT – II

DOMAIN SPECIFIC IOTs: Home Automation – Cities – Environment – Energy – Retail – Logistics - Agriculture – Industry - Health & Lifestyle.

UNIT –III

IOT AND M2M: Introduction – M2M – Difference between IoT an M2M - Software Defined Networking - Network Function Virtualization for IoT.

DEVELOPING INTERNET OF THINGS: IoT Design Methodology – Motivation for using Python

UNIT –IV

IOT PHYSICAL DEVICES & ENDPOINTS: IoT Device – Raspberry Pi Board - Linux on Raspberry Pi – Raspberry Pi Interfaces – Programming raspberry Pi with Python – Other IoT devices.

UNIT –V

CASE STUDIES ILLUSTRATING IOT DESIGN: Home Automation – Cities – Environment – Agriculture – Productivity applications.

TEXT BOOKS

1. Vijay Madisetti – Arshdeep Bahga, *Internet of Things a Hands-on Approach*,1st Edition, 2014.
2. Pethuru Raj and Anupama C. Raman, *The Internet of Things: Enabling Technologies, Platforms, and Use Cases*, CRC Press,1stEdition, 2014.

REFERENCES

1. Raj Kamal, *Embedded Systems*, Tata McGraw-Hill Education, 2ndEdition, 2011.
2. Adrian McEwen & Hakim Cassimally, *Designing of Internet of Things*, John Wiley and sons Ltd, 1st Edition, 2014,
3. Daniel Kellmereit - Daniel Obodovski, *The Silent Intelligence: The Internet of Things*, DnD Ventures, 1st Edition,2013.

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(19CS0545) SOFTWARE DEVELOPMENT & TESTING
(Open Elective-III)

COURSE OBJECTIVES

The objectives of this course is to

1. *Illustrate the Software Development Models*
2. *Explain Software Requirements Engineering Process and SRS document*
3. *Illustrate the importance of modeling and modeling languages*
4. *Explain various testing methodologies*
5. *Explain Quality assurance and test cases*

COURSE OUTCOMES

On successful completion of the course, the students will be able to

1. *Define and develop as software project from requirement gathering to implementation*
2. *Compute the code and test the software*
3. *Demonstrate the plan, estimate and maintain software systems*
4. *Understand the basic testing procedures*
5. *Interpret the test cases and test suites*
6. *Test the applications manually by applying different testing methods and automation tools*

UNIT-I

Introduction: Introduction to Software Engineering , Software Process, Software Myths, A generic view of process, A layered Technology, A Process Framework, Software Process Models, Unified process

Introduction to Agility: Agility, Agile Process, Agile Process Models

UNIT-II

Requirements Analysis and Specification: Requirements Engineering, Eliciting Requirements, Requirements Analysis, Types of Requirements, Requirement Modeling and Data Modeling concepts.

Architectural Design Concepts: The Design Process, Design Concepts, Design Model, Software Architecture, Architecture Styles.

UNIT-III

User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps.

Web App Design: Introduction, Web App Interface Design, Aesthetic Design, Content Design, Architecture Design, Navigation Design, Component-Level Design

UNIT-IV

Software Testing: Introduction, Levels of Software Testing– Unit Testing, Module Testing, Integration Testing, System Testing, Acceptance Testing, Alpha Testing, Beta Testing,

Approach to Software Testing: Types of Software Testing - Black Box Testing, White Box Testing, Test Strategies for Conventional Software, Test Strategies for Object-Oriented Software, Art of Debugging.

UNIT-V

Software Quality: Software Testing Life Cycle, Software Quality, Testing Principles, Test Process –Testing Activities, Quality Assurance.

Software Test Cases: Introduction to Test cases, Test Case Selection – Test Planning and Design –Test Execution Case Study on Test tools and automation.

TEXT BOOKS

1. Roger S.Pressman, *Software Engineering- A practitioner's Approach*, McGraw-HillInternationalEdition, seventh edition, 2001.
2. Software Testing techniques, Boris Beizer, Dreamtech, Second Edition

REFERENCES

1. Ian Sommerville, *Software Engineering*, 8th Edition, Pearson Education, 2008.
2. Richard Fairley, *Software EngineeringConcepts* , McGraw Hill, 2004.
3. Dr.K.V.K.K.Prasad, *Software Testing Tools*, Dreamtech.

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(19HS0861) BUSINESS ETHICS
(Open Elective-III)

COURSE OBJECTIVES

The objectives of this course is to

1. *To provide basic knowledge of business ethics, personal ethics and values in modern context*
2. *To learn and develop best ethical practices in management disciplines to become good managers*
3. *To make them learn role of corporate culture and corporate governance*

COURSE OUTCOMES

After the completion of course Students will be able to:

1. *Apply various ethical principles in business and corporate social responsibility practices*
2. *Recognize how personal ethics can influence behavior and apply in decision making*
3. *Explain the ethical challenges facing the various functional departments*
4. *Identify the organizational and cultural variables that impact ethical judgment*
5. *Analyze various ethical codes in corporate governance*
6. *Identify organizational policies and systems that employ ethical conduct*

UNIT - I

BUSINESS ETHICS: Introduction – Meaning - Scope – Types of Ethics – Characteristics – Factors influencing Business Ethics – Importance of Business Ethics - Arguments for and against business ethics- Basics of business ethics - Corporate Social Responsibility – Issues of Management – Crisis Management

UNIT - II

PERSONAL ETHICS: Introduction – Meaning – Emotional Honesty – Virtue of humility – Promote happiness – karma yoga – proactive – flexibility and purity of mind.

UNIT - III

ETHICS IN MANAGEMENT - I

Introduction – Ethics in HRM – Ethics in HRM: Selection, Training and Development – Ethics at work place – Ethics in performance appraisal - Marketing Ethics – Technology Ethics and Professional ethics.

UNIT - IV

ETHICS IN MANAGEMENT –II: Ethics in Finance: Insider trading - ethical investment - Ethical issues in Information Technology: Information Security and Threats- Intellectual Property Rights Cyber crime

UNIT –V

ROLE OF CORPORATE CULTURE IN BUSINESS: Meaning Functions – Impact of corporate culture cross cultural issues in ethics - Modern Ethical Models for Decision Making, Ethics for manager, ethics in business competition

TEXT BOOKS:

1. Murthy CSV: Business Ethics and Corporate Governance, HPH, 2007
2. Dr. K. Nirmala, Karunakara Readdy : Business Ethics and Corporate Governance, HPH

REFERENCES

1. M.G. Velasquez, *Business Ethics*, Prentice Hall India Limited, New Delhi, 7TH Edition,2012
2. Dr. K. Nirmala, Karunakara Readdy : Business Ethics and Corporate Governance, HPH
3. K. Venkataramana, Corporate Governance, SHBP, 2018.

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(19EE0214) POWER ELECTRONICS AND SIMULATION LAB

COURSE OBJECTIVES

The student has to learn about:

1. *To analyze various characteristics of power electronic devices with gate firing circuits*
2. *To learn the operation of single-phase half & fully-controlled converters, and inverters with different types of loads*
3. *To understand the operation of single-phase AC Voltage controllers with different loads*
4. *To learn various characteristics of power electronic converters*
5. *To control power electronic components by using dSPACE 1104 kit*

COURSE OUTCOMES

The student should be able to do the following:

1. *Analyze various power electronic devices and their commutation circuits*
2. *Understand voltage and current characteristics of various converters and inverters at different firing angles*
3. *Analyze different types converters and inverters with different types of loads*
4. *Design current and speed controllers to control dc motor*
5. *Design DC-DC converter and regulated power supply*
6. *Understand the Characteristics of SCR, MOSFET & IGBT*

LISTOF EXPERIMENTS

Any EIGHT of the Experiments in Power Electronics Lab

1. Characteristics of SCR, MOSFET & IGBT
2. Gate Firing Circuits for SCR's
3. Single Phase AC Voltage Controller with R and RL Loads
4. Single Phase Fully Controlled Bridge Converter with R and RL Loads
5. Single Phase half Controlled Bridge Converter with R and RL Loads
6. Single Phase Inverter with R and RL Loads
7. Single Phase Cycloconverter with R and RL Loads
8. Three Phase Half Controlled Bridge Converter with R-Load
9. Single Phase Dual Converter with RL Loads
10. Design step down DC-DC converter (30V to 5V) using MC34063A IC.

Any TWO Experiments using dSPACE 1104 kit

1. Open loop speed control of DC motor using dSPACE 1104 kit
2. Closed loop speed control of DC motor using dSPACE 1104 kit
3. Generation of PWM pulse using dSPACE 1104 kit.

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(19EE0215) CONTROL SYSTEMS AND SIMULATION LAB

COURSE OBJECTIVES

The objectives of the course are to make the students learn about:

1. *The effects of feedback on system performance*
2. *Determination of transfer functions of DC Machine.*
3. *The design of controllers/compensators to achieve desired specifications.*
4. *The characteristics of servo mechanisms used in automatic control applications.*

COURSE OUTCOMES:

On successful completion of this course, the student will be able to

1. *Design the controllers/compensators to achieve desired specifications.*
2. *Understand the effect of location of poles and zeros on transient and steady state behavior of systems.*
3. *Assess the performance, in terms of time domain specifications, of first and second order systems.*
4. *Understand the effect of P,PD,PI,PID controllers on second order systems.*
5. *Use MATLAB/SIMULINK software for control system analysis and design.*
6. *Use MATLAB/SIMULINK software for state space model*

LIST OF EXPERIMENTS

Any EIGHT of the following experiments are to be conducted:

1. Time Response of Second Order System
2. Characteristics of Synchros
3. Programmable Logic Controller – Study and Verification of Truth Tables of Logic Gates, Simple Boolean Expressions and Application of Speed Control of Motor.
4. Effect of Feedback on DC Servo Motor
5. Transfer Function of DC Machine
6. Effect of P, PD, PI, PID Controller on Second Order Systems
7. Lag and Lead Compensation – Magnitude and Phase Plot
8. Temperature Controller Using PID
9. Characteristics of Magnetic Amplifiers
10. Characteristics of AC Servo Motor

Any TWO simulation experiments are to be conducted:

1. PSPICE Simulation of Op-Amp Based Integrator and Differentiator Circuits.
2. Linear System Analysis (Time Domain Analysis, Error Analysis) Using MATLAB.
3. Stability Analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant System Using MATLAB
4. State Space Model for Classical Transfer Function Using MATLAB –Verification.

TEXT BOOKS:

1. J. Nagrath and M. Gopal *Control Systems Engineering,* New Age International Limited, Publishers, 2nd edition. 2008
2. Nagoor Kani *Control Systems*, RBA Publications, Second Edition, 2009.

REFERENCES:

1. A. Anand Kumar *Control System*, Eastern Economy Edition -PHI learning Private Ltd. 2011
2. Benjamin C. Kuo, *Automatic Control Systems*, Wiley, 2014.

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(19EE0216) ELECTRICAL MEASUREMENTS LAB

COURSE OBJECTIVES:
The objectives of this course are to make the student learn:

1. *Calibration of various electrical measuring/recording instruments.*
2. *To determine the values of inductance and capacitance using a.c bridges.*
3. *To determine accurately the values of very low resistances.*
4. *Measurement of reactive power in 3-phase circuit using single wattmeter.*
5. *How to determine ratio error and phase angle error of CT.*

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. *Calibrate various electrical measuring/recording instruments.*
2. *Accurately determine the values of inductance and capacitance using a.c bridges.*
3. *Accurately determine the values of very low resistances.*
4. *Measure reactive power in 3-phase circuit using single wattmeter.*
5. *Determine ratio error and phase angle error of CT.*
6. *Understand the process of standardization*

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

1. Calibration and Testing of Single Phase Energy Meter
2. Calibration of Dynamometer Power Factor Meter
3. Crompton D.C. Potentiometer – Calibration of PMMC Ammeter and PMMC Voltmeter
4. Kelvins Double Bridge – Measurement of Resistance – Determination of Tolerance.
5. Measurement of % Ratio Error and Phase Angle of Given C.T. by Comparison.
6. Schering Bridge & Anderson Bridge.
7. Measurement of 3 Phase Reactive Power with Single-Phase Wattmeter.
8. Measurement of Parameters of a Choke Coil Using 3 Voltmeter and 3 Ammeter Methods.

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

9. Optical Bench – Determination of Polar Curve Measurement of MHCP of Filament Lamps
10. Calibration LPF Wattmeter – by Phantom Testing
11. Measurement of 3 Phase Power with Two Wattmeter Method (Balanced & Unbalanced).
12. Dielectric Oil Testing Using H.T. Testing Kit
13. LVDT and Capacitance Pickup – Characteristics and Calibration
14. 14. Resistance Strain Gauge – Strain Measurements and Calibration
15. Transformer Turns Ratio Measurement Using A.C. Bridge.
16. A.C. Potentiometer – Calibration of AC Voltmeter, Parameters of Choke.

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(19HS0858) HUMAN VALUES AND PROFESSIONAL ETHICS

COURSE OBJECTIVES:

The Objective of the course is to

1. *Create awareness on Human Values.*
2. *Impart knowledge on an Engineering Ethics*
3. *Instill morality, accountability in an engineering experimentation*
4. *Create awareness on an assessment of safety, risk and rights*
5. *Develop knowledge on global issues*
6. *Create an awareness on Human Values and Engineering Ethics, Engineers social responsibility in an experimentation, appreciate the rights of others and ethics in global issues.*

COURSE OUTCOMES:

On completion of the course the student will be able to

1. *Identify and analyze human values in their relevant field*
2. *Assess their own engineering ethics and have the social consciousness*
3. *Get knowledge on codes of ethics and on an utilitarian thinking*
4. *Identify safety, risks and an ethical concern in research and intellectual contexts*
5. *know necessity of computer and an environmental ethics, give a picture on weapons development*
6. *Upon completion of the course, the student should be able to apply the ethics in society, discuss an ethical issues related to engineering and realize the responsibilities and rights in the society*

UNIT I

Human Values - Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self-confidence – Character – Spirituality – Necessity of Yoga and meditation for professional excellence and stress management.

UNIT II

Engineering Ethics - Senses of Engineering Ethics Variety of moral issues –Types ofinquiry – Moral dilemmas – – Moral – Autonomy Kohlberg's theory Gilligan's theory Consensus and Controversy Models of professional roles - Theories about right action Self-interest Customs and Religion Uses of Ethical Theories

UNIT III

Engineering As Social Experimentation- Engineering as Experimentation--Engineering Projects VS. Standard Experiments, Engineers as responsible Experimenters– Conscientiousness- Comprehensive Perspective - Moral Autonomy - Accountability, Industrial Standards, Codes of Ethics – A Balanced Outlook on Law.

UNIT IV

Safety, Responsibilities and Rights- Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk, Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination

UNIT V

Global Issues-Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership –Code of Conduct – Corporate Social Responsibility

TEXTBOOKS:

1. R S Nagarajan, *Professional Ethics and Human Values*, New Age International (P) Limited Publishers,3rd Edition,2006
2. M.Govindarajan, S.Natarajananad, V.S.SenthilKumar,*Engineering Ethics includes Human Values* -PHI Learning Pvt. Ltd- 2nd Edition,2009.

REFERENCES:

1. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, *Engineering Ethics – Concepts and Cases*, Cengage Learning, 2nd Edition, 2009
2. John R Boatright, *Ethics and the Conduct of Business*, Pearson Education, New Delhi, 1st Edition,2003
3. Edmund G Seebauer and Robert L Barry, *Fundamentals of Ethics for Scientists and Engineers*, Oxford University Press, Oxford, 4th Edition,2001
4. PSR Murthy, *Indian Culture, Values and Professional Ethics*, BS Publication, 2nd Edition, 2013

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(19EC0421) MICROPROCESSORS AND MICROCONTROLLERS

COURSE OBJECTIVES

The objectives of this course:

1. *To understand the basic architecture of computer, evolution, and its applications*
2. *To learn the architectures of Microprocessor and Microcontroller*
3. *To learn the programming of Microprocessors and Microcontrollers using their programming model*
4. *To learn the interfacing of memory, I/O, sensors and actuators to microprocessors and microcontrollers*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Understand the evolution of computers, processors, and its applications*
2. *Explain the various software and hardware parts of a microprocessors and computer*
3. *Understand the architectures of 8085,8086 microprocessors and 8051 microcontroller system*
4. *Analyze the programming model of 8085,8086 Microprocessors & 8051 microcontroller development environment.*
5. *Implement the techniques of interfacing memories, various I/O devices, sensors and actuators with microprocessor and microcontrollers*
6. *Design and develop various microprocessor/microcontroller-based systems for the real-life problems*

UNIT – I

MICROPROCESSORS, MICROCOMPUTERS AND ASSEMBLY LANGUAGE: Microprocessors – Microprocessor instruction set and computer languages – From large computers to single chip microcontrollers – Application: Microprocessor controlled temperature system (MCTS)

MICROPROCESSOR ARCHITECTURE AND MICROCOMPUTER SYSTEMS: Microprocessor Architecture and its operation – Memory – Input and output devices – Example of a microcomputer system

UNIT – II

8085 MICROPROCESSOR ARCHITECTURE: The 8085 MPU - The 8085 Microprocessor, Microprocessor communication and bus timings, Demultiplexing the bus AD7-AD0, Generating control signals and A detailed look at the 8085 MPU and its architecture– Instruction, Data format and Data Storage – Overview of the 8085 Instruction set .

UNIT – III

THE 8051 ARCHITECTURE: Introduction – 8051 microcontroller hardware – Input/output pins, ports and circuits – External memory – Counters and timers – Serial data input/output - Interrupts

UNIT – IV

PROGRAMMING THE 8051: Addressing modes - Moving data – Logical operations – Arithmetic operations – Jump and call instructions

UNIT – V

APPLICATIONS: Introduction – Keyboards – Displays – D/A and A/D Conversion - Multiple interrupts

TEXT BOOKS

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, *Computer Organization*, McGraw Hill Eductaion Pvt. Ltd, 5th Edition, 2017.
2. Ramesh Gaonkar, *Microprocessor Architecture, programming and applications with the 8085*, Penram International Publications Pvt Ltd. 6th Edition, 2015.
3. Kenneth J Ayala, *The 8051 microcontroller*, Penram International Publications Pvt Ltd, 2nd Edition, 1997,

REFERENCES

1. Ray Bhurchandi, *Advanced Microprocessors & Peripheral interfacing*, MCgrawhill Publications, 3rd edition, 2012.
2. N.Senthil Kumar, M.Saravanan, S.Jeevanathan, *Microprocessor and Microcontrollers, Oxford Publishers*. 1st Edition, 2015.

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(19EE0217) POWER SYSTEM OPERATION AND CONTROL

COURSE OBJECTIVES:

The objectives of this course are to make the student learn:

1. *This subject deals with Economic operation of power systems.*
2. *To learn about Hydrothermal scheduling and Modeling of turbines.*
3. *To understand the operation of Automatic controllers.*
4. *It Emphasizes on Single area load frequency control, Two area load frequency control and Reactive power control.*

COURSE OUTCOMES:

After completion of the course, the student will able to:

1. *Apply the Lagrange's method to the economic dispatch of thermal units.*
2. *Develop the mathematical models of turbines and governors.*
3. *Address the load frequency control problem.*
4. *Explain the automatic generation control of a single area and two area system.*
5. *Explain how shunt and series compensation helps in reactive power control.*
6. *Explain the issues concerned with power system operation in competitive environment.*

UNIT I

ECONOMIC OPERATION

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 and problems.

UNIT II

HYDRO - THERMAL SCHEDULING

Optimal scheduling of Hydrothermal System: Hydroelectric power plant models, scheduling problems-Short term hydrothermal scheduling problem.

UNIT III

MODELING OF TURBINE AND GOVERNOR

Modeling of Turbine: First order Turbine model, Block Diagram representation of Steam Turbines and Approximate Linear Models. Modeling of Governor: Mathematical Modeling of Speed Governing System – Derivation of small signal transfer function – Block Diagram.

UNIT IV

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 2-area system – uncontrolled case and controlled case, tie-line bias control. Proportional plus Integral control of single area and its block diagram representation, steady state response.

UNIT V

REACTIVE POWER CONTROL & POWER SYSTEM RESTRUCTURING

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. Introduction – Need for Regulation – Motivation for Power System Restructuring – Key issues in Deregulation.

TEXT BOOKS

1. I.J.Nagrath & D.P.Kothari *Modern Power System Analysis* Tata M Graw – Hill Publishing Company Ltd, 2nd edition.
2. Sivanaga Raju & G.Sreenivasan *Power system operation and control* -Dorling Kindersley (India) pvt.ltd. Licensees of Pearson Education in south Asia.

REFERENCES

1. J.Duncan Glover and M.S.Sarma *Power System Analysis and Design* THOMPSON, 3rd Edition.
2. S. A. Schaum's Outline Series Nasar. *Electric Power Systems Revised 1st Edition,TMH*
3. O I Elgerd *Electric Energy Systems* Mc Graw-hill Edition.
4. S. N. Singh *Electric Power Generation, Transmission and Distribution* 2nd Edition, PHI.
5. Abhijit Chakrabarti, D. P. Kothari, A. K. Mukhopadhyay and Abhinanda *Reactive Power Control and Voltage Stability in Power Transmission Systems by De*, Eastern Economy Edition, 2010.

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(19EE0218) POWER SYSTEM ANALYSIS

COURSE OBJECTIVES

The objectives of this course:

1. *To learn concepts of Y bus and Z bus formation of power system network*
2. *To understand power flow studies of power system network*
3. *To learn short circuit analysis of power systems*
4. *To study swing equation and its solution*
5. *To learn equal area criterion and its applications*

COURSE OUTCOMES (COs)

On successful completion of this course, the student will be able to

1. *Determine of Y bus and Z bus oof a given power systems network*
2. *Make fault calculations for various types of faults*
3. *Conduct load flow studies of a power system network.*
4. *Compare various power system load flow solution methods*
5. *Understand concepts of transient, dynamic and steady state stabilities*
6. *Understand equal area criterion and its applications*

UNIT- I
POWER SYSTEM NETWORK MATRICES

Representation of power system elements-Graph Theory-Bus Incidence matrix-Y bus formation by direct and singular transformation methods-numerical problems. Formation of Z bus. Algorithm for modification of Z bus matrix for addition of element for the following cases: Addition of element from a new bus to reference-addition of element from a new bus to old bus-addition of element between an old bus to reference and addition of element between two old buses.

UNIT- II
SHORT CIRCUIT ANALYSIS

Per Unit system representation–Per Unit equivalent reactance network of a three-phase power system. Symmetrical Fault Analysis: short circuit current and MVA calculations-fault levels - application of series reactors. Symmetrical component theory: Symmetrical component transformation –positive -negative and zero sequence components-voltages-currents and impedances. Sequence networks-positive, negative and zero sequence networks-Unsymmetrical Fault Analysis: LG-LL-LLG faults with and without fault impedance.

UNIT- III

POWER FLOW STUDIES-I

Necessity of power flow studies- Data for power flow studies – Derivation of static load flow equations- Load Flow Solutions using Gauss Siedel Method – acceleration factor – load flow solution with and without PV buses- Algorithm and flow chart. Numerical load flow solution for a power system network (maximum 3 buses). Determination of bus voltages – injected active and reactive powers and losses for the given bus voltages.

UNIT- IV

POWER FLOW STUDIES-II

Newton Raphson method in rectangular and polar co-ordinates form – load flow solution with or without PV buses- Determination of Jacobian elements – Algorithm and Flow Chart-numerical problems-Decoupled and Fast Decoupled methods-Comparison of load flow methods.

UNIT- V

POWER SYSTEM STABILITY ANALYSIS

Concepts of steady state-dynamic and transient stabilities–steady state stability power limit transfer reactance -synchronizing power coefficient -power angle curve-methods to improve steady state stability-Swing Equation –Determination of transient stability by Equal Area criterion- Application of Equal Area Criterion. Solution of swing equation- methods to improve stability.

TEXT BOOKS

1. Grainer and Stevenson *Power System Analysis — Tata Mc Graw Hill,2005.*
2. I.J.Nagarath & D.P.Kothari *Modern Power System Analysis–TMH,2003,2nd edition.*

REFERENCES

1. M.A.Pai,TMH *Computer Techniques in Power System Analysis -2005,2nd Edition.*
2. K.Uma Rao *Computer Techniques and Models in Power Systems, -I.K.International*
3. S A Nasar, Schaum's Outline Series *Electrical Power Systems*- TMH,1997,1st Edn.
4. E.I.Staff and EI *Computer Methods in Power System Analysis* –Abiad, TMH,1969.

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(19EE0224) SWITCH GEAR AND PROTECTION

COURSE OBJECTIVES:

The objectives of this course:

1. *The different types of electromagnetic relays and microprocessor based relays.*
2. *The protection of Generators and Transformers.*
3. *The protection of Feeders, Buses and lines.*
4. *The technical aspects involved in the operation of circuit breakers.*
5. *Generation of over voltages and protection from over voltages.*

COURSE OUTCOMES:

On successful completion of this course, the student will be able to

1. *Student gains knowledge on different Protective Equipments or Power Systems.*
2. *Ability to express Oil circuit Breaker, Air Blast circuit Breakers, SF6 Circuit Breakers.*
3. *Know about various protective Relays - how it works and where it works?*
4. *Ability to understand Protection of Generators and Transformers.*
5. *Ability to understand Protection of Feeders & Lines*
6. *Know about Over voltage and neutral grounding for overall protection.*

UNIT- I

CIRCUIT BREAKERS: Elementary Principles of Arc Interruption, Recovery, Restriking Voltage and Recovery Voltages.- Restriking Phenomenon, Average and Max. RRRV,- Current Chopping and Resistance Switching - CB Ratings and Specifications, Auto Reclosers. Types of Circuit Breakers- Description and Operation -Minimum Oil Circuit Breakers, Air Blast Circuit Breakers, Vacuum and SF6 Circuit Breakers and applications.

UNIT- II RELAYS

Introduction-Electromagnetic Relays - Basic Requirements of Relays– Primary and Backup Protection – Construction Details of – Attracted Armature, Balanced Beam, Inductor Type and Differential Relays– Universal Torque Equation –Characteristics of Over Current, Directional and Distance Relays. Static Relays– Advantages and Disadvantages– Definite Time, Inverse and IDMT Static Relays. Block Diagram for Over Current (Definite, Inverse and IDMT) and

Distance Relays and their Flow Charts. Comparators–Amplitude and Phase Comparators. Microprocessor Based Relays, Advantages and Disadvantages and applications.

UNIT -III

PROTECTION OF GENERATORS AND TRANSFORMERS

Protection of Generators against Stator Faults, Rotor Faults, and Abnormal Conditions. Restricted Earth Fault and Inter-Turn Fault Protection, Problems on percentage Winding. **Protection of Transformers**: Percentage Differential Protection, Design of CTs Ratio, Buchholz Relay Protection.

UNIT- IV

PROTECTION OF FEEDERS & LINES

Protection of Feeder (Radial & Ring Main) Using Over Current Relays. Protection of Transmission Line, 3-Zone Protection Using Distance Relays, Carrier Current Protection. Protection of Bus Bars.

UNIT -V

PROTECTION AGAINST OVER VOLTAGES AND GROUNDING

Generation of Over Voltages in Power Systems. Protection Against Lightning Over Voltages – Valve Type and Zinc-Oxide Lightning Arresters - Insulation Coordination –BIL.
Methods of neutral grounding and grounding practices.

TEXT BOOKS:

1. Badri Ram, D.N Vishwakarma *Power System Protection and Switchgear*, TMH Publications, 2011.
2. Sunil S Rao *Switchgear and Protection*, Khanna Publishers, 1992.
3. Chakrabarti, M.L.Soni, P.V.Gupta,U.S.Bhatnagar *Power System Engineering*, Dhanpat rai & Co. Publishers.

REFERENCES:

1. Bhuvanesh Oza *Power system protection and switch gear* ,-TMH, 2010.
2. C. Christopoulos and A. *Wright Electrical power System Protection*, 2nd Edition, Springer International Edition, 1999.
3. C.L.Wadhwa, *Electrical Power Systems*, New Age international (P) Limited, Publishers, 2012.

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(19CE0147) PROJECT PLANNING AND CONTROL
(OPEN ELECTIVE-IV)

COURSE OBJECTIVES

1. *To describe various elements of an engineering project and to draw the network*
2. *To perform PERT & CPM calculations and to identify the critical path*
3. *To perform various operations on the network*

COURSE OUTCOMES (COs)

After the successful completion of the course the student able to

1. *Differentiate various tools for planning and controlling the project*
2. *Construct the network for a project*
3. *Perform PERT computations and evaluate the critical path*
4. *Perform CPM computations and identify the critical path*
5. *Optimize time and cost for a project*
6. *Work with network during the progress of a project by updating the network and allocating the resource*

UNIT – I

Project Management: Project planning – Project scheduling – Project controlling – Project monitoring and control – Project monitoring and information cell – Decision making in project management – Project life cycle

Basic Techniques of Project Management: Bar charts – Steps for the construction of a bar chart – Limitations of bar charts – Milestone charts – Velocity diagrams – Development of Network – CPM/PERT Networks – Advantages of network over milestone chart

UNIT – II

Elements of Network: Event – Activity – Dummy – Network rules – Graphical guidelines for network – Common partial situations in network – Numbering the events – Cycles

Development of Network: Planning for network construction – Modes of network construction – Steps in development of network – Work breakdown structure – Hierarchies

UNIT – III

PERT: Time Estimates: Uncertainties: Use of PERT – Time estimates – Frequency distribution – Mean, variance and standard deviation – Probability distribution – Beta distribution – Expected time

PERT: Time Computations & Network Analysis: Earliest expected time – Formulation for T_E – Latest allowable occurrence time – Formulation for T_L – Combined tabular computations for T_E and T_L – Slack Critical path Probability of meeting scheduled date

UNIT – IV

CPM: Network Analysis: CPM Process – CPM Network – Activity time estimate – Earliest event time Latest allowable occurrence time Combined tabular computations for T_E and T_L – Start and finish times of activity – Float – Critical activities and critical path

UNIT – V

CPM: Cost Model: Project cost – Indirect project cost – Direct project cost – Slope of direct cost curve – Total project cost and optimum duration – Contracting the network for cost optimization – Steps in time cost optimization

CPM: Updating: Updating process – Data required for updating – Steps in the process updating – When to update

Resources Allocation: Resources usage profiles: histograms – Resources smoothing – Resources levelling

TEXT BOOKS

1. Dr.B.C. Punmia, K.K. Khandelwal, *Project Planning and Control with PERT AND CPM,* Laxmi Publications (P) Ltd., 4th Edition, Reprint 2006
2. Dr.P.N. Modi, Sanjeev Modi and Rajeev Modi, *Program Evolution and Review Technique and Critical Path Method*, Standard Book House, 5th Edition, 2012

REFERENCES

1. L.S. Srinath, *PERT and CPM Principles and Applications*, Affiliated East-West Press (Pvt.) Ltd.
2. S.K. Bhattacharjee, *Fundamentals of PERT/CPM and Project Management*, Khanna Publishers
3. Kumar Neeraj Jha, *Construction Project Management: Theory and Practice,* Pearson, 2 edition, 2015

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(19ME0353) COMPUTER AIDED PROCESS PLANNING
(OPEN ELECTIVE-IV)

COURSE OBJECTIVES

The objectives of this course is to

1. *Provide the student with an understanding of the importance of process planning role in manufacturing.*
2. *Classify the various methods of CAPP*
3. *Understand the importance of product development through CIMS, shop floor control, Computer Integrated Manufacturing and Automation*
4. *Understands about NC, CNC and DNC systems.*
5. *Know about capacity Planning, Adaptive control machining systems, FMS and MRP's*

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. *Know the importance of process planning role in manufacturing*
2. *Describe the various methods of CAPP*
3. *Recognize the importance of product development through CIMS, shop floor control, Computer Integrated Manufacturing and Automation*
4. *Gain the knowledge about NC, CNC and DNC systems.*
5. *Identify about capacity Planning, Adaptive control machining systems*
6. *Familiar in FMS and MRP I and MRP II*

UNIT- I

Introduction to Process Planning: Role of process planning in the manufacturing cycle- Information requirement for process planning system - Merits of conventional process planning over CAPP - Structure of automated process planning system, features recognition, methods.

UNIT- II

Generative CAPP System: Importance - Generative CAPP system - Automation of logical decisions - Knowledge based systems - Inference Engine, implementation, benefits.

Retrieval CAPP System: Significance - Retrieval CAPP system, structure, relative advantages and disadvantages- implementation and applications.

UNIT- III

Implementation Techniques for CAPP: MIPLAN system - The Bottom-up approach - The Top-Down approach - Computer programming languages for CAPP- Criteria for selecting a CAPP system - Benefits of CAPP - MRP - I, MRP - II and benefits.

UNIT- IV

Computer Integrated Production Planning: Capacity planning- shop floor control- MRP-I, MRP-II- CIMS benefits.

Computer Integrated Manufacturing System (CIMS): Introduction to CIMS, Automation strategies, Automation and CAD/CAM, Scope of CIM- Computer controls in NC- NC, CNC and DNC systems, components, block diagram, applications- Part programming- Group technology, benefits.

UNIT- V

Flexible Manufacturing systems (FMS): Components of FMS, workstation, Material handling system and computer control system, FMS Layout configurations and benefits of FMS.

Adaptive control machining systems: Introduction to adaptive control machining systems, application- approaches, adaptive control optimization system, adaptive control constraint system, applications to machining processes, computer process monitoring and computer process control.

TEXT BOOKS

1. Mikel P.Groover *Automation, Production systems and Computer Integrated Manufacturing Systems,* Pearson Higher Education, Inc., 4th Edition, 2015.
2. Dr. Sadhu Singh, *Computer Aided Design and Manufacturing*, Khanna Publishers, 2009.

REFERENCES

1. Gideon Halevi and Roland D. Weill. "Principles of Process Planning". A logical approach, Chapman & Hall, 1995.
2. Chang T C and Richard A Wysk, "An Introduction to automated process planning systems", Prentice Hall, 1985.
3. H.P. Wang and J.K. Li, "Computer Aided Process Planning", Elsevier Science and Technology Publishers, 1st edition, 1991.

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(19EC0451) MATLAB PROGRAMMING
(OPEN ELECTIVE-IV)

COURSE OBJECTIVES

The objectives of this course:

1. *Understand the MATLAB Desktop, Command window and the Graph Window*
2. *Be able to do simple and complex calculation using MATLAB*
3. *Understand the mathematical concepts upon which numerical methods*
4. *Understand the tools that are essential in solving engineering problems*

COURSE OUTCOMES (COs)

On successful completion of this course, student will be able to

1. *Analyze and visualize data effectively by using MATLAB.*
2. *Apply numeric techniques and computer simulations to solve engineering-related problems.*
3. *Apply a top-down, modular, and systematic approach to design, write, test, and debug sequential MATLAB programs to achieve computational objectives.*
4. *Design and document computer programs and analyses in a careful and complete manner so as to effectively communicate results, to facilitate evaluation and debugging by another programmer, and to anticipate and resolve user errors.*
5. *Demonstrate understanding and use of fundamental data structures (classes).*
6. *Create and control simple plot and user-interface graphics objects in MATLAB.*

UNIT-I

INTRODUCTION TO MATLAB: MATLAB Interactive Sessions, Menus and the toolbar, computing with MATLAB, Script files and the Editor Debugger, MATLAB Help System, Programming in MATLAB.

UNIT-II

ARRAYS: Arrays, Multidimensional Arrays, Element by Element Operations, Polynomial Operations Using Arrays, Cell Arrays, Structure Arrays.

UNIT-III

FUNCTIONS & FILES: Elementary Mathematical Functions, User Defined Functions, Advanced Function Programming, Working with Data Files.

UNIT-IV

PROGRAMMING TECHNIQUES: Program Design and Development, Relational Operators and Logical Variables, Logical Operators and Functions, Conditional Statements, Loops, the Switch Structure, Debugging MATLAB Programs.

PLOTTING: XY- plotting functions, Subplots and Overlay plots, Special Plot types, Interactive plotting, Function Discovery, Regression, 3-D plots.

UNIT-V

LINEAR ALGEBRAIC EQUATIONS: Elementary Solution Methods, Matrix Methods for Linear Equations, Cramer Method, Undetermined Systems, Order Systems.

TEXT BOOKS

1. G. H. Golub and C. F. Van Loan, *Matrix Computations*, 3rd Ed., Johns Hopkins University Press, 1996.
2. B. N. Datta, *Numerical Linear Algebra and Applications*, Brooks/Cole, 1994 (out of print)

REFERENCES

1. William J Palm, *Introduction to MATLAB for Engineers*, 3rd edition, Mc GRAW HIL.
2. L. Elden, *Matrix Methods in Data Mining and Pattern Recognition*, SIAM Press,2007.
3. *Amos Gilat*, MATLAB: An Introduction with Applications,4th edition, WILEY.

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(19CS0546) INTRODUCTION TO CYBER SECURITY
(OPEN ELECTIVE-IV)

COURSE OBJECTIVES
The Objectives of this Course

1. *To understand the fundamentals of cybercrime and the cyber offenses.*
2. *To learn the concepts of cyber threats and cyber security.*
3. *To familiarize various cyber threats, attacks, vulnerabilities, defensive mechanisms, security policies and practices.*

COURSE OUTCOMES (COs)
On successful completion of the course Students will able to

1. *Know fundamentals of cybercrimes.*
2. *Analyze the cyber offenses.*
3. *Realize the cyber threats, attacks, vulnerabilities and its defensive mechanism.*
4. *Understand the Tools and Methods Used in Cybercrime.*
5. *Design suitable security policies for the given requirements.*
6. *Explore the industry practices and tools to be on par with the recent trends.*

UNIT- I
Introduction to Cybercrime: Introduction, Cybercrime, and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, And Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.

UNIT - II
Cyber Offenses: How Criminals Plan Them: Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing.

UNIT - III
Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones.

UNIT IV
Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horse and Backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow.

UNIT V

Cyber Security: Organizational Implications Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing: Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

TEXT BOOK:

1. Nina Godbole and Sunil Belapure, *Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives*, Wiley INDIA.

REFERENCES:

1. James Graham, Richard Howard and Ryan Otson,*Cyber Security Essentials*, CRC Press.
2. Chwan-Hwa(john) Wu,J.David Irwin ,*Introduction to Cyber Security* ,CRC Press T&F Group.

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(19HS0862) STRATEGIC MANAGEMENT
(OPEN ELECTIVE-IV)

COURSE OBJECTIVES

1. *To introduce the basic knowledge of concepts underlying in strategic management, its process*
2. *To provide an insight to the tools and techniques used in analyzing and choosing strategies*
3. *To make them learn the principles of strategy formulation, implementation, evaluation and control of strategy*

COURSE OUTCOMES

After the completion of course Students will be able to:

1. *Describe major theoretical concepts, background work and research output in the field of strategic management.*
2. *Develop an understanding of the strategic management process and the functional strategies*
3. *Conduct analysis using various tools and frameworks to make strategic decisions*
4. *Explain the basic concepts, principles and practices associated with strategy formulation and implementation*
5. *Analyze various strategies and explore appropriate strategic implementation at business and corporate levels*
6. *Analyze and evaluate critically real life company situations and develop creative solutions, using a strategic management perspective*

UNIT I

Introduction to Strategic Management –Definition, significance and components- Strategic Management as a process –Developing a strategic vision, Mission, Objectives, Policies, Environmental Scanning

UNIT II

Strategic Analysis and Choice: Tools and techniques- Porter's Five Forces Model -BCG Matrix, GE Model, TOWS Matrix, Mc Kinsey 7'S framework- Organisation Analysis – VRIO frame work, Value Chain Analysis.

UNIT III

Strategy Formulation: - Formulation of strategy at corporate and business level - Strategy Alternatives-Stability Strategy, Growth Strategy, Retrenchment Strategy, and Combination Strategy.

UNIT IV

Strategy Implementation: Types of Strategies: Offensive strategy, Defensive strategy, vertical integration, horizontal strategy- Strategy and Leadership - Organization Structure - Resource Allocation as a vital part of strategy - Management of Change

UNIT V

Strategy Evaluation and control –Establishing strategic controls - Role of the strategist - benchmarking to evaluate performance - strategic information systems– Guidelines for proper control- -strategic audit - Strategy and Corporate Evaluation and feedback in the Indian context.

TEXT BOOKS:

1. P. SubbaRao, *Strategic Management*, Himalaya,2010
2. Azar Kazmi, *Strategic Management and Business Policy*, Tata McGraw Hill Education, 2009

REFERENCES:

1. V.S.P. Rao, *Strategic Management – Text and Cases*, Excel books,2009
2. Fred R. David, *Strategic Management A competitive approach Concepts and Cases* , Pearson, 16th edition,2019
3. R. Srinivasan, *Strategic Management: the Indian context*, 5th edition, PHI,2014
4. N.Chandrasekharan. PS Ananthanarayanan, *Strategic Management*, Oxford publications, 2011
5. Charles L Hill, *Strategic Management an Integrated approach*, Cengage learning, 10th edition,2007

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(19EC0424) MICROCONTROLLER AND ITS APPLICATIONS LAB

COURSE OBJECTIVES

The objectives of this course:

1. *To understand the structure of assembly language and wiring programming.*
2. *Develop programs using various instructions and addressing modes of 8051 microcontroller*
3. *Design and simulate the interfacing of peripherals to microcontroller board.*

COURSE OUTCOMES

On successful completion of this course, students will be able to

1. *Familiar with keil programming environment*
2. *Demonstrate arithmetic, logical and string operations using assembly language programming.*
3. *Develop embedded C language programs for various applications using 8051 microcontroller.*
4. *Explore the provided example code and online resources for extending knowledge about the capabilities of the 8051 microcontrollers*
5. *Test, debug, and deploy the 8051 microcontroller-based systems*
6. *Design and develop own microprocessor/microcontroller-based solutions for the real-world problems*

Note: Minimum **TEN** Experiments to be conducted (9 from Part A and one from Part B)

Part A: 8051 Microcontroller Programming

1. a) 8-bit addition operations
   b) 8-bit subtraction operations
2. a) 8-bit Multiplication operations
   b) 8-bit Division operations
3. Logical operations on an 8-bit number
4. a) String copy
   b) String concatenation
5. Interfacing LED
6. Interfacing Push button
7. Interfacing 7 segment display
8. Interfacing ADC
9. Interfacing Sensors
10. Interfacing Actuators

Part B: Mini projects

1. 4-way Traffic light control system.
2. Three floor elevator system.
3. Automatic streetlight control system.
4. Intruder alert system.
5. Automatic Tollgate system.
6. Water level control system.
7. Digital alarm clock.
8. Electronic code lock.
9. Automatic gardening system.
10. Self-developed project.

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(19EE0220) POWER SYSTEMS AND SIMULATION LAB

COURSE OBJECTIVES:

Students undergoing this course are expected to:

1. *To do the experiments (in machines lab) on various power system concepts like determination of sequence impedance, fault analysis, finding of sub transient reactances*
2. *To draw the equivalent circuit of three winding transformer by conducting a suitable experiment*
3. *To develop the MATLAB program for formation of Y and Z buses.*
4. *To develop the MATLAB programs for gauss-seidel, Newton Raphson and fast decouples load flow studies*
5. *To develop the SIMULINK model for single area load frequency problem.*

COURSE OUTCOMES:

On successful completion of this course, the student will be able to:

1. *Analyze the performance of synchronous machine with different faults*
2. *Calculate the steady-state power flow in a power system.*
3. *Analyze different types of short-circuit faults which occur in power systems*
4. *Acquires the basic knowledge of power system analysis methods.*
5. *Effectively employ different techniques to analyse different power system network*
6. *Analyze the different load flow algorithms using MATLAB*

LIST OF EXPERIMENTS:

1. Determination of Sequence Impedances of Cylindrical Rotor Synchronous Machine.
2. Fault Analysis — I
   LG Fault
   LL Fault
3. Fault Analysis — II
   LLG Fault
   LLLG Fault
4. Determination of Sub transient reactance of salient pole synchronous machine.
5. Equivalent circuit of three winding transformer.
6. Y bus formation using MATLAB
7. Z Bus formation using MATLAB
8. Gauss-Seidel load flow analysis using MATLAB

9. Newton –Raphson load flow analysis using MATLAB
10. Fast decoupled load flow analysis using MATLAB
11. Develop a Simulink model for a single area load frequency problem and Simulate the same
12. Short circuit analysis for line to ground fault and line to line fault using MATLAB.

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(19EE0221) SUBSTATION AUTOMATION LAB (VIRTUAL LAB)

COURSE OBJECTIVES:
To prepare the students

1. *To analyze the operation of switch gears.*
2. *To learn the operation of feeders in work station.*
3. *To understand the substation automation schemes*

COURSE OUTCOMES:
Students will be able to

1. *Test and analyze circuit breakers and switches performance.*
2. *Understand the control, monitoring and protection functions in work station.*
3. *To analyze scenario Fault simulation of feeders, transformers and buses.*
4. *To analyze development of substation automation scheme using PLC for normal load operation.*
5. *To analyze development of substation automation scheme using PLC for timer ON/OFF load control and cyclic ON/OFF load control.*
6. *Understand Auto recloser and Sectionalizers Operation*

LIST OF EXPERIMENTS

Any **TEN** Experiments from the following

1. Circuit Breaker Status Indication from field input.
2. Control of Group Operated Switches (GOS) from workstation.
3. Monitoring Feeder parameter from workstation.
4. Fault scenario simulation in a feeder.
5. Fault scenario simulation in a Transformer /Bus.
6. Load Transfer from one Feeder to other during Transformer Maintenance.
7. Control of Bus Voltages Through On load Tap Changes.
8. Development of 11KV/433 volts substation automation scheme using PLC for normal load operation.
9. Development of 11KV/433 volts substation automation scheme using PLC for timer ON/OFF load control.
10. Development of 11KV/433 volts substation automation scheme using PLC for cyclic ON/OFF load control.
11. Auto recloser and Sectionalizers Operation.

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(19HS0859) ENGLISH FOR CORPORATE COMMUNICATION SKILLS LAB

COURSE OBJECTIVES:

1. *To improve the students' fluency in English, through a well-developed vocabulary*
2. *To enable them listening spoken English at normal conversational speed by English speakers*
3. *To respond appropriately in different social-cultural and professional contexts*
4. *To develop drafting skills among the students.*
5. *To develop Inter-personal and Intra-personal Skills*

COURSE OUTCOMES:

1. *Use fluency in English for all kinds of professional communication*
2. *Enhancing job required skills for getting success in their professions*
3. *Improving Effective Speaking Abilities for their business or professional correspondence*
4. *prepare effective Interview techniques to get job in the present scenario*
5. *Using the appropriate skills in all kinds of professional activities*
6. *Use effective communicative approaches by preparing job application, report and other kinds of spoken and written correspondences.*

UNIT I
COMMUNICATIVE COMPETENCY

1. Functional English
2. Reading Comprehension
3. Vocabulary for competitive purpose
4. Spotting Errors

UNIT II
TECHNICAL WRITING

5. Cover Letter
6. Curriculum vitae
7. Report writing

UNIT III
PRESENTATIONAL SKILLS

8. Impromptu Speech
9. Oral presentation
10. Power point presentation

11. Poster presentation

UNIT IV
CORPORATE SKILLS
12. Problem Solving
13. Team Work
14. Leadership Skills

UNIT V
GETTING READY FOR JOB
15. Group Discussion
16. Interview skills

Minimum requirements for English for Corporate Communication Skills Lab

1. Computer Assisted Language Learning (CALL) Lab: The Computer Assisted Language Lab for 60 Students with 60 systems one Master Console, LAN facility and English Language Software for self-study by learners.

2. English for Corporate Communication Skills Lab with movable chairs and audio visual aids with a P. A. system, Projector, a Digital stereo audio & video system and Camcorder etc.

System Requirement (Hardware component):

Computer network, LAN with minimum 60 multimedia systems with the following

Specifications

i) a) Intel(R) core (TM) i3
   b) Speed 3.10 GHZ
   c) RAM – 4 GB
   d) Hard Disk – 320 GB

ii) Headphones with High quality

Software

Walden Info Tech Software

References

1. Rizvi *Effective Tech Communication*, Tata McGraw – Hill Education, 2007.
2. Sanjay Kumar &Pushpalatha *Communication skills*, Oxford University Press, 2012.
3. *Writing Tutor*. *Advanced English Learners' Dictionary*, 9th Edition, Oxford University Press, 2015.
4. AnjanaAgarwal *Powerful Vocabulary Builder*, New Age International Publishers, 2011.
5. Miles Craven *Listening Extra*, Cambridge University Press, 2008.

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IV B.Tech. I Sem (EEE & AGE)

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(19HS0860) SUPPLY CHAIN MANAGEMENT

COURSE OBJECTIVES:

1. *To understand the role of distribution logistics and supply chain management in an economy*
2. *Understand the concepts of SCM such as outsourcing, distribution strategies, planning for uncertainty, decision making*
3. *To provide an insight in to the role of IT in supply chain management*

COURSE OUTCOMES (COs):

After completion of the course, students would be able to

1. *Appreciate the evolution and identify the role of supply chain management in the economy*
2. *Identify and evaluate the drivers of supply chain management*
3. *Analyze the importance of make or buy decisions and identify appropriate suppliers*
4. *Appraise the importance of supply chain networks*
5. *Assess the risk associated with supply chain practices and take better decisions*
6. *Familiarize with and apply various computer based supply chain optimization tools*

UNIT I

Role of Distribution in Value discovery: Designing a distribution logistics system –Outsourcing of distribution logistics – Distinction between distribution logistics and supply chain management. Introduction - Supply Chain – Fundamentals –Evolution-Role in Economy -Importance - Decision Phases - Supplier- Manufacturer-Customer chain. - Enablers/Drivers of Supply Chain Performance. Supply chain strategy - Supply Chain Performance Measures.

UNIT II

Strategic Sourcing - Outsourcing – Make Vs buy - Identifying core processes - Market Vs Hierarchy - Make Vs buy continuum -Sourcing strategy - Supplier Selection and Contract Negotiation. Supplier Development - World Wide Sourcing

UNIT III

Supply Chain Network - Distribution Network Design – Role – Factors Influencing Options, Value Addition – Distribution Strategies - Models for Facility Location and Capacity allocation - Distribution Center Location Models - Supply Chain Network optimization models. Network Design decisions using Decision trees.

UNIT IV

Planning Demand, Inventory And Supply - Managing supply chain cycle inventory. Uncertainty in the supply chain –- Analyzing impact of supply chain redesign on the inventory - Risk Pooling - Managing inventory for short life – cycle products - multiple item -multiple location inventory management. Pricing and Revenue Management

UNIT V

Current Trends - Supply Chain Integration - Building partnership and trust in SC Value of Information: Bullwhip Effect - Effective forecasting - Coordinating the supply chain. . SC Restructuring - SC Mapping -SC process restructuring,–IT in Supply Chain- Agile Supply Chains- Reverse Supply chain.-Agro Supply Chains.

TEXT BOOKS:

1. *Textbook of Logistics and supply chain management, DK Agarwal, Macmillan 2003*
2. *Supply Chain Management, Janat Shah, Pearson*

REFERENCES:

3. *Supply chain Logistics Management,* Bowersox, Closs, Cooper,2/e,TMH.
4. *Supply chain management concepts and cases,* Rahul V. Altekar, PHI.
5. *Exploring Supply Chain – theory and practice,* Upendra Kachru, excel.

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IV B.Tech. I Sem.

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(19EE0222) UTILIZATION OF ELECTRICAL ENERGY

COURSE OBJECTIVES:

1. *To present the basic concepts on utilization of electrical energy on various applications*
2. *To study the basic principles of light control and types of light schemes.*
3. *To study the concepts of electric heating and welding equipment's used in industries*
4. *To study about the various characteristics of electrical drives and to select the particular electrical drive for the given application*
5. *To provide knowledge on electrical traction*

COURSE OUTCOMES (COs):

After completion of the course, students would be able to

1. *To understand the basic concepts of illumination engineering and design the various lighting schemes.*
2. *To enumerate the concepts of electric heating and welding equipment's used in industries.*
3. *To demonstrate various characteristics of electrical drives and to select the particular electrical drive for the given application.*
4. *To describe the electrical traction systems and its control.*
5. *To discuss the traction system considering economic and technology upgradation.*
6. *To evaluate the specific energy consumption and tractive effort of the given traction system.*

UNIT I –
ILLUMINATION

Introduction, terms used in illumination, laws of illumination, polar curves, and sources of light, Incandescent Lamp, Sodium Vapour Lamp, Fluorescent Lamp, Requirement of Good Lighting Scheme Types, Design and Calculation of Illumination, Street Lighting and Factory Lighting.

UNIT-II

Electric heating: Introduction, Advantages of electric heating, Types-resistance heating, induction heating and dielectric heating, Applications.

Electric welding: Introduction, resistance and arc welding, electric welding equipment, comparison between A.C. and D.C. Welding, Electrolysis - Faraday Laws, Applications of Electrolysis, Power Supply for Electrolysis.

UNIT III ELECTRIC
DRIVES

Types of electric drives, choice of motor, starting and running characteristics, speed control,

temperature rise, selection of electric drives for particular applications, types of loads- continuous, intermittent and variable loads, load equalization.

UNIT IV –

ELECTRIC TRACTION I

Introduction - Systems of electric traction, Comparison between A.C. and D.C. traction,Special features of traction motor- methods of electric braking-plugging rheostat braking andregenerative braking, Mechanics of train movement, Speed-time curves for different services trapezoidal and quadrilateral speed time curves and problems.

UNIT V

ELECTRIC TRACTION-II

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

TEXT BOOKS:

1. E. Openshaw *Utilization of Electric Energy* Taylor, University press.
2. Partab *Art & Science of Utilization of electrical Energy*, Dhanpat Rai & Sons.

REFERENCES:

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

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IV B.Tech.-I Sem.

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(19EE0223) ELECTRICAL DISTRIBUTION SYSTEMS

COURSE OBJECTIVES

Students undergoing this course are expected to:

1. *To demonstrate knowledge on different types of loads and distribution feeders, different Parameters and protection schemes for distribution feeders.*
2. *To analyze different feeder configurations, optimal capacitor placement, the criteria for economical power factor and different grounding methods for protection*
3. *To design proper rating of capacitor to improve power factor.*
4. *To demonstrate skills in evaluating the load parameters of different types of loads and Voltage drop, losses and fault currents in distribution system.*

COURSE OUTCOMES (COs)

After completion of the course, students would be able to

1. *Understand different types of distributions systems and loads.*
2. *Analyse AC and DC distribution systems in ring main and radial configurations*
3. *Understand the concepts of various types of substation design.*
4. *Calculation of power factor and placement of capacitor for p.f. correction*
5. *Analyse automation of distribution systems using SCADA*
6. *Understand the concepts of CIS, GIS and AMR.*

UNIT- I:

INTRODUCTION TO DISTRIBUTION SYSTEMS

Introduction to distribution systems, load modelling and characteristics - coincidence factor, contribution factor, loss factor, relationship between the load and loss factors. Classification of loads (residential, commercial, agricultural and industrial) and their characteristics. Classification of distribution systems - radial, loop, ring main. Comparison of DC Vs AC and under-ground Vs over-head distribution systems.

UNIT-II:

AC AND DC DISTRIBUTION SYSTEMS

Voltage drop calculations and problems in DC distributors radial- DC distributor fed at one end, at both the ends (equal/unequal voltages) and ring main distributor. Voltage drop calculations and problems in AC distributors power factors referred to receiving end voltage and respective load voltages.

UNIT - III:

SUBSTATIONS

Classification of substations - indoor and outdoor, gas and air insulated substations. Substation layout - different bus bar schemes, location of substations - rating of distribution substations. service area with 'n' primary feeders. Neutral Grounding - Grounded and ungrounded systems,

UNIT- IV:

POWER FACTOR CORRECTION

Causes of low power factor, methods of improving power factor– power capacitors, series and shunt capacitors (fixed and switched) for power factor correction, most economical power factor for constant KW load and constant KVA type loads, economic justification for capacitors, procedure to determine the optimum capacitor allocation - numerical problems.

UNIT - V:

DISTRIBUTION AUTOMATION

Introduction to Distribution automation-Definitions-Communication Sensors-Supervisory Control and Data Acquisition (SCADA)-Consumer Information Service (CIS)-Geographical Information system (GIS)-Automatic Meter Reading(AMR)-Automation Systems.

TEXT BOOKS:

1. Turan Gonen, *Electric Power Distribution System Engineering*, Mc Graw-Hill Book Company, 3nd edition, 2013
2. V.K.Mehta, Rohit Mehta, *Principles of Power System*, Principles of Power System, S.Chand & Company Ltd, revised edition, 2013.

REFERENCES:

1. C.L.Wadhwa,, *Generation, Distribution and Utilization of Electrical Energy, New Age International, 1993,* 4th edition *Published year 2017.*
2. A.S.Pabla, *Electric Power Distribution*, Tata Mc Graw-Hill Publishing Company, McGraw-Hill; Seventh edition, 2019.
3. M.L.Soni, P.V.Gupta, V.S. Bhatnagar, A.Chakravarthy, *Power System Engineering*, Dhanpat Rai and Co Private Limited, 2013.

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IV B.Tech. – I Sem.

(19EE0224) POWER QUALITY

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PROFESSIONAL ELECTIVE CURSE(PEC)-I

COURSE OBJECTIVES:

Students undergoing this course are expected to:

1. *To know about introduction on power quality issues.*
2. *To learn about voltage disturbances and power transients that is occurring in power systems.*
3. *To know the concept of harmonics in the system and their effect on different power system equipment.*
4. *To know about different power quality measuring and monitoring concepts.*
5.

COURSE OUTCOMES (COs):

After completion of the course, students would be able to

1. *Identify the terminology used in power quality issues and evaluate the power quality issues.*
2. *Identify the different power quality disturbances existing power system.*
3. *Understand power quality monitoring and classification techniques*
4. *To Study the interruptions types and its influence in various components.*
5. *To study various methods of power quality monitoring.*
6. *To understand the different types of custom power devices.*

UNIT I
INTRODUCTION

Definition of Power Quality- Power Quality Terminology–evaluation procedure, Classification of Power Quality Issues Magnitude Versus Duration Plot-Power Quality Standards - Responsibilities of The Suppliers and Users of Electric Power-CBEMA and ITIC Curves.

UNIT II
POWER QUALITY DISTURBANCES

General classes of power quality problems - Impulsive and oscillatory Transients - Sag-Swell-Sustained Interruption - Under Voltage –Over Voltage – Outage. Sources of Different Power Quality Disturbances- Principles of Regulating the Voltage Conventional Devices for Voltage Regulation Estimation of the sag severity Overview of mitigation methods.

UNIT III

FUNDAMENTALS OF HARMONICS & APPLIED HARMONICS

Harmonic Distortion, Voltage Versus Current Distortion, Harmonics Versus Transients, Effect of harmonics –harmonic distortion voltage and current distortion - harmonic indices - inter harmonics resonance Power System Qualities Under Non Sinusoidal Conditions, Harmonic Indices, Harmonic Sources From Commercial Loads, Harmonic Sources From Industrial Loads. Applied Harmonics: Effects Of Harmonics, Harmonic Distortion Evaluations, devices for controlling harmonic distortion - passive and active filters.

UNIT IV

POWER QUALITY MONITORING

Power Quality Benchmarking-Monitoring Considerations- Choosing Monitoring Locations-Permanent Power Quality Monitoring Equipment-Historical Perspective of Power Quality Measuring Instruments Power Quality Measurement Equipment-Types of Instruments-Assessment of Power Quality Measurement Data- Power Quality Monitoring Standards.

UNIT V

POWER QUALITY ENHANCEMENT USING CUSTOM POWER DEVICES

Custom Power Devices –introduction Network Reconfiguring Type: Solid State Current Limiter (SSCL) -Solid State Breaker (SSB) -Solid State Transfer Switch (SSTS) - Compensating Type: distribution static compensator (DSTATCOM),Dynamic Voltage Restorer (DVR)-Unified Power Quality Conditioner(UPQC)-Principle of Operation Only.

TEXT BOOKS:

1. Roger. C. Dugan, Mark. F. McGranagham, Surya Santoso, H.Wayne Beaty, *"Electrical Power Systems Quality,"* McGraw Hill,2003.
2. Eswald.F.Fudis and M.A.S. Masoum, *"Power Quality in Power System and Electrica Machines,"* Elseviar Academic Press, 2013.

REFERENCE BOOKS:

1. Math H. J. Bollen, *'Understanding Power quality problems ",* IEEE Press, 2007.
2. Arindam Ghosh, Gerard Ledwich, *"Power quality enhancement using custom power devices",* Kluwer academic publishers, 2002.

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IV B. Tech. - I Sem. (EEE)

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(19EE0225) FLEXIBLE AC TRANSMISSION SYSTEMS

PROFESSIONAL ELECTIVE COURSE(PEC)-I

COURSE OBJECTIVES:

The objectives of the course are to make the students learn about:

1. *The basic concepts, different types, and applications of FACTS controllers in power transmission.*
2. *The basic concepts of static shunt and series converters.*
3. *The working principle, structure and control of UPFC Technical Economic aspects of HVAC and HVDC transmission and their comparison.*

COURSE OUTCOMES (COs):

After completion of the course, students would be able to

1. *Understand various basic concepts of FACTS devices.*
2. *Understand the VSC and CSC.*
3. *Understand the static shunt compensators*
4. *Understand the static series compensator.*
5. *Understand the Unified power flow controller.*
6. *apply the concepts in solving problems of simple power systems with FACTS controllers.*

UNIT – I FACTS CONCEPTS

Flow of power in AC parallel paths and Meshed systems, Basic types of FACTS controllers, Brief description and Definitions of FACTS controllers

UNIT- II VOLTAGE AND CURRENT SOURCED CONVERTERS

Concept of Voltage Sourced Converters, Single Phase Full Wave Bridge Converter, Three Phase Full
Wave Bridge Converter

Concept of Current Sourced Converters, Thyristor based converters, Current Sourced Converter with
Turn off Devices, Current Sourced –Vs- Voltage Sourced Converters

UNIT – III STATIC SHUNT COMPENSATORS

Objectives of shunt compensation, Methods of controllable VAR generation, Static VAR compensators, SVC and STATCOM, comparison.

UNIT – IV STATIC SERIES COMPENSATORS

Objectives of series compensation, variable impedance type - thyristor switched series capacitors (TCSC), switching converter type series compensators – static series synchronous compensator (SSSC) – power angle characteristics.

UNIT – V COMBINED COMPENSATORS

Introduction, unified power flow controller (UPFC), Basic operating principle, Independent real and reactive power flow controller, control structure

TEXT BOOKS:

1. *Understanding FACTS: Concepts and Technology of Flexible AC Transmission Systems: Narain G. Hingorani, Laszlo Gyugyi - Standard Publishers Distributors - IEEE Press – First Edition, Published Year-2011*

REFERENCES*:*

1. *Thyristor-Based FACTS Controllers for Electrical Transmission Systems, IEEE PressSeries on Power Engineering, R. Mohan Mathur, Rajiv K. Varma, 2002.*
2. *Flexible AC Transmission Systems, Yong Hua Song, Allan T Johns, Published by The Institute of Electrical Engineers, 1999, London, UK.*

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(19EE0226) ELECTRICAL ENERGY CONSERVATION ANDAUDITING PROFESSIONAL ELECTIVE COURSE(PEC)-I

COURSE OBJECTIVES:

1. *To understand the energy management concepts*
2. *To understand Energy conservation principles and measures*
3. *To Learn the methods of energy audit and usage of instruments*
4. *To analyze and report the outcome of energy audit*

COURSE OUTCOMES (COs):

After completion of the course, students would be able to

1. *Identify the energy demand supply gap in the World & India and understand energy*
2. *Illustrate the energy conservation opportunities in different thermal systems*
3. *Describe the energy conservation opportunities in different electrical systems*
4. *Identify and evaluate the common energy conservation opportunities in different energy*
5. *Understand the need for energy audit*
6. *To examine the economic evaluation of energy conservation solutions adopted*

UNIT I
INTRODUCTION TO ENERGY CONSERVATION

Principles - Past and present energy scenario of world – Energy consumption in India resource availability Demand supply gap - Environmental aspects Energy Conservation act Standards and labeling designated consumers.

UNIT II
ENERGY CONSERVATION IN THERMAL SYSTEMS

Steam systems Boilers - blow down control – furnaces – thermic fluid heaters – steam traps – insulators and refractories – cooling tower – air pressure control – waste heat recovery – cogeneration.

UNIT III
ENERGY CONSERVATION IN ELECTRICAL SYSTEMS

Components of EB billing - types of tariff – HT and LT supply – Transformers cableselection power factor improvement capacitors – harmonics – electric motors efficiency energy efficient motors – variable speed drives - lighting – types- efficacy – LED

UNIT IV

ENERGY CONSERVATION IN INDUSTRIES

Pumps fans blowers compressed air systems refrigeration and air conditioning systems cooling towers DG sets

UNIT V

ENERGY AUIDT AND ENERGY ECONOMICS

Energy audit -need types - benefits - methodology and barriers role of energy managers instruments for energy auditing; Energy economics discount rate depreciation cost - payback period internal rate of return net present value life cycle costing case study.

TEXT BOOKS:

1. Kennedy, William J., Turner, Wayne C.,& Capehart, Barney L., *Guide to Energy Management*, The Fairmount Press.
2. Callaghan, P.W., *Design and Management for Energy Conservation*, Pergamon Press, Oxford.

REFERENCES:

1. Dryden, I.G.C., *The Efficient Use of Energy*, Butterworths, London.
2. Turner, W.C., *Energy Management Handbook*, Wiley, New York (1982).

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(19EE0227) POWER SEMICONDUCTOR DRIVES
PROFESSIONAL ELECTIVE COURSE (PEC) –II

COURSE OBJECTIVES:

1. *To understand the application of Power Electronics*
2. *To learn the operation of the chopper fed DC Drives and characteristics*
3. *To Understand the basic concept and advanced speed control techniques using Power electronics converters that are used in industry*
4. *Distinguishing features of Induction Motor drives and Synchronous Motor Drives*

COURSE OUTCOMES (COS):

After completion of the course, students would be able to

1. *Analyzation of single Phase and three phase rectifier fed DC motors as well as chopper fed DC Motors.*
2. *Study the four quadrant operation of DC Drives*
3. *Develop the concept of Speed control of induction motor by using AC Voltage control and Voltage Source Inverters.*
4. *Understand the Principle of static rotor resistance control and various slip power recovery schemes.*
5. *Formulate the concept of CSI inverter fed synchronous motor drive*
6. *Apply the concept of closed loop control motor drives.*

UNIT- I

CONVERTER FED DC MOTORS

Introduction to Thyristor Controlled Drives, Single Phase, Three 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 Characteristic, Problems.

UNIT- II

FOUR QUADRANT OPERATION OF DC DRIVES

Introduction to Four Quadrant Operation, Motoring Operations, Electric Braking, Plugging, Dynamic and Regenerative Braking Operations. Four Quadrant Operation of D.C Motors by Dual Converters, Closed Loop Operation of DC Motor.

UNIT- III

CHOPPER FED DC MOTORS

Single Quadrant, Two Quadrant and Four Quadrant Chopper Fed DC Separately Excited and Series Excited Motors , Continuous Current Operation, Output Voltage and Current Wave Forms Speed - Torque Expressions, Speed - Torque Characteristics , Problems on Chopper Fed D.C Motors, Closed Loop Operation.

UNIT -IV

CONTROL OF INDUCTION MOTOR

Induction Motor Stator Voltage Control and Characteristics by AC Voltage Controllers, Waveforms, Speed - Torque Characteristics, Stator Frequency Control and Characteristics by Voltage Source and Current Source Inverter and Cycloconverters, PWM Control ,Comparison of VSI and CSI Operations ,Speed - Torque Characteristics, Closed LoopOperation of Induction Motor Drives ,Static Rotor Resistance Control ,Slip Power Recovery, Static Scherbius Drive, Static Kramer Drive –Their Performance and Speed - Torque Characteristics ,problems and Applications.

UNIT -V

CONTROL OF SYNCHRONOUS MOTORS

Self and separate Control of Synchronous Motors ,Operation of Self Controlled Synchronous Motors-VSI and CSI Fed Cycloconverters. Load Commutated CSI Fed Synchronous Motor, Operation, Waveforms – Speed - Torque Characteristics, Closed Loop Control Operation of Synchronous Motor Drives, Variable Frequency Control-PWM, VSI, CSI, Problems and applications.

TEXT BOOKS:

1. Power semiconductor controlled drives by G K Dubey, Prentice Hall, 1989.

2. "*Power Electronics Circuits, Devices and Applications* ", Rashid M.H., Pearson Education, Fourth Edition. 2014.

REFERENCES*:*

1. *Power Electronics by* MD Singh and K B Khanchandani, Tata – McGraw-Hill Publishing company, 1998
2. *"Modern Power Electronics and AC Drives",* Bimal K Bose, Pearson Education 2002.
3. *"Electric Drives – Concepts and Applications*", Vedam Subramanyam, McGraw Hill, Second Edition, 2010.
4. *A First course on Electrical Drives by* S K Pillai New Age International (P) Ltd. 2nd Edition, 1989.
5. *"Electric Motor Drives – Modeling, Analysis and Control*", R.Krishnan, Prentice-Hall of India Pvt. Ltd., New Delhi, 2003.

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(19EE0228) SOLAR AND WIND ENERGY SYSTEMS

PROFESSIONAL ELECTIVE COURSE(PEC)-II

COURSE OBJECTIVES:

1. *To understand wind and solar energy resource assessment techniques. And also to understand the principles of conversion to useful forms of energy from solar and wind energy resources.*
2. *To understand the working principles of the conversion devices, limitations, cost of energy generation and environmental issues.*
3. *To discuss theories and parameters for designing solar and wind energy system*

COURSE OUTCOMES (COS):

After completion of the course, students would be able to

1. *Understand the generation of electricity from solar and wind sources of energy.*
2. *Estimate the solar energy, Utilization of it, Principles involved in solar energy collection and conversion of it to electricity generation.*
3. *Differentiate the types of solar energy technologies, their importance, different tapping devices and describe the method of harnessing the solar energy.*
4. *Explore the concepts involved in wind energy conversion system by studying its components, types and performance.*
5. *Analyze and evaluate the implication of solar and wind energy. Concepts in solving numerical problems pertaining to solar and wind energy systems.*
6. *Demonstrate self -learning capability to design & establish renewable energy systems.*

UNIT I
INTRODUCTION

Solar radiation; Earth-Sun relation: Solar angles, Sun path diagram; Shadow determination, Solar spectrum, Effect of earth atmosphere on solar radiation, Measurement and estimation of solar radiation on horizontal and tilted surfaces, Solar radiation measurement devices.

UNIT II
SOLAR THERMAL SYSTEM

Introduction to different solar thermal energy systems: Solar flat plate collector, concentrating collector, Solar cooker, Solar Pond; Development of solar thermal collectors; Concentrating solar collector: optical design of concentrators, solar water heaters, solar dryers; Solar thermal power generation and economics; Solar Energy Mission.

UNIT III
PV SYSTEM

Photovoltaic: Principle of photovoltaic conversion; Solar cell basics and materials; Different

solar cell technologies: Crystalline silicon solar cell, Thin Film solar cell, Tandem solar cell; Photovoltaic system: Component and configurations; stand alone, hybrid system and grid connected PV systems, PV system design and economics.

UNIT IV
INTRODUCTION TO WIND ENERGY

Atmospheric circulations, classification, factors influencing wind, wind shear, turbulence, wind speed monitoring, Wind resource assessment, Betz limit. Wind turbines: Wind turbine types, Horizontal Axis Wind Turbine (HAWT) - Blade Element Theory, Vertical Axis Wind Turbine (VAWT) aerodynamics. Application, power, torque and speed characteristics.

UNIT V
AERODYNAMICS AND WIND POWER GENERATION

Aerodynamic forces, rotor types, rotor characteristics, forces developed by blades, aerodynamic models, breaking systems, tower, control and monitoring system. Power and energy produce from wind turbines, wind power performance, maximum power coefficient, tip loss correction, wind driven induction generator, synchronous and asynchronous generators and loads, integration of wind energy converters to electrical networks, inverters. Types of wind energy generation (WEG) system: stand alone, grid connected, hybrid connection. Wind energy Programme in India.

TEXT BOOKS:

1. B.H. Khan, *Non-Conventional Energy Resources*,Tata McGraw-Hill Education, 2006
2. D.S. Chauhan, S.K.Srivastava , *Non-Conventional Energy Resources,* New Age Int.(P) Ltd, 2010
3. B. Sorensen "*Renewable Energy*", Academic press, June 2017.

REFERENCES:

1. Johnson G. L.; *Wind Energy Systems (Electronic Edition)*, Prentice Hall, 2006
2. Hau E. *Wind Turbines: Fundamentals, Technologies, Application and Economics,* Springer, 2000
3. Mathew S. *Wind Energy: Fundamentals, Resource Analysis and Economics,* Springer, 2000.
4. Burton T. Sharpe D. Jenkins N. and Bossanyi E. *Wind Energy Handbook,* John Wiley, 2001.
5. Garg H. P. and Prakash S. Solar Energy: *Fundamental and Application,* Tata McGraw Hill, 2000.
6. Nayak J. K. and Sukhatme S. P. , *Solar Energy: Principles of Thermal Collection and Storage,* Tata McGraw Hill, 2006.

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(19EE0229) GENERATION OF ENERGY THROUGH WASTE

PROFESSIONAL ELECTIVE COURSE(PEC)-II

COURSE OBJECTIVES

1. *To understand different types of waste as fuel*
2. *To introduce Pyrolysis methods and conversion processes*
3. *To understand gasification methods for biomass*
4. *To learn concepts of biomass resources, combustion types and biogas plant technology*

COURSE OUTCOMES (COs):

After completion of the course, students would be able to

1. *Analyse agro based, forest residue and industrial waste conversion processes.*
2. *Manufacture of Pyrolytic oils and gases*
3. *Manufacture of charcoal, yields and applications*
4. *Understand various types of gasifiers operation*
5. *Understand inclined and fluidized bed combustors operation*
6. *Understand types of biogas plants and biomass energy programme in India*

UNIT- I

Introduction to Energy from waste: Classification of waste as fuel – Agro based- Forest residue- Industrial waste- MSW- conversion devices- Incinerators- Gasifiers-Digestors.

UNIT- II

Bio-mass Pyrolysis: Pyrolysis- Types- Slow-Fast- Manufacture of Charcoal- methods- yields and application. Manufacture of Pyrolytic oils and gases – yields and applications.

UNIT- III

Biomass Gasification: Gasifiers- Fixed bed system- Downdraft and Updraft gasifiers- Fluidized bed gasifiers- construction and operation- Gasifier burner arrangement for thermal heating.

UNIT- IV

Biomass Combustion: Biomass stoves- Types- Inclined combustors- Fluidized bed combustors- construction and operation of above biomass combustors.

UNIT- V

Properties of Biogas: Biogas plant Technology and status – Biomass resources and their classification- Biomass conversion processes- thermo chemical conversion – Direct Combustion- Biomass gasification-

Pyrolysis and liquefaction – bio-chemical conversion- anaerobic digestion- Types of biogas plants-applications-Biomass Energy Programme in India.

TEXT BOOKS

1. Non-Conventional Energy- Desai Ashok V. Wiley Eastern Ltd 1990.
2. Biogas Technology – A Practical Hand Book – Khandelwal K.C. and Mahdi SS, Vol I & II. Tata Mc Graw Hill Publishing Co Ltd.,1983.

REFERENCES

1. Food, Feed and Fuel from Biomass – Challal D.S., IBH Publishing Co Pvt Ltd.,1991.
2. Non-conventional Energy Sourcrs- GD Roy, Khanna Publishers, 6th Edition
3. Biomass & Bioenergy – Khahid Rehman Hekeem, Mohammad Jawald., Umar Rashid- Springer International Publishing Ltd.

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IV B. Tech. - I Sem. (EEE)

(19EE230) HVDC TRANSMISSION SYSTEMS
PROFESSIONAL ELECTIVE COURSE (PEC) –III

COURSE OBJECTIVES

1. *To introduce students with the concept of HVDC Transmission system.*
2. *To familiarize the students with the HVDC converters and their control system.*
3. *To expose the students to the harmonics and faults occur in the system and their prevention*

COURSE OUTCOMES (COs):

After completion of the course, students would be able to

1. *Develop the knowledge of HVDC transmission and HVDC converters*
2. *learn about different control schemes as well as starting and stopping of DC links*
3. *Analyze the different harmonics generated by the converters and their variation with the change in firing angles*
4. *Develop harmonic models and use the knowledge of circuit theory to develop filters and assess the requirement and type of protection for the filters.*
5. *Study and understand the nature of faults happening on DC sides of the converters.*
6. *Recognize the need to follow the advancements in both the existing systems and HVDC systems and determine the most economic coexistence of both.*

UNIT I
INTRODUCTION TO HVDC TRANSMISSION

HVDC Transmission: Technical And Economical Comparision of HVAC ond HVDC Transmission, Types of DC Links, Power Handling Capabilities of HVDC Lines, Basic Conversion Principles, Static Converter Configuration.

UNIT II
STATIC POWER CONVERTER ANALYSIS

Static Power Converters: 3 Pulse, 6 Pulse & 12 Pulse Converters, Converter Station and Terminal Equipment Commutation Process, Rectifier and Inverter Operation, EquivalentCircuit for Rectifier, Inverter and HVDC Link.

UNIT III
CONTROL OF HVDC CONVERTER SYSTEMS

Control of HVDC Converter Systems: Principle of DC Link Control – Constant Current, Constant Extinction Angle and Constant Ignition Angle Control and Voltage Dependent Current

Control. Individual .Phase Control and Equidistant Firing Angle Control

UNIT IV

HARMONICS AND FILTERS

Origin of Harmonics in HVDC Systems, Classification of Harmonics, Harmonics Elimination, Suppression Methods, Design of HVDC AC & DC Filters etc.

UNIT V

TRANSIENTS, FAULTS AND PROTECTION OF HVDC SYSTEMS

Origin of over Voltages in HVDC Systems, Over Voltages due to DC and AC Side Line Faults - Converter Faults, Over Current Protection- Valve Group and DC Line Protection. Over Voltage Protection of Converters, Surge Arresters etc.

TEXT BOOKS:

1. *HVDC Power Transmission System* ,Padiyar, K.R., New Age International (P) Limited, Publishers (2008)
2. *"HVDC Transmission" ,S.kamaksaiah, V.Kamaraju McGraw hill company, 2011.*

REFERENCES:

1. "Direct Current Transmission". Edwart, K., (Vol. 1), John Wiley and Sons (2008).
2. *"EHVAC, HVDC Transmission & Distribution Engineering", S Rao, , Khanna Publishers,2001.*
3. *"HVDC Transmission"* Arrillaga, J., , IEE Press (2007).

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IV B.Tech. – I Sem.

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(19EE0231) NEURAL NETWORKS AND FUZZY LOGIC
PROFESSIONAL ELECTIVE COURSE (PEC) –III

COURSE OBJECTIVES:

1. *To introduce the basics of Neural Networks and essentials of Artificial Neural*
2. *Networks with Single Layer and Multilayer Feed Forward Networks.*
3. *To have knowledge on Associate Memories, Fuzzy sets and Fuzzy Logic system components.*
4. *To know Neural Network and Fuzzy Network system application to Electrical Engineering*
5. *The main objective of this course is to provide the student with the basic understanding of neural networks and fuzzy logic fundamentals.*

COURSE OUTCOMES (COs):

After completion of the course, students would be able to

1. *Understand the basic concept of artificial neural networks*
2. *Understand different learning mechanism in artificial neural networks*
3. *Create Neural Network models for electrical engineering.*
4. *Understand the basic concepts of fuzzy sets.*
5. *Understand the basic concepts of fuzzy logic.*
6. *Create Fuzzy models for electrical engineering*

UNIT - I:

FUNDAMENTALS OF ARTIFICIAL NEURAL NETWORKS

Neural networks- introduction, Organization of human brain, Biological neuron, artificial neuron, McCulloch- Pitts neuronmodel,Characteristics and Applications of artificial neural networks Architecturesofartificialneuralnetworks-activationfunctions,important terminologies of ANN, learning strategies- supervised,unsupervised, reinforced learning.

UNIT - II:

SUPERVISED NETWORKS

Perceptron networks-Perceptron learning, Limitations of Perceptron, back propagation networks-architecture, Computations in each layer, Error calculation in Back propagation networks, Gradient descent method in learning, back propagation algorithm, learning factors - initial weights, leaning constant, momentum coefficient, Applications of Neural Networks to Electrical Engineering.

UNIT - III:

ASSOCIATIVE MEMORIES

Introduction, Associative Memories- Auto associative Memory, Bidirectional Associative Memory(BAM), Architectures, Storage and Recall Phases, Recognition of noisy patterns, Hamming distance and Energy functions.Discrete Hopfield network architecture and storage and recall algorithm.

UNIT - IV:

CLASSICAL AND FUZZY SETS

Introduction to classical sets- properties Fuzzyvs crsip Fuzzy sets ,Membership functions, basic fuzzy set operation, properties of fuzzysets- Fuzzy relations Fuzzy Cartesian product, operations on fuzzy relations.

UNIT -V:

FUZZY LOGIC SYSTEMS

Fuzzification Fuzzy quantifiers, fuzzy inference, fuzzy rulebased system-developmentof rule base and decision making system-Defuzzification to crispsets-Fuzzification and Defuzzification methods. Applications of Fuzzy logic systems in Electrical Engineering.

TEXT BOOKS:

1. S. Rajasekaran, G.A. Vijayalakshmi Pai *Neural Networks, Fuzzy Logic, and GeneticAlgorithms Synthesis and Applications* PHI, 2012
2. S.N. Sivanandam, S.N. Deepa *Principles of Soft computing*, Wiley India private Ltd.,2nd edition, 2013.

REFERENCES:

1. Timothy J Ross *Fuzzy Logic with Engineering Application* , McGraw HillInc.1997.
2. Jacek M. Zurada *Introduction to Artificial Neural Networks*, Jaico Publishing House.1994
3. Simon Haykin *Neural Networks - A Comprehensive Foundation*, Prentice- Hall Inc,1999.

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IV B.Tech. I Sem.

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(19EE0232) REACTIVE POWER COMPENSATION AND MANAGEMENT
PROFESSIONAL ELECTIVE COURSE (PEC) –III

COURSE OBJECTIVES:

1. *To identify the necessity of reactive power compensation*
2. *To describe load compensation*
3. *To select various types of reactive power compensation in transmission systems*
4. *To illustrate reactive power coordination system*
5. *To characterize distribution side and utility side reactive power management.*

COURSE OUTCOMES (COs):

After completion of the course, students would be able to

1. *Distinguish the importance of load compensation in symmetrical as well as un symmetrical loads.*
2. *Observe various compensation methods in transmission lines.*
3. *Construct model for reactive power coordination.*
4. *Distinguish demand side reactive power management & user side reactive power management.*
5. *Understand the Reactive power management in electric traction.*
6. *Understand the Reactive power management in Electric arc furnaces.*

UNIT-I: LOAD COMPENSATION

Objectives and specifications – Reactive power characteristics – Inductive and capacitive approximate biasing – Load compensator as a voltage regulator – Phase balancing and power factor correction of unsymmetrical loads - Examples.

UNIT-II: STEADY STATE & TRANSIENT STATE REACTIVE POWER COMPENSATION IN TRANSMISSION SYSTEM

Uncompensated line – Types of compensation – Passive shunt and series and dynamic shunt compensation – Characteristic time periods – Passive shunt compensation – Static compensation- Series capacitor compensation – Compensation using synchronous condensers –Examples.

UNIT-III: REACTIVE POWER COORDINATION & DEMAND SIDE MANAGEMENT

Objective – Mathematical modeling – Operation planning – Transmission benefits – Basic concepts of quality of power supply – Disturbances - Steady – state variations – Effects of under Voltages – Frequency – Harmonics, radio frequency and electromagnetic

interferences. Load patterns – Basic methods - load shaping – Power tariffs - KVAR based tariffs - penalties for voltage flickers and Harmonic voltage levels.

UNIT-IV: DISTRIBUTION & USER SIDE REACTIVE POWER MANAGEMENT

System losses – Loss reduction methods – Examples – Reactive power planning – Objectives – Economics - Planning capacitor placement – Retrofitting of capacitor banks - KVAR requirements for domestic appliances – Purpose of using capacitors – Selection of capacitors – Deciding factors – Types of capacitors, characteristics and Limitations.

UNIT-V: REACTIVE POWER MANAGEMENT IN ELECTRIC TRACTION SYSTEMS AND ARC FURNACES

Typical layout of traction systems – Reactive power control requirements – Distribution transformers - Electric arc furnaces – Furnaces transformer – Filter requirements – Remedial measures – Power factor of an arc furnace.

TEXT BOOKS:

1. J.E.Miller, Reactive Power Control in Electric Power Systems, John Wiley and Sons,1982 (Units I to IV).
2. D.M.Tagare, Reactive power Management, Tata McGraw Hill, 2004 (Units V toVIII).