COURSE STRUCTURE AND DETAILED SYLLABUS

for

III & IV B.TECH

ELECTRICAL AND ELECTRONICS ENGINEERING

(Applicable for the batches admitted from 2016-17)

GURU NANAK INSTITUTIONS
TECHNICAL CAMPUS
(An Autonomous Institution)
Campus: Ibrahimpatnam, R.R. District - 501506 (T.S).

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS

(AUTONOMOUS)

CONTENTS

III YEAR I SEMESTER

III YEAR II SEMESTER

IV YEAR I SEMESTER

IV YEAR II SEMESTER

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS (AUTONOMOUS)

COURSE STRUCTURE

III. B. Tech. Electrical & Electronics Engineering

III YEAR - I SEMESTER

S. No	Sub Code	Subject	L	T	P	Credits
1	EC0541	Linear and Digital IC Applications	4	0	0	4
2	EC0547	Microprocessors & Micro Controllers	4	0	0	4
3.		**Open Elective – I**	3	0	0	3
4	MB0531	MEFA	4	0	0	4
5	EE0541	Power systems—II	3	1	0	3
6	EE0542	Control Systems Lab	0	0	3	2
7	EE0543	Electrical and Electronic Measurements lab	0	0	3	2
8	EC0548	Microprocessors Lab	0	0	3	2
					Total Credits	**24**

Library=1, sports=1, NPTEL/Student activities =2

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS (AUTONOMOUS)

COURSE STRUCTURE

III. B. Tech. Electrical & Electronics Engineering

III YEAR - II SEMESTER

S. No	Sub Code	Subject	L	T	P	Credits
1		**Open Elective – II**	3	0	0	3
2		**Professional Elective – I**	4	0	0	4
	EE0651	Computer Methods in Power Systems				
	CS0659	Computer Organization				
	EE0652	Special Machines				
3		**Professional Elective – II**	4	0	0	4
	EE0653	Digital Control System				
	EE0654	Optimization Techniques				
	EC0656	VLSI Design				
4	EE0641	Power Electronics	4	0	0	4
5	EE0642	Switch Gear and Protection	4	0	0	4
6	HE0631	Advanced English Language Communications Skills Lab	0	0	3	1
7	EE0643	Power Electronics Lab	0	0	3	2
8	EC0645	Micro Controllers Lab	0	0	3	2
					Total Credits	**24**

Library=1, sports=1, NPTEL/Student activities =2

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)

COURSE STRUCTURE

IV. B. Tech. Electrical & Electronics Engineering

IV YEAR - I SEMESTER

S. No	Sub Code	Subject	L	T	P	Credits
1	EC0745	Digital Signal Processing	4	0	0	4
2		**Professional Elective – III**	4	0	0	4
	EE0751	HVDC Transmission and FACTS				
	EE0752	Reliability Engineering				
	EE0753	HIGH Voltage Engineering				
3		**Professional Elective – IV**	4	0	0	4
	EE0754	Switch Mode Power Supplies				
	CS075A	Artificial Neural Networks and Fuzzy Systems				
	EE0756	Electrical Distribution System				
4		**Professional Elective – V**	4	0	0	4
	EE0757	Static Electric Drives				
	EE0758	Solar Photovoltaic Systems				
	EE0759	Utilization of Electric Power				
5	EE0741	Power System Operation and Control	4	0	0	4
6	EC0746	Digital Signal Processing Lab	0	0	3	2
7	EE0742	Power systems lab	0	0	3	2
8	EE0781	Mini Project	--	--	--	2
					Total Credits	**26**

Library=1, sports=1, NPTEL/Student activities =2

COURSE STRUCTURE

IV. B. Tech. Electrical & Electronics Engineering

IV YEAR - II SEMESTER

S. No	Sub Code	Subject	L	T	P	Credits
1		**Open Elective – III**	3	0	0	3
2	MB0831	Management Science	4	0	0	4
3	EE0891	Seminar	0	0	2	1
4	EE0871	Major Project	--	--	--	14
					Total Credits	**22**

Library=1, sports=1, NPTEL/Student activities =2

COURSE STRUCTURE

OPEN ELECTIVES
(Students have to choose other offering department Open Elective Subjects only)

OPEN ELECTIVE- I (III year I semester)

Sl. No.	Subject Code	Subject Name	Offering Department
1	CE0561	Disaster Management	Civil Engineering
2	EE0561	Non – Conventional Power Generation	Electrical & Electronics Engineering
3	EE0562	Electrical Engineering Materials	
4	EE0563	Nano-Technology	
5	ME0561	Operations Research	Mechanical Engineering
6	ME0562	Basics of Thermodynamics	
7	ME0563	Fabrication Processes	
8	EC0561	Electronic Measuring Instruments	Electronics & Communication Engineering
9	CS0561	OOPS through JAVA	Computer Science & Engineering
10	CS0562	Computer Graphics	

OPEN ELECTIVE- II (III year II semester)

Sl. No.	Subject Code	Subject Name	Offering Department
1	CE0661	Estimation, Quantity Survey & Valuation	Civil Engineering
2	EE0661	Design Estimation and Costing of Electrical Systems	Electrical & Electronics Engineering
3	EE0662	Energy Storage Systems	
4	EE0663	Mechatronics	
5	ME0661	Jet propulsion and Rocket Engineering	Mechanical Engineering
6	ME0662	Ergonomics	
7	EC0661	Principles of Electronic Communications	Electronics & Communication Engineering
8	CS0661	Cyber Security	Computer Science & Engineering
9	CS0662	Database Management Systems	

COURSE STRUCTURE

OPEN ELECTIVE- III (IV year II semester)

S.No.	Subject Code	Subject Name	Offering Department
1	CE0861	Environmental Impact Assessment	Civil Engineering
2	MB0861	Entrepreneur Resource Planning	Master of Business Administration
3	MB0862	Management Information Systems	
4	MB0863	Organizational Behavior	
5	ME0861	Fundamentals of Robotics	Mechanical Engineering
6	ME0862	Non-Conventional Energy Sources	
7	ME0863	Aspects of Heat Transfer in Electrical/Electronically controlled units	
8	EC0861	Principles of Computer Communications and Networks	Electronics & Communication Engineering
9	IT0861	Web technologies	Information Technology
10	CS0861	Simulation & Modeling	Computer Science & Engineering

III Year B.Tech. EEE I-Sem **L T P C**
4 0 0 4

(EC0541) PC. LINEAR AND DIGITAL IC APPLICATIONS
(Common to ECE)

Prerequisite: Pulse and Digitl Circuits

Course Objectives:
The main objectives of the course are:
1. To introduce the basic building blocks of linear integrated circuits.
2. To teach the linear and non - linear applications of operational amplifiers.
3. To introduce the theory and applications of analog multipliers and PLL.
4. To teach the theory of ADC and DAC.
5. To introduce the concepts of waveform generation and introduce some special function ICs.
6. To understand and implement the working of basic digital circuits

Course Outcomes:
On completion of this course, the students will have:
1. A thorough understanding of operational amplifiers with linear integrated circuits.
2. Understanding of the different families of digital integrated circuits and their characteristics.
3. Also students will be able to design circuits using operational amplifiers for various applications.

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

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

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

DAC and ADC Specifications.

UNIT -IV:

Digital Integrated Circuits

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

UNIT -V:

Sequential Logic IC's and Memories

Familiarity with commonly available 74XX & CMOS 40XX Series ICs– All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers. Memories - ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.

TEXT BOOKS:

1. Op-Amps & Linear ICs – Ramakanth A. Gayakwad, PHI, 2003.
2. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd, 2nd Ed., 2003.
3. Digital Fundamentals – Floyd and Jain, Pearson Education, 8th Edition, 2005.

REFERENCE BOOKS:

1. Op Amps and Linear Integrated Circuits-Concepts and Applications James M. Fiore, Cengage Learning/ Jaico, 2009.
2. Operational Amplifiers with Linear Integrated Circuits by K.Lal Kishore – Pearson, 2009.
3. Linear Integrated Circuits and Applications – Salivahana, TMH.
4. Modern Digital Electronics – RP Jain – 4/e – TMH, 2010.
5. Digital Design Principles and Practices – John. F. Wakerly 3/e, 2005.
6. Operational Amplifiers with Linear Integrated Circuits, 4/e William D.Stanley, Pearson Education India, 2009.

III Year B.Tech. EEE I-Sem

L	T	P	C
4	0	0	4

(EC0547) PC- MICROPROCESSORS AND MICROCONTROLLERS

Pre-requisite: Computer programming and Data Structures

Objective: Objectives of this course are

- To familiarize with the architecture of 8086 processor,assembling language programming and interfacing with various modules.
- To understand 8051 Microcontroller concepts, architecture,programming and application of Microcontrollers.

UNIT- I

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

ASSEMBLY LANGUAGE PROGRAMMMING OF 8086: Assembly Directives, Macro's, Simple Programs using Assembler, Implementation of FOR Loop, WHILE, REPEAT and IF-THEN-ELSE Features.

UNIT-II

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

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

UNIT-III

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

UNIT-IV

INTRODUCTION TO MICRO CONTROLLERS: Overview of 8051 Micro Controller, Architecture, I/O ports and Memory Organization, Addressing modes and Instruction set of 8051, Simple Programs using Stack Pointer, Assembly language programming of 8051

INTERRUPTS COMMUNICATION: Interrupts - Timer/Counter and Serial Communication, Programming Timer Interrupts, Programming External H/W interrupts, Programming the serial communication interrupts, Interrupt Priority in the 8051, Programming 8051 Timers, Counters and Programming.

UNIT- V

INTERFACING AND INDUSTRIAL APPLICATIONS: Applications of Micro Controllers, Interfacing 8051 to LED's, Push button, Relay's and Latch Connections, Keyboard Interfacing, Interfacing Seven Segment Display, ADC and DAC Interfacing.

OUTCOMES: After this course, the student

- gets a thorough knowledge on, architecture, pin diagram, register and memory organizations, concept of memory segmentation, minimum and maximum mode of operations
- will be able to draw timing diagrams,
- will be able write programs, peripheral and communication interfacing of 8086 microprocessor and 8051 microcontroller
- Applies the above concepts to real-world electrical and electronics problems and applications.

TEXT BOOKS

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

REFERENCE BOOKS

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

III Year B.Tech. I-Sem **L T P C**
4 0 0 4

(MB0531) HS -MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to all)

Prerequisite : Nil.

Course Objective:

- To understand the concepts and importance of economics in managerial problems
- To understand the basic financial management concepts including the principles of financial analysis

Course Outcomes:

- Students will be able to apply the principles of economics for managerial decisions.
- The students will be able to analyze the financial position of a company with the techniques of financial accounting and ratio analysis

Unit I Introduction & Demand Analysis: Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting- methods of demand forecasting.

Unit II Production & Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Laws of Returns, Internal and External Economies of Scale. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

Unit III Markets & Forms of Business Organisations: Types of competition and Markets, Features of Perfect competition and Monopoly. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing: Objectives and Policies of Pricing. Methods of Pricing. Business: Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Limited companies.

Unit IV Capital Budgeting: Methods and sources of raising capital -Capital Budgeting: Methods of Capital Budgeting: Payback Method,Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

Unit V Introduction to Financial Accounting & Financial Analysis: Accounting concepts and Conventions -Double-Entry Book Keeping, Journal, Ledger, Trial Balance-Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios.

TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, TMH,.
2. Vijay Kumar & Appa Rao Managerial Ecoconomics & Financial Analysis, Cengage.
3. J. V. Prabhakar Rao & P.V. Rao Managerial Ecoconomics & Financial Analysis, Maruthi Publishers,

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson,
3. Lipsey & Chrystel, Economics, Oxford University Press, Domnick Salvatore: Managerial Economics In a Global Economy, Thomson,.
4. Narayanaswamy: Financial Accounting—A Managerial Perspective, PHI, 2012.

III Year B. Tech. EEE I-Sem

L	T	P	C
3	1	0	3

(EE0541) PC - POWER SYSTEMS-II

Pre-requisites: Power Systems –I and Electromagnetic field theory

Objectives:

- To compute inductance and capacitance of different transmission lines.
- To understand performance of short, medium and long transmission lines.
- To examine the traveling wave performance and sag of transmission lines.
- To design insulators for over head lines and understand cables for power transmission.

UNIT- I

TRANSMISSION LINE PARAMETERS: Types of conductors - calculation of resistance for solid conductors - Calculation of inductance for single phase and three phase, single and double circuit lines, concept of GMR & GMD, symmetrical and asymmetrical conductor configuration with and without transposition, Numerical Problems. Calculation of capacitance for 2 wire and 3 wire systems, effect of ground on capacitance, capacitance calculations for symmetrical and asymmetrical single and three phase, single and double circuit lines, Numerical Problems.

UNIT- II

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

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

UNIT – III

POWER SYSTEM TRANSIENTS: Types of System Transients - Travelling or Propagation of Surges - Attenuation, Distortion, Reflection and Refraction Coefficients - Termination of lines with different types of conditions - Open Circuited Line, Short

Circuited Line, T-Junction, Lumped Reactive Junctions (Numerical Problems), Bewley's Lattice Diagrams (for all the cases mentioned with numerical examples).

VARIOUS FACTORS GOVERNING THE PERFORMANCE OF TRANSMISSION LINE: Skin and Proximity effects - Description and effect on Resistance of Solid Conductors - Ferranti effect - Charging Current - Effect on Regulation of the Transmission Line.Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference. Methods of reducing Corona

UNIT- IV

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

SAG AND TENSION CALCULATIONS: Sag and Tension Calculations with equal and unequal heights of towers, Effect of Wind and Ice on weight of Conductor, Numerical Problems - Stringing chart and sag template and its applications.

UNIT-V

UNDERGROUND CABLES: Types of Cables, Construction, Types of Insulating materials, Calculation of Insulation resistance and stress in insulation, Numerical Problems. Capacitance of Single and 3-Core belted cables, Numerical Problems. Grading of Cables - Capacitance grading - Numerical Problems, Description of Inter-sheath grading - HV cables.

OUTCOMES:

- Able to compute inductance and capacitance for different configurations of transmission lines.
- Able to analyze the performance of transmission lines
- Can understand transients phenomenon of transmission lines.
- Able to calculate sag and tension calculations.
- Will be able to understand overhead line insulators and underground cables.

TEXT BOOKS

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

REFERENCE BOOKS

1. I.J. Nagarath & D.P Kothari , Power System Engineering, TMH 2/e, 2010
2. B.R. Gupta, Power System Analysis and Design, Wheeler Publishing.
3. Abhijit Chakrpabarti, Sunitha Halder, Power System Analysis, Operation and control, PHI, 3/e, 2010
4. Turan Gonen, Electrical Power Transmission system engineering Analysis and design, CRC Press (Taylor & Francis Group) Special Indian Edition,2/e.

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III Year B. Tech. EEE I-Sem

L	T	P	C
0	0	3	2

(EE0542) PC - CONTROL SYSTEMS LAB

Any Eight of the following experiments are to be conducted

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

Any two simulation experiments are to be conducted using software tools

1. Simulation of Op-Amp based Integrator and Differentiator circuits.
2. Linear system analysis (Time domain analysis, Error analysis).
3. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system.
4. State space model for classical transfer function– Verification.

REFERENCE BOOKS

1. Manuals of related software.

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III Year B. Tech. EEE I-Sem

L	T	P	C
0	0	3	2

(EE0543) PC - ELECTRICAL AND ELECTRONIC MEASUREMENTS LAB

The following experiments are required to be conducted as compulsory experiments

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

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

9. Calibration LPF wattmeter – by Phantom testing.
10. Measurement of 3-phase power with single watt meter and two CTs.
11. C.T. testing using mutual Inductor – Measurement of % ratio error and phase angle of given CT by Null method.
12. PT testing by comparison – V.G. as Null detector – Measurement of % ratio error and phase angle of the given PT
13. Resistance strain gauge – strain measurements and Calibration.
14. Transformer turns ratio measurement using AC bridges.
15. Measurement of % ratio error and phase angle of given CT by comparison.

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
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III Year B.Tech. EEE I-Sem

L	T	P	C
0	0	3	2

(EC0548) PC - MICROPROCESSORS LAB

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

1. Programs for 16 bit arithmetic operations for 8086 (using various addressing modes)
2. Program for sorting an array for 8086.
3. Program for searching for a number or character in a string for 8086.
4. Program for string manipulations for 8086.
5. Interfacing traffic light controller using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessor kits using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using logical and bit manipulation Instructions of 8086.
11. Program and verify timer/counter in 8086.
12. Program and verify interrupt handling in 8086.
13. UART operation in 8086.
14. Communication between 8086 kit and PC.
15. Interfacing LCD to 8086.
16. Interfacing Matrix/keyboard to 8086.
17. Data Transfer from peripheral to memory through DMA controller 8237/8257.

Note: Minimum of 12 experiments to be conducted.

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III Year B.Tech. I-Sem

L	T	P	C
3	0	0	3

OPEN ELECTIVE-I

(CE0561) DISASTER MANAGEMENT

Pre Requisites: NIL

Course Objectives:
This subject expanins different disasters, tools and methods for disaster management.

Course Outcomes:
Student understands the measures to reduce the risk and loss of property and lives during disaster.

UNIT 1: Understanding Disaster
Concept of Disaster, Different approaches, Concept of Risk, Levels of Disasters, Disaster Phenomena and Events (Global, national and regional)

Hazards and Vulnerability
Natural and man-made hazards; response time, frequency and forewarning levels of different hazards, Characteristics and damage potential or natural hazards; hazard assessment, Dimensions of vulnerability factors; vulnerability assessment, Vulnerability and disaster risk, Vulnerabilities to flood and earthquake hazards.

UNIT 2: Disaster Management Mechanism

Concepts of risk management and crisis managements, Disaster Management Cycle, Response and Recovery, Development, Prevention, Mitigation and Preparedness, Planning for Relief.

UNIT 3: Capacity Building
Capacity Building: Concept, Structural and Nonstructural Measures, Capacity Assessment; Strengthening Capacity for Reducing Risk Counter-Disaster Resources and their utility in Disaster Management, Legislative Support at the state and national levels.

UNIT 4: Coping with Disaster
Coping Strategies; alternative adjustment processes, Changing Concepts of disaster management, Industrial Safety Plan; Safety norms and survival kits. Mass media and disaster management.

UNIT 5: Planning for disaster management
Strategies for disaster management planning, Steps for formulating a disaster risk reduction plan, Disaster management Act and Policy in India. Organizational structure

for disaster management in India. Preparation of state and district disaster management plans.

Text Books

1. Alexander, D. Natural Disasters, ULC press Ltd, London, 1993.
2. Carter, W.N. Disaster Management: A Disaster Management Handbook, Asian Development Bank, Bangkok, 1991.
3. Manual on Natural Disaster Management in India, NCDM, New Delhi, 2001.

References

1. Abarquez I. & Murshed Z. Community Based Disaster Risk Management: Field Practitioner's Handbook, ADPC, Bangkok, 2004.
2. Goudie, A. Geomorphological Techniques, Unwin Hyman, London 1990.
3. Goswami, S.C Remote Sensing Application in North East India, Purbanchal Prakesh, Guwahati, 1997.
4. Chakrabarty, U.K. Industrial Disaster Management and Emergency Response, Asian Book Pvt. Ltd., New Delhi 2007.
5. Disaster Management in India, Ministry of Home Affairs, Government of India, New Delhi, 2011.
6. National Policy on Disaster Management, NDMA, New Delhi, 2009
7. Disaster Management Act. (2005), Ministry of Home Affairs, Government of India, New Delhi, 2005.
8. District Disaster Management Plan-Model Template, NIDM, New Delhi, 2005.
9. Disaster Management, Future challenge and opportunities, Edited by Jagbir singh, I.K. International publishing home Pvt, Ltd.

III Year B.Tech. I-Sem

L	T	P	C
3	0	0	3

OPEN ELECTIVE-I
(EE0561) NON CONVENTIONAL POWER GENERATION

Pre-requisite: Nil.

OBJECTIVES:

- To introduce various types of renewable technologies available.
- The technologies of energy conversion from these resources and their quantitative analysis.

UNIT - I Fundamentals of Solar Energy-Solar spectrum- Solar Radiation on Earth's surface-Solar radiation geometry-Solar radiation measurements- Solar radiation data-Solar radiation on horizontal and tilted surfaces. Solar Thermal conversion- Flat plate collectors- concentrated collectors- construction and thermal analysis- Solar applications- Solar ponds- Heliostat systems-water heater-air heater-solar still.

UNIT – II Solar-Electric Power generation- Photovoltaic cells- Equivalent circuit- V-I Characteristics- Photovoltaic modules – constructional details- design considerations-Tracking- Maximum power point tracking - Solar Thermo electric conversion.

UNIT – III Wind Energy- Fundamentals of wind energy-power available in wind- Betz Limit-Aerodynamics of wind turbine- Wind turbines- Horizontal and vertical axis turbines –their configurations- Wind Energy conversion systems.

UNIT – IV Energy from Bio Mass- Various fuels- Sources-Conversion technologies-Wet Processes – Dry Processes- Bio Gas generation – Aerobic and anaerobic digestion - Factors affecting generation of bio gas - Classification of bio gas plants-Different Indian digesters- Digester design considerations - Gasification process - Gasifiers – Applications. Geothermal Energy - sources- Hydrothermal convective - Geo-pressure resources - Petro-thermal systems (HDR) - Magma Resources-Prime Movers.

UNIT – V OTEC Systems- Principle of operation - Open and closed cycles, Energy from Tides - Principle of Tidal Power - Components of tidal Power plants - Operation Methods - Estimation of Energy in Single and double basin systems - Energy and Power from Waves-Wave energy conversion devices - Fuel Cells - Design and Principle of operation - Types of Fuel Cells - Advantages and disadvantages - Types of Electrodes – Applications - Basics of Batteries - Constructional details of Lead acid batteries - Ni-Cd Batteries.

OUTCOMES:

- The student will be able analyse solar thermal and photovoltaic systems and related technologies for energy conversion.
- Wind energy conversion and devices available for it.
- Biomass conversion technologies.

- Geo thermal resources and energy conversion principles and technologies.
- Power from oceans (thermal, wave, tidal) and conversion and devices.
- Fundamentals of fuel cells and commercial batteries.

TEXT BOOKS

1. John Twidell & Wier, Renewable Energy Resouces, CRC Press, 2009.
2. G.D.Rai – Non Conventional Energy sources, Khanna publishers.

REFERENCE BOOKS

1. D.P .Kothari, Singal,Rakesh, Ranjan, Renewable Energy sources and Emerging Technologies, PHI, 2009.
2. F.C.Treble, Generating Electricity from Sun.
3. C.S.Solanki, Solar Photo volatics- Fundamentals- Principles and Applications, PHI 2009
4. S.P.Sukhatme, Solar Energy Principles and Application - TMH

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III Year B.Tech. I-Sem

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OPEN ELECTIVE-I
(EE0562) ELECTRICAL ENGINEERING MATERIALS

Pre-requisites: Nil

Objectives: To understand the importance of various materials used in electrical engineering and obtain a qualitative analysis of their behavior and applications.

UNIT- I

DIELECTRIC MATERIALS: Dielectric as Electric Field Medium, leakage currents, dielectric loss, dielectric strength, breakdown voltage, breakdown in solid dielectrics, flashover, liquid dielectrics, electric conductivity in solid, liquid and gaseous dielectrics, Ferromagnetic materials, properties of ferromagnetic materials in static fields, spontaneous, polarization, curie point, anti-ferromagnetic materials, piezoelectric materials, pyroelectric materials.

UNIT – II

MAGNETIC MATERIALS: Classification of magnetic materials, spontaneous magnetization in ferromagnetic materials, magnetic Anisotropy, Magnetostriction, diamagnetism, magnetically soft and hard materials, special purpose materials, feebly magnetic materials, Ferrites, cast and cermet permanent magnets, ageing of magnets. factors effecting permeability and hysteresis

UNIT – III

SEMICONDUCTOR MATERIALS: Properties of semiconductors, Silicon wafers, integration techniques, Large and very large scale integration techniques (VLSI)

UNIT – IV

MATERIALS FOR ELECTRICAL APPLICATIONS: Materials used for Resistors, rheostats, heaters, transmission line structures, stranded conductors, bimetals fuses, soft and hard solders, electric contact materials, electric carbon materials, thermocouple materials. Solid, Liquid and Gaseous insulating materials, Effect of moisture on insulation.

UNIT – V

SPECIAL PURPOSE MATERIALS: Refractory Materials, Structural Materials, Radioactive Materials, Galvanization and Impregnation of materials, Processing of

electronic materials, Insulating varnishes and coolants, Properties and applications of mineral oils, Testing of Transformer oil as per ISI

OUTCOMES: Will be able to

- Understand various types of dielectric materials, their properties in various conditions.
- Evaluate magnetic materials and their behavior.
- Evaluate semiconductor materials and technologies.
- Materials used in electrical engineering and applications.

TEXT BOOKS

1. R K Rajput: A course in Electrical Engineering Materials, Laxmi Publications. 2009
2. T K BasaK: A course in Electrical Engineering Materials:, New Age Science Publications 2009
3. TTTI Madras: Electrical Engineering Materials
4. Adrianus J.Dekker: Electrical Engineering Materials, THM Publication

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OPEN ELECTIVE-I
(EE0563) NANO-TECHNOLOGY

Pre-requisites: Nil

OBJECTIVES: To enable the student to understand fundamentals of nano materials and technologies for these materials and their manufacturing, applications in various fields.

UNIT - I

Background of Nanotechnology: Scientific Revolutions, Nanotechnology and Nanomachines - The Periodic Table, Atomic Structure, Molecules and Phases, Energy, Molecular and Atomic size, Surfaces and Dimensional Space, Top down and Bottom up approach.

UNIT - II

Molecular Nanotechnology: Atoms by inference, Electron Microscopes, Scanning electron microscope, Modern transmission electron microscope, Scanning probe microscope-atomic force microscope, scanning, tunneling microscope, Self Assembly.

UNIT - III

Nanopowders and Nanomaterials: Preparation, Plasma arcing, chemical vapor deposition, Sol-gels, Electrodeposition, Ball milling, using natural nanoparticles, Applications of nanomaterials.

UNIT - IV

Nanoelectronics: Approaches to nanoelectronics, Fabrication of integrated circuits, MEMS, NEMS, Nano circuits, Quantum wire, Quantum well, DNA-directed assembly and application in electronics.

UNIT - V

Applications: MEMS, NEMS, Coatings, Optoelectronic Devices, Environmental Applications, Nanomedicine.

OUTCOMES:

- To evaluate electronic structural studies of nano materials and different synthesis methods to obtain nano structures.
- Understand characterization techniques through various measurements to study electrical, mechanical,thermal properties of nano materials.

- Applications of nano materials for specific purposes like MEMS, NEMS, nano electronics, energy storage.

TEXT BOOKS

1. Introduction to Nanoscience and Nanotechnology Gabor L. Hornyak, **NanoThread, Inc., Golden, Colorado, USA;** H.F. Tibbals, **University of Texas Southwestern Medical Center, Dallas, USA;** Joydeep Dutta**, Asian Institute of Technology, Pathumthani, Thailand;** John J. Moore, **Colorado School of Mines, Golden, USA**
2. Introduction to Nanotechnology by Charles P. Poole Jr and Frank J.Owens Wiley India Pvt Ltd.
3. Introduction to Nanoscience and Nanotechnology, Chatopadhyaya.K.K, and Banerjee A.N,
4. Introduction to nano tech by phani kumar
5. Introduction to Nano Technology by Charles P. Poole Jr and Frank J. Owens. Wiley India Pvt Ltd.
6. Introduction to Nanoscience and Nanotechnology, Chatopadhyaya.K.K, and Banerjee A.N,
7. NANOTECHNOLOGY Basic Science and EmergingTsechnologies by Michael Wilson, Kamali Kannangara, Geoff Smith, Michelle Simmons, Burkhard Raguse**-** CHAPMAN & HALL/CRC PRESS 2002.

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OPEN ELECTIVE-I
(ME0561) OPERATIONS RESEARCH

Prerequisites: None

Objectives:
Understanding the mathematical importance of development of model in a particular optimization model for the issue and solving it.

Outcomes:
Understanding the problem, identifying variables & constants, formulas of optimization model and applying appropriate optimization Techniques

UNIT – I
Development – Definition– Characteristics and Phases – Types of models – Operations Research models – applications.
ALLOCATION: Linear Programming Problem - Formulation – Graphical solution – Simplex method – Artificial variables techniques: Two–phase method, Big-M method; Duality Principle.

UNIT – II
TRANSPORTATION PROBLEM – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy.
Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem; Traveling Salesman problem.

UNIT – III
SEQUENCING – Introduction – Flow **–**Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines-graphical model
REPLACEMENT: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely-Group Replacement.

UNIT – IV
THEORY OF GAMES: Introduction –Terminology– Solution of games with saddle points and without saddle points- 2 x 2 games –m x 2 & 2 x n games - graphical method – m x n games - dominance principle.
INVENTORY: Introduction – Single item, Deterministic models – Types - Purchase inventory models with one price break and multiple price breaks –Stochastic models – demand discrete variable or continuous variable – Single Period model with no setup cost.

UNIT – V

WAITING LINES: Introduction – Terminology-Single Channel – Poisson arrivals and Exponential Service times – with infinite population and finite population models Multichannel – Poisson arrivals and exponential service times with infinite population.

DYNAMIC PROGRAMMING:

Introduction – Terminology- Bellman's Principle of Optimality – Applications of dynamic programming- shortest path problem – linear programming problem.

TEXT BOOK :

1. Operation Research /J.K.Sharma/ MacMilan.
2. Operations Research/A.C.S.Kumar/Yesdee

REFERENCE BOOKS :

1. Operations Research: Methods and Problems / Maurice Saseini, Arhur Yaspan and Lawrence Friedman
2. Operations Research /A.M.Natarajan, P.Balasubramaniam, A. Tamilarasi/Pearson Education.
3. Operations Research / Wagner/ PHI Publications.
4. Introduction to O.R/Hillier & Libermann (TMH).
5. Introduction to O.R /Taha/PHI

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OPEN ELECTIVE-I

(ME0562) BASICS OF THERMODYNAMICS

Pre-requisite: Engineering Chemistry and Physics

Course Objective: To understand the treatment of classical Thermodynamics and to apply the First and Second laws of Thermodynamics to engineering applications

Course Outcomes:

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

- Understand and differentiate between different thermodynamic systems and processes
- Understand and apply the laws of Thermodynamics to different types of systems undergoing various processes
- Understand and analyze the Thermodynamic cycles

UNIT – I
Introduction: Basic Concepts:

System, Control Volume, Surrounding, Boundaries, Universe, Types of Systems, Macroscopic and Microscopic viewpoints, Concept of Continuum, Thermodynamic Equilibrium, State, Property, Process, Exact & Inexact Differentials, Cycle, Reversibility – Quasi – static Process, Irreversible Process, Causes of Irreversibility

UNIT II

Types, Displacement & Other forms of Work, Heat, Point and Path functions, Zeroth Law of Thermodynamics – Concept of Temperature – Principles of Thermometry – Reference Points – Const. Volume gas Thermometer – Scales of Temperature, Ideal Gas Scale

UNIT – III

First and Second Laws of Thermodynamics: First Law: Cycle and Process, Specific Heats (cp and cv), Heat interactions in a Closed System for various processes, Limitations of First Law, Concept of Heat Engine (H.E.) and Reversed H.E. (Heat Pump and Refrigerator), Efficiency/COP, Second Law: Kelvin-Planck and Clausius Statements, Carnot Cycle, Carnot Efficiency, Statement of Clausius Inequality, Property of Entropy, T-S and P-V Diagrams

UNIT IV

Mixtures of perfect Gases – Mole Fraction, Mass friction Gravimetric and volumetric Analysis – Dalton's Law of partial pressure, Avogadro's Laws of additive volumes – Mole fraction , Volume fraction and partial pressure, Equivalent Gas const.

Atmospheric air - Psychrometric Properties – Dry bulb Temperature, Wet Bulb Temperature, Dew point Temperature, , Specific Humidity, Relative Humidity, saturated Air, Vapour pressure, Degree of saturation – Adiabatic Saturation ,Psychrometric chart.

UNIT - V

Power Cycles : Otto, Diesel cycles - Description and representation on P–V and T-S diagram, Thermal Efficiency, Mean Effective Pressures on Air standard basis

Refrigeration Cycles:

Bell-Coleman cycle, Vapour compression cycle-performance Evaluation.

TEXT BOOKS :

1. Engineering Thermodynamics / PK Nag /TMH, III Edition
2. Thermodynamics / C.P.Arora.

REFERENCE BOOKS:

1. Thermodynamics – An Engineering Approach – Yunus Cengel & Boles /TMH
2. Fundamentals of Classical Thermodynamics – G. Van Wylan & R.E. Sonntag – John Wiley Pub.
3. Thermodynamics – J.P.Holman / McGrawHill
4. Engineering Thermodynamics – Jones & Dugan
5. Thermodynamics & Heat Engines – Yadav – Central Book Depot, Allahabad.

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Open Elective – I

(ME0563) FABRICATION PROCESSES

Prerequisites: Nil

Objectives:
Understand the philosphipies of various Manufacturing process.

Outcomes:
For given product, one should be able identify the manufacturing process.

UNIT – I

Casting : Steps involved in making a casting – Advantage of casting and its applications; Patterns - Pattern making, Types, Materials used for patterns, pattern allowances and their construction; Properties of moulding sands.

Methods of Melting - Crucible melting and cupola operation – Defects in castings;

Casting processes – Types – Sand moulding, Centrifugal casting, die- casting, Investment casting, shell moulding; Principles of Gating – Requirements – Types of gates, Design of gating systems – Riser – Function, types of Riser and Riser design.

UNIT – II

Welding: Classification – Types of welds and welded joints; Gas welding - Types, oxy-fuel gas cutting. Arc welding, forge welding, submerged arc welding, Resistance welding, Thermit welding.

Inert Gas Welding _ TIG Welding, MIG welding, explosive welding, Laser Welding; Soldering and Brazing; Heat affected zone in welding. Welding defects – causes and remedies; destructive and non- destructive testing of welds.

UNIT – III

Hot working, cold working, strain hardening, recovery, recrystallisation and grain growth.

Stamping, forming and other cold working processes. Blanking and piercing – Bending and forming – Drawing and its types – wire drawing and Tube drawing – coining – Hot and cold spinning.

Types of presses and press tools. Forces and power requirement in the above operations.

UNIT – IV

Extrusion of Metals : Basic extrusion process and its characteristics. Hot extrusion and cold extrusion - Forward extrusion and backward extrusion – Impact extrusion – Extruding equipment – Tube extrusion and pipe making, Hydrostatic extrusion. Forces in extrusion

UNIT – V

Forging Processes : Forging operations and principles – Tools – Forging methods – Smith forging, Drop Forging – Roll forging – Forging hammers : Rotary forging – forging defects – cold forging, swaging, Forces in forging operations.

TEXT BOOKS :

1. Manufacturing Technology / P.N. Rao/TMH

REFERENCE BOOKS :

1. Production Technology / R.K. Jain

2. Metal Casting / T.V Ramana Rao / New Age

3. Principles of Metal Castings / Rosenthal.

4. Welding Process / Parmar /
5. Production Technology /Sarma P C /

6. Manufacturing Engineering and Technology/Kalpakjin S/ Pearson Edu.

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(OPEN ELECTIVE - I)
(EC0561) ELECTRONIC MEASURING INSTRUMENTS

Note: No detailed mathematical treatment is required.

Prerequisite : Nil

Course Objectives:

- It provides an understanding of various measuring systems functioning and metrics for performance analysis.
- Provides understanding of principle of operation, working of different electronic instruments viz. signal generators, signal analyzers, recorders and measuring equipment.
- Provides understanding of use of various measuring techniques for measurement of different physical parameters using different classes of transducers.

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Unit-I:

Block Schematics of Measuring Systems and Performance Metrics: Performance Characteristics, Static Characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag.

Unit-II:

Signal Generators: AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square wave Generators, Function Generators, Arbitrary Waveform Generator, and Specifications.

Unit-III:

Measuring Instruments: DC Voltmeters, D' Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Multimeters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments. CRT, Block Schematic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes.

Unit-IV:

Recorders: X-Y Plotter, Curve tracer, Galvanometric Recorders, Servo transducers, pen driving mechanisms, Magnetic Recording, Magnetic recording techniques.

Unit-V:

Transducers: Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Digital Temperature

sensing system, Piezoelectric Transducers, Variable Capacitance Transducers, Magneto Strictive Transducers.

TEXT BOOKS:

1. Electronic Measurements and Instrumentation: B.M. Oliver, J.M. Cage TMH Reprint 2009.
2. Electronic Instrumentation: H.S.Kalsi – TMH, 2nd Edition 2004.

REFERENCES:

1. Electronic Instrumentation and Measurements – David A. Bell, Oxford Univ. Press, 1997.
2. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbincs, W.D. Cooper: PHI 5th Edition 2003.
3. Electronic Measurements and Instrumentation – K. Lal Kishore, Pearson Education 2010.
4. Industrial Instrumentation: T.R. Padmanabham Springer 2009.

Course Outcomes:

On completion of this course student can be able to

- Identify the various electronic instruments based on their specifications for carrying out a particular task of measurement.
- Measure various physical parameters by appropriately selecting the transducers.
  Use various types of signal generators, signal analyzers for generating and analyzing various real-time signals

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OPEN ELECTIVE – I

(CS0561) OOPS THROUGH JAVA

PREREQUISITES:

1. A course on "Computer Programming & Data Structures"

COURSE OBJECTIVES:

1. Introduces object oriented programming concepts using the Java language.
2. Introduces the design of Graphical User Interface using applets and swings

SYLLABUS:

UNIT – I

Object oriented thinking and Java Basics- Need for oop paradigm, summary of oop concepts, coping with complexity, abstraction mechanisms. A way of viewing world – Agents, responsibility, messages, methods, History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, method binding, inheritance, overriding and exceptions, parameter passing, recursion, nested and inner classes, exploring string class.

UNIT – II

Inheritance, Packages and Interfaces – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces, Exploring java.io.

UNIT – III

Exception handling and Multithreading-- Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions,

creating own exception sub classes. String handling,Exploring java.util.Differences between multi threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication, thread groups, daemon threads. Enumerations, auto boxing, annotations, generics.

UNIT – IV

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

UNIT – V

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets. Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

TEXT BOOKS:

1. Java the complete reference, 7th editon, Herbert Schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson Eduction.

REFERENCE BOOKS:

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch,John Wiley & sons.
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. An introduction to Java programming and object oriented application development, R.A. Johnson- Thomson.

COURSE OUTCOMES:

1. Develop applications for a range of problems using object- oriented programming techniques
2. Design simple Graphical User Interface applications
3. Implement the packages and interfaces
4. Introduce exception handling, event handling and multithreading

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OPEN ELECTIVE – I

(CS0562) COMPUTER GRAPHICS

PREREQUISITES:

1. Familiarity with the theory and use of coordinate geometry and of linear algebra such as matrix multiplication.
2. A course on "Computer Programming and Data Structures"

COURSE OBJECTIVES:

1. The aim of this course is to provide an introduction of fundamental concepts and theory of computer graphics.
2. Topics covered include graphics systems and input devices; geometric representations and 2D/3D transformations; viewing and projections; illumination and color models; animation; rendering and implementation; visible surface detection;

SYLLABUS:

UNIT-I

Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices, Output primitives:Points and lines, line drawing algorithms (Bresenham's and DDA Algorithm), mid-point circle and ellipse algorithms Filled area primitives: Scan-line polygon fills algorithm, boundary-fill and flood-fill algorithms.

UNIT-II

2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems, 2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm, Polygon Filling.

UNIT-III

3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

UNIT-IV

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations. 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT-V

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications, Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub- division and octree methods.

TEXT BOOKS:

1. "Computer Graphics C version", Donald Hearn and M.Pauline Baker, Pearson Education
2. "Computer Graphics Principles & practice", second edition in C, Foley, Van Dam, Feiner and Hughes, Pearson Education.
3. Computer Graphics, Steven Harrington, TMH

REFERENCE BOOKS:

1. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
2. Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
3. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.

COURSE OUTCOMES:

1. Acquire familiarity with the relevant mathematics of computer graphics.
2. Be able to design basic graphics application programs, including animation
3. Be able to design applications that display graphic images to given specifications

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(EE0651) PE-I.1 COMPUTER METHODS IN POWER SYSTEMS

Pre-requisites: Power Systems-I, Power Systems –II, Electrical Circuits and Mathematics

Objectives: Objectives this course, are

- to understand and develop Y_{bus} and Z_{bus} matrices
- to know the importance of load flow studies and its importance
- to understand and applications of short circuit studies
- to explain rotor angle stability of power systems

UNIT-I: POWER SYSTEM NETWORK MATRICES: Graph Theory: Definitions and Relevant concepts in Graph Theory, Network Matrices. Transmission Network Representations: Bus Admittance frame and Bus Impedance frame. Formation of Y_{bus}: Direct and Singular Transformation Methods, Numerical Problems. Formation of Z_{Bus}: Modification of existing Z_{Bus} Matrix for addition of a new branch, & complete Z_{Bus} building algorithm Numerical Problems.

UNIT–II: POWER FLOW STUDIES-I : Introduction: Necessity of Power Flow Studies, Bus classification and Notations, Convergence & Bus mismatch criterias. Load Flow Methods: Gauss-Seidal Method in complex form without & with voltage control buses, line flows and loss calculations, Newton Raphson method in Polar and Rectangular form, derivation of Jacobian elements, Numerical Problems for one or two iterations.

UNIT–III: POWER FLOW STUDIES-II: Introduction to sensitivity & decoupled submatrices of J-matrix, Decoupled load flow method and its assumptions, Fast Decoupled load method and its assumptions, Comparison of Different Methods – DC load Flow method, Numerical problems for one or two iterations.

UNIT–IV: SHORT CIRCUIT ANALYSIS: Per-Unit Systems. Per-Unit equivalent reactance network of a three phase Power System, Numerical Problems. Symmetrical fault Analysis: Short Circuit Current and MVA Calculations, Fault levels, Application of Series Reactors, Numerical Problems. Symmetrical Components, sequence impedances and networks, Numerical Problems. Unsymmetrical Fault Analysis: Fault current calculations for LG, LL, LLG faults with and without fault impedance, Numerical Problems.

UNIT–V: POWER SYSTEM STABILITY ANALYSIS: Introduction to Power System Stability issues. Rotor dynamics & Swing equation, Power angle equation with & without neglecting line resistance, Steady State Stability, Determination of Transient Stability through Equal Area Criterion for single machine infinite system, Critical clearing angle & time, Numerical problems. Multi-machine transient analysis: Classical representation of system and its assumptions, Solution of Swing Equation by Point-by-Point Method, Methods to improve Stability.

OUTCOMES:

- After this course, the student will be able to
- develop the Y_{bus} and Z_{bus} matrices
- develop load flow programs
- understand the importance of short circuit studies
- understand stability and instability power systems

TEXT BOOKS

1. Abhijit Chakrabarthi , Sunita Haldar, Power System Analysis Operation and Control, 3 ed , PHI,2010.
1. I.J.Nagrath & D.P.Kothari: Modern Power system Analysis – Tata McGraw-Hill Publishing company, 2nd edition.

REFERENCE BOOKS

1. M.A.Pai,Computer Techniques in Power System Analysis, TMH Publications
2. Grainger and Stevenson, Power System Analysis, Tata McGraw Hill.
3. K.Uma rao, Computer Techniques and Models in Power Systems, I.K. International.
4. Hadi Saadat, Power System Analysis, TMH Edition.

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(CS0659) PE-I.2- COMPUTER ORGANIZATION

PRE-REQUISITE:

1. A course on “Digital Logic Design”

COURSE OBJECTIVE:

The aim of the course is to describe the basic principles of organization, operation and performance of modern-day computer systems

UNIT-1:
BASIC STRUCTURE OF COMPUTERS:
Computer Types, Functional unit, Basic concepts, Bus structures, Software, Performance, Multiprocessors and Multi computers. Decimal Arithmetic unit, Decimal Arithmetic operations, Data Representation, Fixed Point Representation, Floating Point Representation, Error Detection codes.

UNIT-II:
REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS:
Register Transfer language, Register Transfer Bus and Memory Transfers, Arithmetic Micro operations, Logic micro operations, Shift micro operations, Arithmetic logic shift unit, Instruction codes, Computer Registers, Computer instructions, Instruction cycle.

UNIT–III:
MEMORY – REFERENCE INSTRUCTIONS.
Input Output and Interrupt. STACK organization. Instruction formats. Addressing modes, DATA Transfer and manipulation, Program control, Reduced Instruction set computer.
MICRO PROGRAMMED CONTROL: Control memory, Address sequencing, micro program example, design of control unit Hard wired control, Micro programmed control

UNIT-IV:
THE MEMORY SYSTEM:
Basic concepts semiconductor RAM memories, Read-only memories, Cache memories performance considerations, Virtual memories secondary storage, Introduction to RAID.
INPUT-OUTPUT ORGANIZATION: Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes, Priority Interrupt Direct Memory Access. Input-output processor (IOP) Serial communication; introduction to peripheral component, inter connect (PCI) bus introduction to Standard serial communication protocols like RS232, USB, IEEE 1394.

UNIT-V:

PIPELINE AND VECTOR PROCESSING:

Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors. MULTI PROCESSORS: Characteristics oF Multiprocessors, Interconnection Structures, Interprocessor Arbitration. Inter Processor Communication and Synchronization Cache Coherence.Shared Memory Multiprocessors.

OUTCOMES: After this course, the student

- Evaluates necessary mathematical representations for computer operation
- Understands the arithmetic and logical operations at register level
- Evaluates memory operations, differentiate various storage devices
- Understands input and output devices of the organization
- Understands the interfacing need for multiprocessor systems and their architecture.

TEXT BOOKS:

1. M.Moris Mano, Computer Systems Architecture –IIIrd Edition, PHI/Pearson.
2. V.Rajaraman and T.Radhakrishnan, Computer Organization and Architecture, PHI Publications.

REFERENCES:

1. William Stallings, Computer Organization and Architecture – Sixth Edition, PHI/Pearson.
2. Andrew S. Tanenbaum, Structured Computer Organization –4th Edition PHI/Pearson.
3. Sivaraama Dandamudi Fundamentals or Computer Organization and Design, - Springer Int. Edition.
4. Car Hamacher, Zvonks Vranesic, SafeaZaky, Computer Organization –Vth Edition, McGraw Hill.

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(EE0652) PE- I.3 SPECIAL MACHINES

Pre-requisites: Electrical Machines-I and Electrical Machines-II

Objectives: Objectives of this course are

- To impart knowledge on construction, principle of operation, control and performance of stepper motors
- To impart knowledge on construction, principle of operation, control and performance of switched reluctance motors
- To impart knowledge on construction, principle of operation, control and performance of Brushless DC motors
- To impart knowledge on construction, principle of operation, control and performance of linear induction motor.

UNIT-1 SPECIAL TYPES OF D.C MACHINES-I

Series booster-Shunt booster-Non-reversible boost-Reversible booster

SPECIAL TYPES OF DC MACHINES –II

Armature excited machines—Rosenberg generator- The Amplidyne and metadyne—Rototrol and Regulex-third brush generator-three-wire generator-dynamometer.

UNIT -II STEPPER MOTORS

Introduction-synchronous inductor (or hybrid stepper motor), Hybrid stepping motor, construction, principles of operation, Energisation with two phase at a time- essential conditions for the satisfactory operation of a 2-phase hybrid step motor- very slow-speed synchronous motor for servo control-different configurations for switching the phase windings-control circuits for stepping motors-an open-loop controller for a 2-phase stepping motor.

UNIT-III VARIABLE RELUCTANCE STEPPING MOTORS

Variable reluctance (VR) Stepper motors, single-stack VR step motors, Multiple stack VR motors-Open-loop control of 3-phase VR step motor-closed-Loop control of step motor, discriminator (or rotor position sensor) transilator, major loop-characteristics of step motor in open-loop drive – comparison between open-loop position control with step motor and a position control servo using a conventional (dc or ac) servo motor-Suitability and areas of application of stepper motors-5- phase hybrid stepping motor-single phase-stepper motor, the construction, operating principle torque developed in the motor.

SWITCHED RELUCTANCE MOTOR

Introduction – improvements in the design of conventional reluctance motors- Some distinctive differences between SR and conventional reluctance motors-principle of operation of SRM- Some design aspects of stator and rotor pole arcs, design of stator

and rotor and pole arcs in SR motor-determination of L(θ)--- θ profile –power converter for SR motor-A numerical example –Rotor sensing mechanism and logic control, drive and power circuits, position sensing of rotor with Hall problems—derivation of torque expression, general linear case.

UNIT –IV

PERMANENT MAGNET MATERIALS AND MOTORS

Introduction, Hysteresis loops and recoil line- stator frames (pole and yoke - part) of conventional PM dc Motors, Equivalent circuit of a PM-Development of Electronically commutated dc motor from conventional dc motor.

BRUSHLESS DC MOTOR

Types of construction – principle of operation of BLDM- sensing and switching logic scheme, sensing logic controller, lockout pulses –drive and power circuits, Base drive circuits, power converter circuit-Theoretical analysis and performance prediction, modeling and magnet circuit d-q analysis of BLDM -transient analysis formulation in terms of flux linkages as state variables-Approximate solution for current and torque under steady state –Theory of BLDM as variable speed synchronous motor (assuming sinusoidal flux distribution)- Methods or reducing Torque Pulsations, 180 degrees pole arc and 120 degree current sheet.

UNIT-V

LINEAR INDUCTION MOTOR

Development of a double sided LIM from rotary type IM- A schematic of LIM drive for electric traction development of one sided LIM with back iron-field analysis of a DSLIM fundamental assumptions.

OUTCOMES: After the course, the student

- Acquires knowledge on constructional features of Rosenberg generator, amplidyne, metadyne, etc.,
- Obtains knowledge on stepper motors and variable reluctance motors
- Will be exposed to magnetic materials and BLDC motors and linear induction motor.

TEXT BOOKS

1. K.Venkataratnam, Special electrical machines, university press.
2. R.K. Rajput - Electrical machines - 5th edition.
3. V.V. Athani - Stepper motor: Fundamentals, Applications and Design, New age International publishers.

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(EE0653) PE-II.1 DIGITAL CONTROL SYSTEMS

Pre-requisites: Mathematics, Control Systems

OBJECTIVES: Objectives of this course are

- to understand the fundamentals of digital control systems, z-transforms
- to understand state space representation of the control systems, concepts of controllability and observability
- to study the estimation of stability in different domains
- to understand the design of discrete time control systems, compensators, state feedback controllers, state observers through various transformations

UNIT – I INTRODUCTION TO DIGITAL CONTROL SYSTEMS AND Z-TRANSFORMS: Introduction - Merits and Demerits of Digital Control Systems - Practical aspects of the choice of sampling rate and Multirate sampling - Basic discrete time signals - Quantization – Sampling Theorem - Data Conversions and Quantization - Sampling process - Mathematical Modeling - Data Reconstruction and Filtering of sampled signals - Zero - Order Hold (ZOH). z- Transform and Inverse z-Transform, Relationship between s - plane and z - plane - Difference equation - Solution by recursion and z-Transform - Pulse Transfer Functions of the ZOH and relationship between G(s) and G(z) - Bilinear Transformation .

UNIT- I INPUT/OUTPUT ANALYSIS OF DIGITAL CONTROL SYSTEMS: Pulse transfer function - z transform analysis of open loop, closed loop systems - Modified z Transform - transfer function - Stability of linear digital control systems - Stability tests – Jury Stability test. Root loci - Frequency domain analysis - Bode plots - Gain margin and phase margin.

UNIT – III DESIGN OF CONTROLLERS FOR I/O MODEL DIGITAL CONTROL SYSTEMS: Cascade and Feedback Compensation by continuous data controllers - Digital controllers - Design using Bilinear Transformation - Realization of Digital PID controllers, Design of Digital Control Systems based on Root Locus Technique.

UNIT – IV STATE SPACE ANALYSIS AND STATE FEEDBACK CONTROL DESIGN OF DIGITAL CONTROL SYSTEMS: State Equations of discrete data systems, solution of discrete state equations, State Transition Matrix: Computation methods for State Transition Matrix: z - transform method - Relation between State Equations and Pulse Transfer Functions. Concepts on Controllability and Observability - Pole placement design by state feed back.

UNIT- V DIGITAL STATE OBSERVER AND STABILITY ANALYSIS

Design of the full order and reduced order state observer, Design of Dead beat Controller - some case studies - Stability analysis of discrete time systems based on Lyapunov approach.

OUTCOMES: After this course, the student

- will be able to map S-plane and Z-plane, do state-space analysis
- will be able to do stability analysis in S-domain and Z-domains
- will be able to do stability analysis through bilinear transformation and R-H criteria,
- to design of discrete-time control systems, design of lag, lead, lead-lag compensators, design of PID controllers and design of state feedback controllers and observers,
- applies the above concepts to real-world electrical and electronics problems and applications.

TEXT BOOKS

1. K. Ogata, Discrete Time Control Systems, PHI/Addison - Wesley Longman Pte. Ltd., India, Delhi, 1995.
2. B.C Kuo, Digital Control Systems, 2nd Edition, Oxford University Press, Inc., 1992.

REFERENCE BOOKS

1. F. Franklin, J.D. Powell, and M.L. Workman, Digital control of Dynamic Systems, Addison - Wesley Longman, Inc., Menlo Park, CA , 1998.
2. M. Gopal, Digital Control and State Variable Methods, Tata McGraw Hill, India, 1997.
3. C. H. Houpis and G.B. Lamont, Digital Control Systems, McGraw Hill, 1985.
4. John S. Baey, Fundamentals of Linear State Space Systems, McGraw Hill, 1st edition.
5. Bernard Fried Land, Control System Design, McGraw Hill, 1st edition.
6. Dorsay, Continuous and Discrete Control Systems, McGraw Hill.

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(EE0654) PE- II.2 OPTIMIZATION TECHNIQUES

Pre-requisites: Electrical Circuits, Electronic Devices and Circuits

OBJECTIVES: Objectives of this course are

- to introduce various optimization techniques i.e classical, linear programming, transportation problem, simplex algorithm, dynamic programming
- constrained and unconstrained optimization techniques for solving and optimizing an electrical and electronic engineering circuits design problems in real world situations.
- to explain the concept of Dynamic programming and its applications to project implementation.

UNIT – I INTRODUCTION AND CLASSICAL OPTIMIZATION TECHNIQUES: Statement of an Optimization problem – design vector – design constraints – constraint surface – objective function – objective function surfaces – classification of Optimization problems. **Classical Optimization Techniques:** Single variable Optimization – multi variable Optimization without constraints – necessary and sufficient conditions for minimum/maximum – multivariable Optimization with equality constraints. Solution by method of Lagrange multipliers – Multivariable Optimization with inequality constraints – Kuhn – Tucker conditions.

UNIT – II LINEAR PROGRAMMING: Standard form of a linear programming problem – geometry of linear programming problems – definitions and theorems – solution of a system of linear simultaneous equations – pivotal reduction of a general system of equations – motivation to the simplex method – simplex algorithm.
Transportation Problem: Finding initial basic feasible solution by north – west corner rule, least cost method and Vogel's approximation method – testing for optimality of balanced transportation problems.

UNIT – III UNCONSTRAINED NONLINEAR PROGRAMMING: One dimensional minimization methods, Classification, Fibonacci method and Quadratic interpolation method
Unconstrained Optimization Techniques: Univariant method, Powell's method and steepest descent method.

U**NIT – IV CONSTRAINED NONLINEAR PROGRAMMING:** Characteristics of a constrained problem - classification - Basic approach of Penalty Function method -

Basic approach of Penalty Function method - Basic approaches of Interior and Exterior penalty function methods - Introduction to convex programming problem.

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

OUTCOMES: After this course, the student will be able to

- explain the need of optimization of engineering systems
- understand optimization of electrical and electronics engineering problems
- apply classical optimization techniques, linear programming, simplex algorithm, transportation problem
- apply unconstrained optimization and constrained non-linear programming and dynamic programming
- formulate optimization problems.

TEXT BOOKS

1. Singiresu S. Rao, Engineering Optimization: Theory and Practice by John Wiley and Sons, 4th edition, 2009.
2. H.S. Kasene & K.D.Kumar, Introductory Operations Research, Springer (India), Pvt. Ltd.

REFERENCE BOOKS

1. George Bernard Dantzig, Mukund Narain Thapa, “Linear programming”, Springer series in operations research 3rd edition, 2003.
2. H.A. Taha, “Operations Research: An Introduction”, 8th Edition, Pearson/Prentice Hall, 2007.
3 Kalyanmoy Deb, “Optimization for Engineering Design – Algorithms and Examples”, PHI Learning Pvt. Ltd, New Delhi, 2005.

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(EC0656) PE-II.3 -VLSI DESIGN

UNIT- I: INTRODUCTION
Introduction to IC Technology – MOS, PMOS, NMOS, CMOS & Bj-CMOS technologies-Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Encapsulation, Probe testing, Integrated Resistors and Capacitors.
BASIC ELECTRICAL PROPERTIES: Basic Electrical Properties of MOS and BiCMOS Circuits: Ids-Vds relationships, MOS transistor threshold Voltage, gm, gds, figure of merit wo; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi- CMOS Inverters, CMOS Nanotechnology

UNIT - II: VLSI CIRCUIT DESIGN PROCESSES
VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2 μm CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

UNIT - III: GATE LEVEL DESIGN
Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Basic circuit concepts, Sheet Resistance RS and its concept to MOS, Area Capacitance Units, Calculations - Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers.
SUBSYSTEM DESIGN: Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters, High Density Memory Elements.

UNIT - IV: SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN
PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach.
VHDL SYNTHESIS : VHDL Synthesis, Circuit Design Flow, Circuit Synthesis, Simulation, Layout, Design capture tools, Design Verification Tools, Test Principles.

UNIT - V: CMOS TESTING
CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques, System-level Test Techniques, Layout Design for improved Testability.

TEXTBOOKS:
1. Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, Essentials of VLSI circuits and systems, PHI, 2005.
2. Weste and Eshraghian , Principles of CMOS VLSI Design, Pearson Education, 1999.

REFERENCES:

1. John P. Uyemura, Chip Design for Submicron VLSI: CMOS Layout & Simulation, Thomson Learning.
2. John .P. Uyemura , Introduction to VLSI Circuits and Systems JohnWiley, 2003.
3. John M. Rabaey, Digital Integrated Circuits - PHI, EEE, 1997.
4. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition,1997.
5. S.M. SZE,VLSI Technology ,2nd Edition, TMH, 2003.

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(EE0641) PC - POWER ELECTRONICS

Pre-requisite: Electronic Devices and Circuits

Objective: Objectives of this course are

- to introduce the basic concepts of power semiconductor devices, types, operation and characteristics
- to understand the operation of converters and choppers and their analysis
- to understand the operation of AC voltage controllers and inverters

UNIT – I POWER SEMI CONDUCTOR DEVICES AND COMMUTATION CIRCUITS: Thyristors - Silicon Controlled Rectifiers (SCR's) - BJT - Power MOSFET - Power IGBT and their characteristics and other thyristors - Basic theory of operation of SCR - Static characteristics – Turn-on and Turn-off methods- Dynamic characteristics of SCR - Turn on and Turn off times - Salient points. Two transistor analogy of SCR - R,RC,UJT firing circuits - Series and parallel connections of SCRs - Snubber circuit details – Specifications and Ratings of SCR, BJT, IGBT - Numerical problems – Line Commutation and Forced Commutation circuits.

UNIT – II SINGLE PHASE HALF WAVE CONTROLLED CONVERTERS: Phase control technique - Single phase Line commutated converters - Half wave controlled converters with Resistive, RL load and RLE load - Derivation of average load voltage and current - Active and Reactive power inputs to the converters without and with Free wheeling Diode - Numerical problems **SINGLE PHASE FULLY CONTROLLED CONVERTERS:** Fully controlled converters, Mid point and Bridge connections with Resistive, RL loads and RLE load - Derivation of average load voltage and current – Line commutated inverters, semi-converters, active and Reactive power inputs to the converters, Effect of source inductance – Expressions of load voltage and current - Numerical problems.
THREE PHASE LINE COMMUTATED CONVERTERS: Three phase converters - Three pulse and six pulse converters and bridge connections with R, RL load voltage and current with R and RL load and RLE loads - Semi Converters, Effect of Source inductance–Dual converters Waveforms - Numerical Problems

UNIT – III 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 – Derivation of RMS load voltage, current and power factor- wave forms , Numerical problems.

UNIT – IV CHOPPERS: Choppers – Time ratio control and Current limit control strategies – Step down choppers - Derivation of load voltage and currents with R, RL and RLE loads- Step up Chopper – load voltage expression.
Morgan's chopper – Jones chopper - Oscillation choppers (Principle of operation only) - waveforms –– AC Chopper – Problems

UNIT – V INVERTERS: Inverters – Single phase inverter – Basic series inverter , parallel Capacitor inverter, bridge inverter – Waveforms,. Simple bridge inverters – Modified Mc Murray and Mc Murray – Bedford inverters, Voltage control techniques for inverters- Pulse width modulation techniques – Numerical problems.

OUTCOMES: After this course, student will be able to

- understand the operation and characteristics of various types of semiconductor devices
- analyze the operation and characteristics of various single-phase converters, three-phase converters and choppers
- analyze the operation and performance of AC voltage controllers and inverters

TEXT BOOKS

1. P.S.Bhimbra, Power Electronics, Khanna publications.
2. M. D. Singh & K. B. Kanchandhani, Power Electronics, Tata Mc Graw – Hill Publishing company, 1998.
3. M. H. Rashid, Power Electronics : Circuits, Devices and Applications,– Prentice Hall of India, 2nd edition, 1998

REFERENCE BOOKS

1. Power Electronics: Circuits, Devices and Applications, M. H. Rashid, Prentice Hall of India.
2. Power Electronics, M. D. Singh & K. B. Kanchandhani, Tata Mc Graw - Hill Publishing Company.
3. Power Electronics, Vedam Subramanyam, New Age International (P) Limited, Publishers.
4. Elements of Power Electronics, Philip T. Krein, Oxford University Press.
5. Power Electronics, M. S. Jamil Asghar, PHI Private Limited.
6. Power Electronics, P.C.Sen,Tata Mc Graw-Hill Publishing.
7. Power Electronics, K. Hari Babu, Scitech Publications India Pvt. Ltd.
8. Principles of Power Electronics, John G. Kassakian, Martin, F. Schlect, Geroge C. Verghese, Pearson Education.

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(EE0642) PC- SWITCH GEAR AND PROTECTION

Pre-requisites: Power Systems –I and Power Systems - II

Objectives: Objectives of this course are

- to introduce protection equipment like Circuit Breakers and Relays
- to introduce protection of Generators, Transformers and feeder bus bars from over voltages and other hazards.
- To emphasize Neutral for overall protection.

UNIT - I INTRODUCTION TO CIRCUIT BREAKERS: Circuit Breakers: Elementary principles of arc interruption, Recovery, Restriking Voltage and Recovery voltages.- Restriking Phenomenon, Average and Maximum RRRV, Numerical Problems - Current Chopping and Resistance Switching - CB ratings and Specifications: Types and Numerical Problems. – Auto-reclosures.

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

UNIT – II ELECTROMAGNETIC AND STATIC RELAYS: Principle of Operation and Construction of Attracted armature, Balanced Beam, induction Disc and Induction Cup relays.

Types of Over Current Relays: Instantaneous, DMT and IDMT types. and their characteristics.

Application of relays: Over current/ under voltage relays, Direction relays, Differential Relays and Percentage Differential Relays.

Universal torque equation, Distance relays: Impedance, Reactance and Mho and Off-Set Mho relays, Characteristics of Distance Relays and Comparison. Static Relays: Static Relays verses Electromagnetic Relays.

UNIT – III PROTECTION OF POWER EQUIPMENT: Protection of generators against Stator faults, Rotor faults, and Abnormal Conditions. Restricted Earth fault and Inter-turn fault Protection. Numerical Problems on % Winding Unprotected. Protection of transformers: Percentage Differential Protection, Numerical Problem on Design of CT s Ratio, Buchholtz relay Protection.

Protection of Lines: Over Current, Carrier Current and Three-zone distance relay protection using Impedance relays. Translay Relay.

Protection of Bus bars – Differential protection.

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

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

OUTCOMES: After this course, the student

- gets a thorough knowledge on, various types of protective devices (circuit breakers, relays etc..) and their co-ordination, protection of generators, transformers, feeders, bus-bars, through different types of protective devices, overvoltage protection, lightening, concept of earthing and grounding
- applies the above concepts to real-world electrical and electronics problems and applications.

TEXT BOOKS

1. Sunil S Rao, Switchgear and Protection – Khanna Publlishers.
2. Badri Ram , D.N Viswakarma, Power System Protection and Switchgear, TMH Publications.

REFERENCE BOOKS

1. Paithankar and S.R.Bhide, Fundamentals of Power System Protection, PHI, 2003.
2. C R Mason, Art & Science of Protective Relaying – Wiley Eastern Ltd.
3. C.L.Wadhwa, Electrical Power Systems –New Age international (P) Limited, Publishers, 3nd editon.
4. B.L.Soni, Gupta, Bhatnagar, Chakrabarthy, A Text book on Power System Engineering, Dhanpat Rai & Co.

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(HE0631) ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

1. Introduction

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

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organise ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and viceversa.
- Taking part in social and professional communication.

2. Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a welldeveloped vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

Learning Outcomes

- Accomplishment of sound vocabulary and its proper use contextually.
  - Flair in Writing and felicity in written expression.
  - Enhanced job prospects.
  - Effective Speaking Abilities

3. Syllabus:

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. Activities on Fundamentals of Inter-personal Communication and Building Vocabulary - Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.
2. Activities on Reading Comprehension –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. Activities on Writing Skills – Structure and presentation of different types of writing – letter writing/Resume writing/ ecorrespondence/ Technical report writing/ Portfolio writing –planning for writing – improving one's writing.
4. Activities on Presentation Skills – Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through osters/projects/reports/ emails/ assignments etc.
5. Activities on Group Discussion and Interview Skills –Dynamics of group discussion, intervention, summarizing,modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

4. Minimum Requirement:
The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

5. Prescribed Lab Manual: A book titled A Course Book of Advanced Communication Skills (ACS) Lab published by Universities Press, Hyderabad.

6. Suggested Software:
The software consisting of the prescribed topics elaborated above should be procured and used.

- Oxford Advanced Learner's Compass, 8th Edition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, CrackingGRE by CLIFFS)
- The following software from 'train2success.com'
- Preparing for being Interviewed
- Positive Thinking
- Interviewing Skills
- Telephone Skills

- Time Management

7. Books Recommended:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. English Language Communication : A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
3. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
4. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
5. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
6. The Basics of Communication: A Relational Perspective. Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications. 2012.
7. English Vocabulary in Use series, Cambridge University Press 2008.
8. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
9. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
10. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
11. Handbook for Technical Writing by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
12. Job Hunting by Colm Downes, Cambridge University Press 2008.
13. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
14. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.
15. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/Cambridge University Press.
16. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

Advanced Communication Skills Lab Practicals:

1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

Mini Project: As a part of Internal Evaluation

1. Seminar/ Professional Presentation
2. A Report on the same has to be prepared and presented.

* Teachers may use their discretion to choose topics relevant and suitable to the needs of students.
* Not more than two students to work on each mini project.

* Students may be assessed by their performance both in oral presentation and written report.

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(EE0643) PC - POWER ELECTRONICS LAB

Any eight experiments should be conducted

1. Study of Characteristics of SCR, MOSFET & IGBT
2. Gate firing circuits for SCR's
3. Single Phase AC Voltage Controller with R and RL Loads
4. Single Phase fully controlled bridge converter with R and RL loads
5. Forced Commutation circuits (Class A, Class B, Class C, Class D & Class E)
6. DC Jones chopper with R and RL Loads
7. Single Phase Parallel, inverter with R and RL loads
8. Single Phase Cycloconverter with R and RL loads
9. Single Phase Half controlled converter with R load
10. Three Phase half controlled bridge converter with R-load
11. Single Phase series inverter with R and RL loads
12. Single Phase Bridge converter with R and RL loads
13. Single Phase dual converter with RL loads

Any two simulation experiments should be conducted

1. Simulation of single-phase full converter using RLE loads and single-phase AC voltage controller using RLE loads.
2. Simulation of resonant pulse commutation circuit and Buck chopper.
3. Simulation of single phase Inverter with PWM control.

REFERENCE BOOKS

1. M.H.Rashid, Simulation of Electric and Electronic circuits using PSPICE – by M/s PHI Publications.
2. User's manual of related softwares
3. Reference guides of related softwares

4. Rashid, Spice for power electronics and electric power, CRC Press

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(EC0645) PC - MICROCONTROLLERS LAB

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

1. Programs for 16 bit arithmetic operations for 8051 (using various addressing modes)
2. Program for sorting an array for 8051.
3. Program for searching for a number or character in a string for 8051.
4. Program for string manipulations for 8051.
5. Interfacing traffic light controller using 8051.
6. Interfacing ADC and DAC to 8051.
7. Parallel communication between two microcontroller kits using 8255.
8. Serial communication between two microcontroller kits using 8251.
9. Interfacing to 8051 and programming to control stepper motor.
10. Programming using logical and bit manipulation Instructions of 8051.
11. Program and verify timer/counter in 8051.
12 Program and verify interrupt handling in 8051.
13. UART operation in 8051.
14. Communication between 8051 kit and PC.
15. Interfacing LCD to 8051.
16. Interfacing Matrix/keyboard to 8051.
17. Data Transfer from peripheral to memory through DMA controller 8237/8257.

Note: Minimum of 12 experiments to be conducted

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OPEN ELECTIVE -II

(CE0661) ESTIMATION, QUANTITY SURVEY & VALUATION

Pre Requisites:
Surveying, Concrete Technology, Reinforced Concrete Design

Course Objectives:

Subject provides the methods for estimation of various construction items in a structure. Cost estimate of buildings requires the knowledge of using SOR & SSR for analysis of rates on various works.

Course Outcomes:

Student estimates the cost of different items in Civil Engineering structures and evaluates the total cost.

UNIT – I

General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating. Detailed Estimates of Buildings.

UNIT – II

Reinforcement bar bending and bar requirement schedules

UNIT – III

Earthwork for roads and canals.

UNIT – IV

Rate Analysis – Working out data for various items of work over head and contingent charges.

UNIT-V

Contracts – Types of contracts – Contract Documents – Conditions of contract, Valuation -Standard specifications for different items of building construction.

NOTE: NUMBER OF EXERCISES PROPOSED:

1. Three in flat Roof & one in Sloped Roof
2. Exercises on Data – three Nos.

Text Books:

1. Estimating and Costing by B.N. Dutta, UBS publishers, (2012).
2. Estimating and Costing by G.S. Birdie. (2014)

Reference books:

1. Standard Schedule of rates and standard data book by public works department.

2. I. S. 1200 (Parts I to XXV – 1993/ method of measurement of building and Civil Engineering works – B.I.S.)
3. Estimation, Costing and Specifications by M. Chakraborthi; Laxmi publications. (2015)

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
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III Year B.Tech. II-Sem

L	T	P	C
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OPEN ELECTIVE-II
(EE0661) DESIGN ESTIMATION AND COSTING OF ELECTRICAL SYSTEMS

Pre-requisite: Power systems-I and Power Systems-II

Objectives: Objectives of this course are

- To emphasize the estimating and costing aspects of all electrical equipment, installation and designs to analyze the cost viability.
- To design and estimation of wiring,
- To design overhead and underground distribution lines, substations and illumination design.

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

UNIT - II ELECTRICAL INSTALLATION FOR DIFFERENT TYPES OF BUILDINGS AND SMALL INDUSTRIES: Electrical installations for residential buildings – estimating and costing of material, Electrical installations for commercial buildings, Electrical installations for small industries.

UNIT - III OVERHEAD AND UNDERGROUND TRANSMISSION AND DISTRIBUTION LINES: Introduction, Supports for transmission lines, Distribution lines – Materials used, Underground cables, Mechanical Design of overhead lines, Design of underground cables.

UNIT - IV SUBSTATIONS: Introduction, Types of substations, Outdoor substation – Pole mounted type, Indoor substations – Floor mounted type.

UNIT – V DESIGN OF ILLUMINATION SCHEMES: Introduction, Terminology in illumination, laws of illumination, various types of light sources, Practical lighting schemes LED, CFL and OCFL differences.

OUTCOMES: Students are in a position to Understand the design considerations of electrical installations.

- To design electrical installation for buildings and small industries.
- To identify and design the various types of light sources for different applications.

TEXT BOOKS

1. Electrical Design Estimating and Costing, K. B. Raina, S. K. BhattAcharya, New Age International Publisher.
2. Design of Electrical Installations, Er. V. K. Jain, Er. Amitabh Bajaj, University Science Press.

REFERENCE BOOKS

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

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OPEN ELECTIVE-II

(EE0662) ENERGY STORAGE SYSTEMS

Pre-requisite: None

Objectives: Objectives of this course are

- To enable the student to understand the need for energy storage, devices and technologies available and their applications,

UNIT - I

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

UNIT - II

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

UNIT - III

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

UNIT - IV

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

UNIT - V

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

OUTCOMES: After this course, the student

- Can analyze the characteristics of energy from various sources and need for storage
- Can classify various types of energy storage and various devices used for the purpose
- Can apply the same concepts to real time problems.

TEXT BOOKS

1. Energy Storage Benefits and Market Analysis' by James M. Eyer, Joseph J. Iannucci and Garth P. Corey.
2. The Electrical Energy Storage by IEC Market Strategy Board.

REFERENCE BOOKS:

2. Jim Eyer, Garth Corey: Energy Storage for the Electricity Grid: Benefits and Market Potential Assessment Guide, Report, Sandia National Laboratories, Feb 2010.

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OPEN ELECTIVE-II
(EE0663) MECHATRONICS

UNIT – I **INTRODUCTION**: Definition – Trends - Control Methods: Standalone , PC Based (Real Time Operating Systems, Graphical User Interface , Simulation) - Applications: identification of sensors and actuators in Washing machine, Automatic Camera, Engine Management, SPM, Robot, CNC, FMS, CIM.
SIGNAL CONDITIONING : Introduction – Hardware - Digital I/O , Analog input – ADC , resolution, Filtering Noise using passive components – Registors, capacitors - Amplifying signals using OP amps –Software - Digital Signal Processing – Low pass , high pass , notch filtering

UNIT – II **PRECISION MECHANICAL SYSTEMS:** Modern CNC Machines – Design aspects in machine structures, guideways, feed drives, spindle and spindle bearings, measuring systems, control software and operator interface, gauging and tool monitoring.
ELECTRONIC INTERFACE SUBSYSTEMS: TTL, CMOS interfacing - Sensor interfacing – Actuator interfacing – solenoids , motors Isolation schemes- opto coupling, buffer IC's - Protection schemes – circuit breakers, over current sensing, resetable fuses, thermal dissipation - Power Supply - Bipolar transistors / MOSFETs

UNIT – III **ELECTROMECHANICAL DRIVES:** Relays and Solenoids - Stepper Motors - DC brushed motors – DC brushless motors - DC servo motors - 4-quadrant servo drives , PWM's - Pulse Width Modulation – Variable Frequency Drives, Vector Drives - Drive System load calculation.
MICROCONTROLLERS OVERVIEW: 8051 Microcontroller , micro processor structure – Digital Interfacing - Analog Interfacing - Digital to Analog Convertors - Analog to Digital Convertors - Applications. Programming – Assembly, C (LED Blinking , Voltage measurement using ADC).

UNIT – IV **PROGRAMMABLE LOGIC CONTROLLERS:** Basic Structure - Programming : Ladder diagram -Timers, Internal Relays and Counters - Shift Registers - Master and Jump Controls - Data Handling -Analog input/output - PLC Selection - Application.

UNIT – V PROGRAMMABLE MOTION CONTROLLERS: Introduction - System Transfer Function – Laplace transform and its application in analyzing differential equation of a control system - Feedback Devices: Position , Velocity Sensors - Optical Incremental encoders - Proximity Sensors : Inductive , Capacitive, Infrared - Continuous and discrete processes - Control System Performance & tuning - Digital Controllers - P , PI , PID Control - Control modes – Position , Velocity and Torque - Velocity Profiles – Trapezoidal- S. Curve - Electronic Gearing - Controlled Velocity Profile - Multi axis Interpolation , PTP , Linear , Circular - Core functionalities – Home , Record position , GOTO Position - Applications : SPM, Robotics.

TEXT BOOKS

1. Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering by W Bolton, Pearson Education Press, 3rd edition, 2005.
2. Mechatronics by M.D.Singh, J.G.Joshi PHI.
3. Mechatronics HMT

REFERENCE BOOKS

1. “Designing Intelligent Machines”. open University, London.
2. Michel B. Histand and David G. Alciatore,”
3. Introduction to Mechatronics and Measurement systems, “Tata MC Graw Hill
4. I. C.W. Desi ha, “Control sensors and actuators,” Prentice Hall.
5. Mechatronics Source Book by Newton C Braga, Thomson Publications, Chennai.
6. Mechatronics – N. Shanmugam / Anuradha Agencies Publisers.
7. Mechatronics System Design / Devdas shetty /Richard / Thomson.

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4	0	0	4

OPEN ELECTIVE-II

(ME0661) JET PROPULSION & ROCKET ENGINEERING

Prerequites: None

Course outcomes:

After doing this course, student should be in position to

1.Understand Turbo Jet Propulsion System

2.Analyze the flight performance

3.Understand Principles of Jet Propulsion and Rocketry & Nozzle Theory and Characteristics

4.Learn the Aero thermo chemistry of the combustion products

5.Understand the physics of Solid propellant rocket engine, Liquid Rocket Propulsion System & Ramjet and Integral Rocket Ramjet Propulsion System**.**

Unit - I:

Turbo Jet Propulsion System:

Gas turbine cycle analysis – layout of turbo jet engine. Turbo machinerycompressors and turbines, combustor, blade aerodynamics, engine off design performance analysis.

Flight Performance:

Forces acting on vehicle – Basic relations of motion – multi stage vehicles.

Unit - II:

Principles of Jet Propulsion and Rocketry:

Fundamentals of jet propulsion, Rockets and air breathing jet engines – Classification – turbo jet , turbo fan, turbo prop, rocket (Solid and Liquid propellant rockets) and Ramjet engines.

Nozzle Theory and Characteristics Parameters:

Theory of one dimensional convergent – divergent nozzles – aerodynamic choking of nozzles and mass flow through a nozzle – nozzle exhaust velocity – thrust, thrust coefficient, Ac / At of a nozzle, Supersonic nozzle shape, non-adapted nozzles, summer field criteria, departure from simple analysis – characteristic parameters – 1) characteristic velocity, 2) specific impulse 3) total impulse 4) relationship between the characteristic parameters 5) nozzle efficiency, combustion efficiency and overall efficiency.

Unit - III: Aero Thermo Chemistry of The Combustion Products:

Review of properties of mixture of gases – Gibbs – Dalton laws – Equivalent ratio, enthalpy changes in reactions, heat of reaction and heat of formation – calculation of adiabatic flame temperature and specific impulse – frozen and equilibrium flows.

Solid Propulsion System:

Solid propellants – classification, homogeneous and heterogeneous propellants, double base propellant compositions and manufacturing methods. Composite propellant oxidizers and binders. Effect of binder on propellant properties. Burning rate and burning rate laws, factors influencing the burning rate, methods of determining burning rates.

Unit - IV:

Solid propellant rocket engine – internal ballistics, equilibrium motor operation and equilibrium pressure to various parameters. Transient and pseudo equilibrium operation, end burning and burning grains, grain design. Rocket motor hard ware design. Heat transfer considerations in solid rocket motor design. Ignition system, simple pyro devices.

Liquid Rocket Propulsion System:

Liquid propellants – classification, Mono and Bi propellants, Cryogenic and storage propellants, ignition delay of hypergolic propellants, physical and chemical characteristics of liquid propellant. Liquid propellant rocket engine – system layout, pump and pressure feed systems, feed system components. Design of combustion chamber, characteristic length,

constructional features, and chamber wall stresses. Heat transfer and cooling aspects. Uncooled engines, injectors – various types, injection patterns, injector characteristics, and atomization and drop size distribution, propellant tank design.

Unit - V: Ramjet and Integral Rocket Ramjet Propulsion System:

Fuel rich solid propellants, gross thrust, gross thrust coefficient, combustion efficiency of ramjet engine, air intakes and their classification – critical, super critical and sub-critical operation of air intakes, engine intake matching, classification and comparison of IIRR propulsion systems.

TEXT BOOKS:

1. Gas Turbines and propulsive systems-P.Khajuria & S.P.Dubey/Dhanpatrai pub.
2. Gas Dynamics & Space Propulsion M.C.Ramaswamy / Jaico Publishing House.

REFERENCE BOOKS:

1. Rocket propulsion –Sutton
2. Gas Turbines /Cohen, Rogers & Sarvana Muttoo/Addision Wesley & Longman.
3. Gas Turbines-V.Ganesan /TMH.

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III Year B.Tech. II-Sem

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OPEN ELECTIVE-II
(ME0662) ERGONOMICS

Prerequisites: None

Objectives:
Provide a broad based introduction to ergonomic principles and their application in the design of work, equipment and the workplace. Consideration is given to musculo-skeletal disorders, manual handling, ergonomic aspects of the environment as well as to the social and legal aspects.

Course Outcomes:
On completing this course successfully the student will be able to:
- understand and apply ergonomic principles to the creation of safer, healthier and more efficient and effective activities in the workplace;
- understand ergonomic risk assessments and appropriate control measures;
- understand the causes of upper limb disorders and how to reduce them;
- appreciate workplace layout and equipment design;
- appreciate environmental aspects of good ergonomic design.

UNIT I
Introduction to Ergonomics, Human, Machine Systems, Basic Work Systems, Human Relations and Occupational Psychology, Hawthrone Experiments, Participation, Occupational Medicine, Human Performance Psychology, FMJ versus FJM, Human Factors and Ergonomics. Modern Work Systems and Neo, Taylorism, Attempts to Humanize Work, Generic Tools in Ergonomics, Effectiveness and Cost Effectiveness of Ergonomics in General.

UNIT II
Design and Evaluation of Manual Handing Tasks, Anatomy and Biomechanics of Manual Handling, Prevention of Manual Handling Injuries in the Workplace, Design of Manual Handling Tasks.

Body Mechanics at Work: Risk Assessment and Design, Low Back Pain, Biomechanics of Spinal Loading, Ergonomics and Musculoskeletal System in General, Effectiveness and Cost Effectiveness.

UNIT III

Physically Demanding Work: Stress and Fatigue, Physically and Psychologically Demanding Work, Muscles, Structure and Function, and Capacity, Physical work capacity.User, Cantered Workspace Design Anthropometric Data, Statistical Essentials, Types of Anthropometric Data, Applications Of Anthropometry in Design, Multiple Workspace Configurations, Status of Anthropometry in Ergonomics.

UNIT IV

Human Error, Accidents, and Safety, Micro ergonomics, Human Error, and Accidents, Prevention of Error in Human, Machine Interaction, Macroergonomices: Performance Shaping Factors.

UNIT V

Visual Environment: Measurements and Design, Vision and the Eye, Measurement of Light, Lighting Design Considerations, Visual figure, Eyestrain, and Near Work, Status of Methods in Risk Assessment and Task design.

Hearing, Sound, Noise and Vibration, Measurement of Sound, Hearing Protection, Design of Acoustic Environment.

Text books

1. Introduction to Ergonomics(Third Edition)/ R.S.Bridger/CRC Press , Taylor & Francis Group

References

1. Human factors in Engineering and Design/E.J.McCormick/ TMH Edison
2. Motion and Time Design and Measurement of work/ Barnes Ralph., / John Wiley & sons Newyork, 2002

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OPEN ELECTIVE –II
(EC0661) PRINCIPLES OF ELECTRONIC COMMUNICATIONS

Prerequsite : Nil

Course Objectives:
The objective of this subject is to:

- Introduce the students to modulation and various analog and digital modulation schemes.
- They can have a broad understanding of satellite, optical, cellular, mobile, wireless and telecom concepts.

Unit 1:
Introduction: Need for Modulation, Frequency translation, Electromagnetic spectrum, Gain, Attenuation and decibels.

Unit 2:
Simple description on Modulation: Analog Modulation-AM, FM, Pulse Modulation-PAM, PWM, PCM, Digital Modulation Techniques-ASK, FSK, PSK, QPSK modulation and demodulation schemes.

Unit 3:
Telecommunication Systems: Telephones Telephone system, Paging systems, Internet Telephony.
Networking and Local Area Networks: Network fundamentals, LAN hardware, Ethernet LANs, Token Ring LAN.

Unit 4:
Satellite Communication: Satellite Orbits, satellite communication systems, satellite subsystems, Ground Stations Satellite Applications, Global Positioning systems.

Optical Communication: Optical Principles, Optical Communication Systems, Fiber – Optic Cables, Optical Transmitters & Receivers, Wavelength Division Multiplexing.

Unit 5:

Cellular and Mobile Communications: Cellular telephone systems, AMPS, GSM, CDMA, WCDMA.

Wireless Technologies: Wireless LAN, PANs and Bluetooth, ZigBee and Mesh Wireless networks, Wimax and MANs, Infrared wireless, RFID communication, UWB.

Text Books:

1. Principles of Electronic Communication Systems, Louis E. Frenzel, 3e, McGraw Hill publications, 2008.
2. Kennady, Davis, Electronic Communications systems, 4e, TMH, 1999

Reference Books:

1. Tarmo Anttalainen, Introduction to Telecommunications Network Engineering, Artech House Telecommunications Library.
2. Theodore Rappaport, Wireless Communications-Principles and practice, Printice Hall, 2002.
3. Roger L. Freeman, Fundamentals of Telecommunications, 2e, Wiley publications.
4. Wayne Tomasi, Introduction to data communications and networking, Pearson Education, 2005.

Course Outcomes:

By completing this subject, the student can

- Work on various types of modulations.
- Should be able to use these communication modules in implementation.
- Will have a basic understanding of various wireless and cellular, mobile and telephone communication systems.

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OPEN ELECTIVE-II
(CS0661) CYBER SECURITY

PREREQUISITES:
1. A Course on "Network Security and Cryptography"

COURSE OBJECTIVES:
1. The purpose of the course is to educate on cyber security and the legal perspectives of cyber crimes and cyber offenses.
2. Introduce tools and methods for enhancing cyber security.

SYLLABUS:

UNIT-I Introduction to Cybercrime:

Introduction, Cybercrime and Information security, who are cyber criminals, Classification of Cyber crimes, Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cyber crimes. 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-II 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, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops. Tools and Methods Used in Cyber Crime: Introduction, Proxy services and Anonymizers, Phishing, Password Cracking,

Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks.

UNIT-III Cyber crimesand Cyber Security: the Legal Perspectives Introduction Cyber Crime and Legal Landscape around the world, Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario In India, Digital signatures and the Indian IT Act, Amendments to the Indian IT Act, Cybercrime and Punishment Cyber law, Technology and Students: Indian Scenario.

Understanding Computer Forensics Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Chain of Custody concept, Network Forensics, Approaching a computer, Forensics Investigation, Challenges in Computer Forensics, Special Tools and Techniques Forensics Auditing.

UNIT-IV Cyber Security: Organizational Implications

Introduction, cost of cyber crimes 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. Cybercrime and Cyber terrorism: Introduction, intellectual property in the cyberspace, the ethical dimension of cyber crimes the psychology, mindset and skills of hackers and other cyber criminals.

UNIT-V

Cybercrime: Illustrations, Examples and Mini-Cases Examples:

Official Website of Maharashtra Government Hacked, Indian Banks Lose Millions of Rupees, Parliament Attack, Pune City Police Bust Nigerian Racket, e-mail spoofing instances.

Mini-Cases:

The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Illustrations of Financial Frauds in Cyber Domain, Digital Signature-Related Crime Scenarios.

TEXT BOOK:

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

REFERENCE BOOK:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.

COURSE OUTCOMES:

1. Ability to demonstrate the knowledge of cyber security

2. Understand the Indian and Global Act concerning cyber crimes
3. Employ security and privacy methods in the development of modern applications such that personal data is protected; and provide safe Internet usage.

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III Year B.Tech. II-Sem

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OPEN ELECTIVE-II

(CS0662) DATA BASE MANAGEMENT SYSTEMS

PREREQUISITES:

1. A course on "Advanced Data Structures"

COURSE OBJECTIVES:

1. To understand the basic concepts and the applications of database systems.
2. To master the basics of SQL and construct queries using SQL.
3. Topics include data models, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

SYLLABUS:

UNIT-I

Database System Applications: database system Vs. file system, view of data, data abstraction, instances and schemas, data models, the ER model, relational model, other models, database languages, DDL, DML, database access for application programs, database users and administrator, transaction management, database system structure, storage manager, the query processor, history of data base systems, data base design and ER diagrams, beyond ER design entities, attributes and entity sets, relationships and relationship sets, additional features of ER model, concept design with the ER Model, conceptual design for large enterprises.

UNIT-II

Introduction to the Relational Model: integrity constraint over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying/altering, tables and views, form of basic SQL query, examples of basic SQL

queries, introduction to nested queries, correlated nested queries, set comparison operators, aggregation operators, NULL values, comparison using null values, logical connectivity's, AND, OR and NOT, impact on SQL constructs, outer joins, disallowing NULL values, complex integrity constraints in SQL, triggers and active data bases, Oracle, SQL Server, DB2.

UNIT-III

Relational Algebra: Selection and projection, set operations, renaming, Joins, Division, Examples of Algebra overviews, Relational calculus, Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus. Schema refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, dependency preserving decomposition, schema refinement in database design, multi valued dependencies, FOURTH normal form, FIFTH normal form.

UNIT-IV

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity. Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions, Buffer Management, Failure with loss of nonvolatile storage, Advance Recovery systems, Remote Backup systems.

UNIT-V

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:

Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3rd Edition

Database System Concepts, Silberschatz, Korth, Mc Graw hill, V edition.

REFERENCE BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
1. Introduction to Database Systems, C.J. Date Pearson Education
2. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
3. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah,PHI.
4. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student

COURSE OUTCOMES:

Gain knowledge of fundamentals of DBMS, database design and normal forms
Master the basics of SQL for retrieval and management of data.
Be acquainted with the basics of transaction processing and concurrency control.
Familiarity with database storage structures and access techniques

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IV Year B.Tech. EEE I-Sem **L T P C**
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(EC0745) PC –DIGITAL SIGNAL PROCESSING

Pre-requisite: Mathematics
OBJECTIVES: Objecitves of this course are

- to deal with the fundamentals of signal analysis
- to introduce the concepts of Fourier series, Fourier transforms, Laplace transforms, Z-transforms, linear time invariant systems
- to introduce discrete Fourier series, discrete Fourier transform, fast Fourier transform
- to introduce filters and their design aspects

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

UNIT – II
DISCRETE FOURIER SERIES: Properties and theorems of discrete Fourier series, DFS representation of periodic sequences.
DISCRETE FOURIER TRANSFORMS: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT. Relation between Z-transform and DFS.
FAST FOURIER TRANSFORMS: Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT, and FFT for composite number.

UNIT – III
REALIZATION OF DIGITAL FILTERS; Review of Z-transforms, Applications of Z – transforms, Solution of difference equations of digital filters, Block diagram representation of linear constantcoefficient difference equations, Basic structures of IIR systems, Transposed forms, Basic structures of FIR systems, System function, stability criterion.

UNIT – IV

IIR DIGITAL FILTERS: Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters, bilinear transformation method and impulse invariance techniques.
FIR DIGITAL FILTERS: Characteristics of FIR Digital Filters, frequency response. Design of FIR Digital Filters using Window Techniques - Frequency Sampling technique, Comparison of IIR & FIR filters.

UNIT – V

INTRODUCTION TO DSP PROCESSORS: Introduction to programmable DSPs: Multiplier and Multiplier Accumulator (MAC), Modified Bus Structures and Memory Access schemes DSPs Multiple access memory, multiport memory, On-Chip Peripherals – All the above with an example of TMS320CXX processors.
OUTCOMES: After this course, the student

- gets a thorough knowledge on signal analysis by various mathematical tools viz., Fourier transforms, Laplace transforms, Z-transforms, Discrete Fourier Transform, Fast-Fourier transforms
- understands importance of filters, their design methodology and necessary mathematical analysis
- gets knowledge of DSP processors, architecture and programming skills

TEXT BOOKS

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

REFERENCE BOOKS

1. Andreas Antoniou , Digital Signal Processing:, TATA McGraw Hill , 2006.
2. MH Hayes, Schaum's Outlines, Digital Signal Processing, TATA McGraw Hill, 2007.
3. C. Britton Rorabaugh DSP Primer - Tata McGraw Hill, 2005.
4. Robert J. Schilling, Sandra L. Harris, Fundamentals of Digital Signal Processing using Matlab Thomson, 2007.
5. Alan V. Oppenheim, Ronald W. Schafer, Digital Signal Processing –, PHI Ed., 2006
7. S. Salivahanan, Digital Signal Processing-.TMH, 2000.

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IV Year B.Tech. EEE I-Sem **L T P C**
4 0 0 4

(EE0751) PE.III.1 HVDC TRANSIMISSION AND FACTS

Prerequisites: Electrical Circuit, Control System, Power Electronics, Power Systems -I and Power Systems -II

Objectives: Objectives of this course are

- To facilitate the students understand the basic concepts and recent trends in HVDC transmission.
- To introduce the application of a variety of high power-electronic controllers for active and reactive power in AC transmission lines.
- To enable the students to work with the concepts of HVDC transmission and are exposed to the basics and control FACTS controllers.

UNIT-I INTRODUCTION Comparison of AC and DC Transmission systems, Application of D.C. Transmission, Types of DC links, Typical layout of a HVDC converter station. HVDC converters, pulse number, Analysis of phase Bridge circuit with and without overlap, converter Bridge characteristics, equivalent circuits of Rectifier and inverter configurations, twelve pulse converters.

UNIT -II CONVERTER AND HVDC SYSTEM CONTROL Principles of DC link control, converter control characteristics, system control Hierarchy, Firing angle control, current and extinction Angle control starting and stopping of DC link. Harmonics, filters and reactive power control, Introduction, generation of Harmonics, AC and DC Filters, Reactive power requirements at steady state, sources of Reactive power static VAR systems.

UNIT – III FACTS CONCEPTS Flow of power in AC parallel paths and Meshed systems, Basic types of FACTS controllers, Brief description and Definitions of FACTS controllers.VSC for FACTS applications.

UNIT - IV STATIC SHUNT COMPENSATORS Objectives of shunt compensation, Principles of shunt compensation – Variable Impedance type & switching converter type

- Static Synchronous Compensator (STATCOM) configuration - characteristics and control, SVC and STATCOM, comparison.

UNIT - V 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 – Basic operating control Schemes. UPFC introduction(Block diagram)

Outcomes: After this course, the student

- will be skilled enough to work with the HVDC systems, being capable of analyzing the HVDC circuits and develop exquisite interest to work in the area of HVDC transmission.
- shall be able to explain the basic principles of different types of FACTS controllers and their characteristics.
- shall be able to model different FACTS controllers, form a basis for selecting a particular controller for a given application and analyze and compare the performance of various FACTS controllers.

TEXT BOOKS

1. Padiyar, K.R., 'HVDC transmission systems', Wiley Eastern Ltd., 2010.
2. Hingorani ,L.Gyugyi, 'Concepts and Technology of Flexible AC Transmission System', IEEE Press New York, 2000 ISBN –078033 4588

References books

1. Kimbark, E.W., 'Direct Current Transmission-vol.1', Wiley Interscience, 1971.
2.Padiyar K.R., 'FACTS controllers for Transmission and Distribution systems' New Age International Publishers, 1 st Edition, 2007
2. S.Kamakshaiah and V.Kamaraju, 'HVDC Transmission', 1 st Edition, Tata McGraw Hill, 2011.
3.Enrique Acha, Claudio R.Fuerte-Esqivel, Hugo Ambriz-Perez, Cesar Angeles-Camacho 'FACTS – Modeling and simulation in Power Networks' John Wiley & Sons, 2002.

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IV Year B.Tech. EEE I-Sem

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(EE0752) PE.III.2 RELIABILITY ENGINEERING

Pre-requisite: Mathematics

Objectives: Objectives of this course are

- to introduce the basic concepts of reliability, various models of reliability
- to analyze reliability of various systems
- to introduce techniques of frequency and duration for reliability evaluation of repairable systems.

UNIT – I

BASIC PROBABILITY THEORY: Elements of probability, probability distributions, Random variables, Density and Distribution functions- Binomial distribution- Expected value and standard deviation - Binomial distribution, Poisson distribution, normal distribution, exponential distribution, Weibull distribution.

Definition of Reliability: Definition of terms used in reliability, Component reliability, Hazard rate, derivation of the reliability function in terms of the hazard rate. Hazard models - Bath tub curve, Effect of preventive maintenance. Measures of reliability: Mean Time to Failure and Mean Time Between Failures.

UNIT – II

NETWORK MODELING AND EVALUATION OF SIMPLE SYSTEMS: Basic concepts- Evaluation of network Reliability / Unreliability - Series systems, Parallel systems - Series-Parallel systems- Partially redundant systems- Examples.

Network Modeling and Evaluation of Complex systems:

Conditional probability method- tie set, Cutset approach- Event tree and reduced event tree methods- Relationships between tie and cutsets- Examples.

UNIT – III

TIME DEPENDENT PROBABILITY: Basic concepts- Reliability function f(t). F(t), R(t) and h(t) - Relationship between these functions.

Network Reliability Evaluation Using Probability Distributions: Reliability Evaluation of Series systems, Parallel systems – Partially redundant systems- determination of reliability measure- MTTF for series and parallel systems – Examples.

UNIT – IV

DISCRETE MARKOV CHAINS: Basic concepts- Stochastic transitional probability matrix- time dependent probability evaluation- Limiting State Probability evaluation- Absorbing states –Examples

Continuous Markov Processes: Modeling concepts- State space diagrams- Unreliability evaluation of single and two component repairable systems

UNIT – V

FREQUENCY AND DURATION TECHNIQUES: Frequency and duration concepts, application to multi state problems, Frequency balance approach.

Approximate System Reliability Evaluation: Series systems – Parallel systems- Network reduction techniques- Cut set approach- Common mode failures modeling and evaluation techniques- Examples.

OUTCOMES: After this course, the student will be able to

- model various systems applying reliability networks
- evaluate the reliability of simple and complex systems
- estimate the limiting state probabilities of repairable systems
- apply various mathematical models for evaluating reliability of irrepairable systems

TEXT BOOKS

1. Roy Billinton and Ronald N Allan, Reliability Evaluation of Engineering Systems, Plenum Press.
2. E.Balagurusamy, Reliability Engineering by Tata McGraw-Hill Publishing Company Limited

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(EE0753) PE.III.3 HIGH VOLTAGE ENGINEERING

Pre-requisite: Power Systems - I

Objectives: Objectives of this course are

- to deal with the detailed analysis of Breakdown occurring in gaseous, liquids and solid dielectrics
- to inform about generation and measurement of High voltage and current
- to introduce High voltage testing methods

UNIT – I INTRODUCTION TO HIGH VOLTAGE TECHNOLOGY AND APPLICATIONS: Electric Field Stresses, Gas / Vacuum as Insulator, Liquid Dielectrics, Solids and Composites, Estimation and Control of Electric Stress, Numerical methods for electric field computation, Surge voltages, their distribution and control, Applications of insulating materials in transformers, rotating machines, circuit breakers, cable power capacitors and bushings.

UNIT – II BREAK DOWN IN GASEOUS AND LIQUID DIELECTRICS: Gases as insulating media, collision process, Ionization process, Townsend's criteria of breakdown in gases, Paschen's law - Liquid as insulator, pure and commercial liquids - breakdown in pure and commercial liquids.

BREAK DOWN IN SOLID DIELECTRICS: Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice.

UNIT – III GENERATION OF HIGH VOLTAGES AND CURRENTS: Generation of High Direct Current Voltages, Generation of High alternating voltages, Generation of Impulse Voltages, Generation of Impulse currents, Tripping and control of impulse generators.

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

UNIT – IV NON-DISTRUCTIVE TESTING OF MATERIAL AND ELECTRICAL APPARATUS: Measurement of D.C Resistivity, Measurement of Dielectric Constant and loss factor, Partial discharge measurements.

HIGH VOLTAGE TESTING OF ELECTRICAL APPARATUS: Testing of Insulators and bushings, Testing of Isolators and circuit breakers, testing of cables, Testing of Transformers, Testing of Surge Arresters, and Radio Interference measurements.

UNIT – V OVER VOLTAGE PHENOMENON AND INSULATION CO-ORDINATION: Natural causes for over voltages – Lightning phenomenon, Overvoltage due to switching surges, system faults and other abnormal conditions, Principles of Insulation Coordination on High voltage and Extra High Voltage power systems.

OUTCOMES: After this course, the student

- gets a thorough knowledge on, basics of high voltage engineering
- to understand break-down phenomenon in different types of dielectrics
- to understand generation and measurement of high voltages and currents
- to understand the phenomenon of over-voltages, concept of insulation co-ordination
- to know testing of various materials and electrical apparatus used in high voltage engineering

TEXT BOOKS

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

REFERENCE BOOKS

1. C.L.Wadhwa , High Voltage Engineering by, New Age Internationals (P) Limited, 1997.
2. Ravindra Arora, Wolfgang Mosch, High Voltage Insulation Engineering by, New Age International (P) Limited, 1995.
3. Mazen Abdel Salam, Hussein Anis, Ahdan El-Morshedy, Roshdy Radwan , Marcel Dekker High Voltage Engineering, Theory and Practice.

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(EE0754) PE- IV.1 SWITCH MODE POWER SUPPLIES

Pre-requisite: Power Electronics

Objectives: This course deals with

- The introduction of concept of switched mode power supply with both D.C. and A.C. outputs.
- To elaborately study the working of switched mode topologies including resonant power suppliers.
- To have the knowledge of their importance and applications in various fields.

UNIT – I Switched Mode Power Conversion: Introduction to Switched Mode Power Supply**,** Linear DC to DC Power converters, Non- Idealities in reactive elements, Design of Inductors, Design of Transformers- Copper loss , Power factor, Non-isolated topologies, Isolated topologies, Quasi-resonant zero-current/zero-voltage switch Operating principle of Non-Isolated DC to DC power Converters (Buck, Boost, Buck-Boost, and Cuk) Equivalent circuit model of the non-isolated DC-DC converters. Isolated converters (forward, Flyback).

UNIT - II Multiple Output Flyback Switch Mode Power Supplies: Introduction, operating Modes, operating principles, Direct off line Flyback Switch Mode Power Supplies, Flyback converter, snubber network, Problems.

UNIT – III Using Power Semiconductors in Switched Mode Topologies: Introduction to Switched Mode Power Supply Topologies, The Power Supply Designer's Guide to High Voltage Transistors, Base Circuit Design for High Voltage Bipolar Transistors in Power Converters, Isolated Power Semiconductors for High Frequency Power Supply Applications

UNIT - IV **Rectification:** Explanation, Advantages and disadvantages, SMPS and linear power supply comparison, Theory of operation , Input rectifier stage, Inverter stage, Voltage converter and output rectifier, Regulation, An Introduction to Synchronous Rectifier Circuits using Power MOS Transistors

UNIT – V **Switch mode variable power supplies:** Introduction, variable SMPS techniques, operating principles, practical limiting factors, Efficiency and EMI Applications.

Resonant Power Supplies: An Introduction to Resonant Power Supplies, Resonant Power Supply Converters - The Solution for Mains Pollution Problems.

OUTCOMES: students are in a position to

- Know the concepts and principle of operation of various types of switched mode power supply systems both D.C. and A.C. outputs.

TEXT BOOKS:

1. "Switch Mode Power Supplies" by Keith H. Billings Taylor Morey- Tata McGraw-Hill Publishing Company, 3rd edition.
2. "Switch Mode Power Supplies", Robert W. Erickson.

REFERENCE BOOKS:

1. Switching Power Supplies A-Z, Second Edition- Sanjaya Maniktala.
2. Steven M. Sandler, Switch Mode Power Supplies, Tata McGraw Hill

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(CS075A) PE.IV.2 ARTIFICIAL NEURAL NETWORKS AND FUZZY SYSTEMS

PRE-REQUISITE:

1. A course on "Computer Networks"

COURSE OBJECTIVE:

The aim of the course is to introduce the basics of neural networks, architectures and its applications, fuzzy sets and fuzzy logic system components

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

Essentials of Artificial Neural Networks: Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN – Connectivity, Neural Dynamics (Activation and Synaptic), Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules, Types of Application.

UNIT–II FEED FORWARD NEURAL NETWORKS: Single Layer Feed Forward Neural Networks: Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Perceptron Convergence theorem, Limitations of the Perceptron Model, Applications.

Multilayer Feed forward Neural Networks: Credit Assignment Problem, Generalized Delta Rule, Derivation of Backpropagation (BP) Training, Summary of Backpropagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

UNIT - III ASSOCIATIVE MEMORIES: Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory (Associative Matrix, Association Rules, Hamming Distance, The Linear Associator, Matrix Memories, Content Addressable Memory).
Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function, Proof of BAM Stability Theorem.
Architecture of Hopfield Network: Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis, Capacity of the Hopfield Network.

UNIT – IV CLASSICAL AND FUZZY SETS: Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

UNIT – V FUZZY LOGIC SYSTEM: Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

OUTCOMES: After this course, the student

- To understand artificial neural network models and their training algorithms
- To understand the concept of fuzzy logic system components, fuzzification and defuzzification
- applies the above concepts to real-world problems and applications.

TEXT BOOKS

1. Rajasekharan and Pai, Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications– PHI Publication.
2. Satish Kumar , Neural Networks, TMH, 2004.

REFERENCE BOOKS

1. James A Freeman and Davis Skapura, Neural Networks, Pearson Education, 2002.
2. Simon Hakins, Neural Networks, Pearson Education.
3. C..Eliasmith and Ch. Anderson, Neural Engineering, PHI.

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IV Year B.Tech. EEE I-Sem

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(EE0756) PE.IV.3 ELECTRICAL DISTRIBUTION SYSTEMS

Pre-requisites: Power Systems – I and Power Systems - II

Objectives: Objectives of this course are

- to distinguish between transmission and distribution systems
- to understand design considerations of feeders
- to compute voltage drop and power loss in feeders
- to understand protection of distribution systems
- to examine the power factor improvement and voltage control

UNIT – I **GENERAL CONCEPTS:** Introduction to distribution system, Distribution system planning, Factors effecting the Distribution system planning, Load modeling and characteristics. Coincidence factor - contribution factor - Loss factor - Relationship between the load factor and loss factor. Load growth, Classification of loads (Residential, commercial, Agricultural and Industrial) and their characteristics.

DISTRIBUTION FEEDERS: Design Considerations of Distribution Feeders: Radial, loop and network types of primary feeders, Introduction to low voltage distribution systems (LVDS) and High voltage distribution systems (HVDS), voltage levels, Factors effecting the feeder voltage level, feeder loading, Application of general circuit constants (A,B,C,D) to radial feeders, basic design practice of the secondary distribution system, secondary banking, secondary network types, secondary mains.

UNIT – II **SUBSTATIONS:** Location of Substations: Rating of distribution substation, service area with 'n' primary feeders. Benefits derived through optimal location of substations. Optimal location of Substations (Perpendicular bisector rule and X, Y co-ordinate method).

SYSTEM ANALYSIS: Voltage drop and power-loss calculations: Derivation for voltage drop and power loss in lines, manual methods of solution for radial networks, three phase balanced primary lines, analysis of non-three phase systems, method to analyze the distribution feeder cost.

UNIT – III **PROTECTION:** Objectives of distribution system protection, types of common faults and procedure for fault calculations, over current Protective Devices: Principle of operation of Fuses, Auto-Circuit Recloser - and Auto-line sectionalizes, and circuit breakers.

COORDINATION: Coordination of Protective Devices: Objectives of protection co-ordination, general coordination procedure, Types of protection coordination: Fuse to Fuse, Auto-Recloser to Fuse, Circuit breaker to Fuse, Circuit breaker to Auto-Recloser.

UNIT – IV COMPENSATION FOR POWER FACTOR IMPROVEMENT: Capacitive compensation for power-factor control - Different types of power capacitors, shunt and series capacitors, effect of shunt capacitors (Fixed and switched), effect of series capacitors, difference between shunt and series capacitors, Calculation of Power factor correction, capacitor allocation - Economic justification of capacitors - Procedure to determine the best capacitor location.

UNIT – V VOLTAGE CONTROL: Voltage Control: Importance of voltage control, methods of voltage control, Equipment for voltage control, effect of shunt capacitors, effect of series capacitors, effect of AVB/AVR on voltage control, line drop compensation, voltage fluctuations.

OUTCOMES: After this course, the student will be able to

- distinguish between transmission, and distribution line and design the feeders
- compute power loss and voltage drop of the feeders
- design protection of distribution systems
- understand the importance of voltage control and power factor improvement

TEXT BOOKS

1. Turan Gonen, Electric Power Distribution system Engineering, CRC Press.
2. V. Kamaraju, Electrical Power Distribution Systems, Tata Mc Graw Hill Publishing company, 2nd edition, 2010.

REFERENCE BOOKS

1. G. Ram Murthy, Electrical Power Distribution hand book, 2nd edition, University press.
2. A.S. Pabla, Electric Power Distribution, Tata McGraw Hill Publishing company, 5th edition, 1997.

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IV Year B.Tech. EEE I-Sem

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(EE0757) PE- V.1 STATIC ELECTRIC DRIVES

Pre-requisites:

Power Electronics, Electrical Machines-I and Electrical Machines –II

Objectives: Objectives of this course are

- to introduce control of DC motor drives with single phase converters, three phase converters and choppers in all four quadrants
- to introduce the control of AC motor drives with variable frequency converters and variable voltage controllers.

UNIT – I PHASE CONTROLLED CONVERTER FED DC-MOTOR: Introduction to Thyristor controlled Drives, Single Phase semi and Fully controlled converters connected to d.c separately excited and d.c series motors – continuous current operation – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque Characteristics- Problems on Converter fed d.c motors.

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

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

UNIT – III CONTROL OF DC MOTORS BY CHOPPERS: Single quadrant, Two – quadrant and four quadrant chopper fed dc separately excited and series excited motors – Continues current operation – Output voltage and current wave forms – Speed torque expressions – speed torque characteristics – Problems on Chopper fed d.c Motors – Closed Loop operation (Block Diagram Only)

UNIT – IV CONTROL OF INDUCTION MOTOR: Variable voltage characteristics-Control of Induction Motor by Ac Voltage Controllers – Waveforms – speed torque characteristics. Variable frequency characteristics-Variable frequency control of induction motor by Voltage source and current source inverter and cyclo converters-PWM control – Comparison of VSI and CSI operations – Speed torque characteristics –

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

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

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

OUTCOMES: After this course, the student will be able to

- analyze DC motors speed control through phase controlled rectifiers and choppers
- analyze four quadrant operation of DC motors through four-quadrant choppers and dual converters
- analyze the operation of induction motors fed from AC voltage controllers and cyclo-converters
- understand static rotor resistance control slip-power recovery schemes for induction motors.
- understand self control and separate control of synchronous motors.

TEXT BOOKS

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

REFERENCE BOOKS

1. MD Singh and K B Khanchandani, Power Electronics - Tata McGraw Hill Publishing company,1998.
2. B.K.Bose, Modern Power Electronics and AC Drives by PHI.
3. Vedam Subramanyam, Thyristor Control of Electric drives –Tata McGraw Hill Publications.

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(EE0758) PE-V.2 SOLAR PHOTO VOLTAIC SYSTEMS

Pre-requisite: None

Objectives: Objectives of this course are

1. to introduce photovoltaic systems
2. to deal with various technologies of solar PV cells
3. to understand details about manufacture, sizing and operating techniques
4. to have knowledge of design considerations.

Unit 1: SOLAR ENERGY:

Sun and Earth, Solar Spectrum, Solar Geometry, Solar radiation on horizontal and inclined planes, Instruments for measurement of solar radiation ,Solar cell, Equivalent circuit, V-I characteristics, Performance improvement.

Unit 2: SOLAR CELLS:

Manufacture of Solar Cells-Technologies, Design of Solar cells, Photovoltaic modules, Design requirements, encapsulation systems, manufacture, power rating, hotspot effect, Design qualifications.

Unit 3: PROTECTION AND MEASUREMENTS:

Flat plate arrays, support structures, module interconnection and cabling, lightning protection, Performance measurement – using natural sun light and simulator, determination of temperature coefficients, internal series resistance, curve correction factor.

Unit 4: PHOTOVOLTAIC SYSTEMS:

Photovoltaic systems- types- general design considerations- system sizing- battery sizing- inverter sizing-design examples – Balance of PV systems.

Unit 5: MAXIMUM POWER POINT TRACKERS:

Maximum power point trackers-algorithms- perturb and observe-incremental conductance method, hill climbing method, , hybrid and complex methods, data based and other approximate methods, instrument design, other MPP techniques-Grid interactive PV system.

OUTCOMES: After this course, the student will be able to

- **identify photovoltaic system components and system types**

- **calculate electrical energy and power**
- **correctly size system components, design considerations of solar equipment**
- **design a basic grid-tie PV system.**

Text Books:

1.Generating electricity from Sun, F.C.Treble, Pergamon Press
2.Photvolatic systems: Analysis and design, A.K.Mukherjee, Nivedita Thakur, PHI 2011
3.Solar Photovoltaics: Fundamentals, Technologies and applications, C.S.Solanki, PHI, 2009

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(EE0759) PE.V.3 UTILIZATION OF ELECTRIC POWER

Pre-requisites: Electrical Machines-I and Electrical Machines-II

Objectives: Objectives of this course are

- to understand the fundamentals of illumination and good lighting practices
- to understand the methods of electric heating and welding.
- To understand the concepts of electric drives and their application to electrical traction systems.

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

UNIT – II : ELECTRIC HEATING

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

ELECTRIC WELDING

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

UNIT – III: ILLUMINATION Introduction, terms used in illumination, laws of illumination, polar curves, photometry, integrating sphere, sources of light.

VARIOUS ILLUMINATION METHODS

Discharge lamps, MV and SV lamps – comparison between tungsten filament lamps and fluorescent tubes, Basic principles of light control, Types and design of lighting and flood lighting.

UNIT –IV: ELECTRIC TRACTION – I

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

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

UNIT – V: ELECTRIC TRACTION-II

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

OUTCOMES: After this course, the student

- gets a thorough knowledge on, electric drives characteristics and their applicability in industry based on the nature of different types of loads and their characteristics
- understands the concepts and methods of electric heating, welding, illumination and electric traction
- applies the above concepts to real-world electrical and electronics problems and applications.

TEXT BOOK:

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

REFERENCE BOOKS:

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

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(EE0741) PC - POWER SYSTEM OPERATION AND CONTROL

Pre-requisite: Power Systems-I

Objectives: Objectives of this course are

- To understand real power control and operation
- To know the importance of frequency control
- To analyze different methods to control reactive power
- To understand unit commitment problem and importance of economic load dispatch
- To understand real time control of power systems.

UNIT – I: LOAD - FREQUENCY CONTROL

Basics of speed governing mechanism and modeling - speed-load characteristics – load sharing between two synchronous machines in parallel. Control area concept LFC control of a single-area system. Static and dynamic analysis of uncontrolled and controlled cases. Integration of economic dispatch control with LFC. Two-area system – modeling - static analysis of uncontrolled case - tie line with frequency bias control of two-area system - state variable model.

UNIT II : REACTIVE POWER–VOLTAGE CONTROL

Basics of reactive power control. Excitation systems – modeling. Static and dynamic analysis - stability compensation - generation and absorption of reactive power. Relation between voltage, power and reactive power at a node - method of voltage control - tap-changing transformer. System level control using generator voltage magnitude setting, tap setting of OLTC transformer and MVAR injection of switched capacitors to maintain acceptable voltage profile and to minimize transmission loss.

UNIT–III: ECONOMIC LOAD DISPATCH

Statement of economic dispatch problem – cost of generation – incremental cost curve - co-ordination equations without loss and with loss, solution by direct method and λ-iteration method.

UNIT – IV UNIT COMMITMENT

Statement of Unit Commitment problem – constraints; spinning reserve, thermal unit constraints, hydro constraints, fuel constraints and other constraints. Solution methods - Priority-list methods - forward dynamic programming approach. Numerical problems on priority-list method using full-load average production cost and Forward DP method.

UNIT–V: COMPUTER CONTROL OF POWER YSTEMS

Need of computer control of power systems. Concept of energy control centre (or) load dispatch centre and the functions - system monitoring - data acquisition and control. System hardware configuration – SCADA and EMS functions. Network topology – Importance of Load Forecasting and simple techniques of forecasting.

.**OUTCOMES:** After this course, the student will be able to

- Know importance of frequency and real power control
- Know the reactive power control methods and importance of reactive power
- Compare unit commitment and economic dispatch and their importance
- Understand real time control of power systems.

TEXT BOOKS:

1. D.P. Kothari and I.J. Nagrath, 'Modern Power System Analysis', Third Edition, Tata McGraw Hill Publishing Company Limited, New Delhi, 2003.
2. Olle. I. Elgerd, 'Electric Energy Systems Theory – An Introduction', Tata McGraw Hill Publishing Company Ltd, New Delhi, 30th reprint, 2007.

REFERENCE BOOKS

1. Chakrabarti & Haldar, "Power System Analysis: Operation and Control", Prentice Hall of India, 2004 Edition.
2. C.L.Wadhwa , 'Power System Analysis', New Age International- 6th Edition, 2010, ISBN : 978-81-224-2839-1
3. Robert Miller, James Malinowski, 'Power System Operation', Tata McGraw Hill Publishing Company Ltd, New Delhi, 3E, JUN-09.
4. P. Kundur, Neal J. Balu, 'Power System Stability & Control', IEEE, 1998 .

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(EC0746) DIGITAL SIGNAL PROCESSING LAB

The Programs shall be implemented in Software (Using MATLAB /Lab View / C Programming/ Equivalent) and Hardware (Using TI /Analog Devices / Motorola / Equivalent DSP processors).

1. Generation of Sinusoidal Waveform / Signal based on Recursive Difference Equations
2. To find DFT / IDFT of given DT Signal
3. To find Frequency Response of a given System given in Transfer Function/ Differential equation form.
4. Implementation of FFT of given Sequence
5. Determination of Power Spectrum of a given Signal(s).
6. Implementation of LP FIR Filter for a given Sequence/Signal.
7. Implementation of HP FIR Filter for a given Sequence/Signal
8. Implementation of LP IIR Filter for a given Sequence/Signal
9. Implementation of HP IIR Filter for a given Sequence/Signal
10. Generation of Sinusoidal Signal through Filtering
11. Generation of DTMF Signals
12. Implementation of Decimation Process
13. Implementation of Interpolation Process
14. Implementation of I/D Sampling Rate Converters

15. Audio application such as to plot a Time and Frequency display of Microphone plus a Cosine using DSP. Read a .wav file and match with their respective spectrograms.
16. Noise Removal: Add noise above 3 KHz and then remove, interference suppression using 400 Hz tone.
17. Impulse Response of First order and Second Order Systems.

Note: - Minimum of 12 experiments has to be conducted.

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IV Year B.Tech. EEE I-Sem

L	T	P	C
0	0	3	2

(EE0841) PC - POWER SYSTEMS LAB

1. Determination of Sequence Impedances of a cylindrical rotor Synchronous Machine.
2. Fault Analysis (L-G, L-L, L-L-G, L-L-L-G).
3. Determination of Sub transient reactance's of a Salient Pole Synchronous Machine.
4. Characteristics of Over Current Relays.
5. Characteristics of Percentage Biased Differential Relay.
6. Performance and Testing of Generator Protection System.

Any four simulation experiments listed below should be conducted using two electrical related softwares

1. Formation of Y_{BUS}.
2. Load Flow Analysis using Gauss Seidal (GS) Method.
3. Load Flow Analysis using Newton Raphson (N-R) Method.
4. Load Flow Analysis using Fast Decoupled (FD) Method.
5. Short Circuit analysis.
6. Distribution System Reliability Analysis.
7. Power System Fault Analysis.

8. Transmission Line Fault Analysis.
9. Verification of Theorems.

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IV Year B.Tech. EEE II-Sem

L	T	P	C
4	0	0	4

(MB0831) MANAGEMENT SCIENCE

Prerequsite : Nil

Course Objective:

- The course introduces the basic concepts of Management Science and Operations Management and its application to business.
- The topics include human resource management, project and strategic management; the course develops problem solving and spreadsheet skills, an invaluable tool for modern business.

Course Outcomes:

- To enable students see that many managerial decisions making situations can be addressed using standard techniques and problem structuring methods
- Students will be able to gain an understanding of the core concepts of Management Science and Operations Management;
- To discuss applications in many functional areas (operations and Human resources, strategy, marketing,)
- To get familiar with Project management techniques and strategic management

Unit I Introduction to Management & Organisation: Concepts of Management and organization- nature, importance and Functions of Management, Systems Approach to Management - Leadership Styles. Basic concepts related to Organisation - Types and Evaluation of Organisation structures.

Unit II Operations & Marketing Management: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement –Statistical Quality Control: control charts, (simple Problems) and Acceptance Sampling, TQM, Six Sigma, JIT System, Supply Chain Management- Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

Unit III Human Resources Management (HRM): Concepts of HRM- Basic functions of

HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

Unit IV Project Management *(PERT/CPM)*: PERT Vs CPM- Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

Unit V Strategic Management: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

TEXT BOOKS:

1. Aryasri: *Management Science*, McGraw Hill, 2015.
2. P.Vijay Kumar and N.Appa Rao *Management Science*, Cengage, 2014.

REFERENCES :

1. Kotler Philip & Keller Kevin Lane: Marketing Management, Pearson, 2014.
2. Koontz & Weihrich: *Essentials of Management*, McGraw Hill, 2014.
3. Thomas N.Duening & John M.Ivancevich *Management—Principles and Guidelines,* Biztantra, 2014.
4. Kanishka Bedi, *Production and Operations Management*, Oxford University Press, 2014.
5. Samuel C.Certo: *Modern Management*, 2014.

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(AUTONOMOUS)

IV Year B.Tech. II-Sem

L	T	P	C
3	0	0	3

OPEN ELECTIVE -III

(CE0861) ENVIRONMENTAL IMPACT ASSESSMENT

Pre Requisites: Environmental Engineering

Course Objectives:
This subject will cover various aspects of Environment Impact Assessment methodologies, impact of development activities. Impact on surface water, Air and Biological Environment. Environment protection and legislation is studied.

Course Outcomes: Student understands various methods of assesment of environmental impact and Environmental protection act and legislation.

UNIT – I
Basic concept of EIA : Initial environmental Examination, Elements of EIA, - factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters.
E I A Methodologies: introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method, Environmental Media Quality Index method, overlay methods, cost/benefit Analysis.

UNIT-II
Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

UNIT-III
Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures.

UNIT – IV

Environmental Audit & Environmental legislation, objectives of Environmental Audit, Types of environmental Audit, Audit protocol, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report, Post Audit activities.

UNIT - V

The Environmental Protection Act, The water Act, The Air (Prevention & Control of pollution Act.), Motor Act, Wild life Act. Case studies and preparation of Environmental Impact assessment statement for various Industries.

Text Books:

1. Larry Canter – Environmental Impact Assessment, McGraw-Hill Publications (1999)
2. Barthwal, R. R. B. – Environmental Impact Assessment, New Age International Publications (2012)

References:

1. Glynn, J. and Gary, W. H. K. - Environmental Science and Engineering, Prentice Hall Publishers (2015)
2. Suresh K. Dhaneja - Environmental Science and Engineering, S.K.,Katania & Sons Publication., New Delhi. (2014)
3. Bhatia, H. S. - Environmental Pollution and Control, Galgotia Publication(P) Ltd, Delhi. (2003) Wathern, P. – Environmental Impact Assessment: Theory & Practice, Publishers- Routledge, London, (1992)

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IV Year B.Tech. II-Sem

L	T	P	C
3	0	0	3

OPEN ELECTIVE-III

(MB0861) ENTERPRISE RESOURCE PLANNING

(Students must read text book. Faculty are free to choose any other cases)

Course Aim:

It enables the student to understand the foundations of Enterprise planning and ERP System Options.

Learning Outcome: The student understands the challenges in implementation of ERP system, ERP System Implementation options, and functional modules of ERP.

1. Introduciton to ERP- Foundation for Understanding ERP systems-Buisiness benefits of ERP-The challenges of impelmenting ERP system-ERP modules and Historical Developement.

Case: Response top RFP for ban ERP system (Mary Sumner).

2. ERP system options & Selection methods-Measurement of project Inpact- information Technology Selection-ERP proposal evaluvation-Project Evaluvation Technique.(David L.olson).

Case: Atlantic Manufacturing (Mary Sumner).

3. ERP system Installation Options- IS/IT Management results-Risk Identificatioon analysis-System Projects- Demonstation of the system-Failure method-system Architecture & ERP (David L.Olson)

Case: DataSolutiions & Technology Knowledge (Mary Sumner).

4. ERP - sales and Marketing- Managment control process in sales and markring-ERP custoemr relatonship managment-ERP systems- Accounting & Fiance control processes. Fiancial modules in ERP systems.

Case: atalantic manufacturing (Mary Sumner).

5. ERP – Produciton and Material Managment-Control process on produciton and manuifacturing-Produciton module in ERP- supply chain Managmeent & e-market place-e-businesss & ERP-e supply chian & ERP- Future directions for ERP.

Case: HR in atalntic manufacturing. (Mary Sumner).

Text Book:

1. Mary Sumner " Enterprice Resource Planning" Pearson, 2012.

Referencs:

1. David L.Olson " Managerial Issues in ERP systems" TMH 2012.
2. Ellen Monk "Enterprice Resource Planning" Cengage, 2012.
3. Alexis Leon "Enterprice Resource Planning" 2e, TMH ,2012
4. Goyal "Enterprice Resource Planning" TMH, 2012
5. Jagan Nathan Vaman "ERP Srategies for Steering Orgnizationsal competence and competetive Advantage" TMH, 2012.

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IV Year B.Tech. II-Sem

L	T	P	C
3	0	0	3

OPEN ELECTIVE-III

(MB0862) MANAGEMENT INFORMATION SYSTEM (MIS)

The objective of the course is to provide the basic concepts of Enterprise Resource Planning and Management of Information System.

Unit – 1: Introduction to IS Models and Types of Information systems – Nolan Stage Hypothesis, IS Strategic Grid, Wards Model, Earl's Multiple Methodology, Critical Success Factors, Soft Systems Methodology, Socio-Technical Systems Approach (Mumford), System Develop Life Cycle, Prototype and End User Computing, Application Packages, Outsourcing, Deciding Combination of Methods. Types of Information Systems

Unit – 2: IS Security, Control and Audit– System Vulnerability and Abuse, business value of security and control, Need for Security, Methods of minimizing risks IS Audit, ensuring system quality.

Unit – 3: Induction to ERP: Overview of ERP, MRP, MRPII and Evolution of ERP, Integrated Management Systems, Reasons for the growth of ERP, Business Modeling, Integrated Data Model, Foundations of IS in Business, Obstacles of applying IT, ERP Market- ERP Modules: Finance, Accounting Systems, Manufacturing and Production Systems, Sales and Distribution Systems, , Human Resource Systems, Plant Maintenance System, Materials Management System, Quality Management System, ERP System Options and Selection, ERP proposal Evaluation.

Unit – 4: Benefits of ERP: Reduction of Lead Time, On-Time Shipment, Reduction in Cycle Time, Improved Resource Utilisation, Better Customer Satisfaction, Improved

Supplier Performance, Increased Flexibility, Reduced Quality Costs, Improved Information Accuracy and Design Making Capabilities.

Unit – 5: ERP Implementation and Maintenance: Implementation Strategy Options, Features of Successful ERP Implementation, Strategies to Attain Success, User Training, Maintaining ERP & IS**.** Case Studies.

References

- Gordon B. Davis & Margrethe H.Olson: Management Information Systems, TMH, 2009.
- C Laudon and Jane P.Laudon, et al: Management Information Systems, Pearson Education, 2009.
- Alexis Leon: ERP (Demystified), 5/E, Tata McGraw-Hill, 2009.
- C.S.V.Murthy: Management Information System, Himalaya,2009
- James A. Obrein: Management Information Systems, TMH, 2009
- David L Olson: Managerial Issues of Enterprise Resource Planning Systems, McGraw Hill, International Edition-2009.
- Rainer, Turban, Potter: Introduction to Information Systems, WILEY-India, 2009.
- Vaman, ERP in Practice, TMH, 2009
- Dharminder and Sangeetha: Management Information Systems, Excel, 2009
- Gerald V.Post, David L Anderson: Management Information Systems, Irvin McGraw Hill, 2009.
- Monk: Concepts in ERP, Cengage, 2009
- Olson: Managerial Issues of ERO, TMH, 2009
- Motiwala:Enterprise Resource Planning, Pearson 2009
- Miller:MIS—Cases, Pearson, 2009

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IV Year B.Tech. II-Sem

L	T	P	C
3	0	0	3

OPEN ELECTIVE-III
(MB0863) ORGANIZATIONAL BEHAVIOUR

The objective of the course is to provide the students with the conceptual framework and the theories underlying Organisational Behaviour.

Unit-1: Introduction to OB - Definition, Nature and Scope –Environmental and organizational context – Impact of IT, globalization, Diversity, Ethics, culture, reward systems and organizational design on Organisational Behaviour. Cognitive Processes-I : Perception and Attribution: Nature and importance of Perception – Perceptual selectivity and organization - Social perception – Attribution Theories – Locus of control –Attribution Errors –Impression Management.

Unit-2: Cognitive Processes-II: Personality and Attitudes - Personality as a continuum – Meaning of personality - Johari Window and Transactional Analysis - Nature and Dimension of Attitudes – Job satisfaction and organisational commitment-Motivational needs and processes- Work-Motivation Approaches Theories of Motivation- Motivation across cultures - Positive organizational behaviour: Optimism – Emotional intelligence – Self-Efficacy.

Unit-3: Dynamics of OB-I: Communication – types - interactive communication in organizations – barriers to communication and strategies to improve the follow of communication - Decision Making: Participative decision making techniques – creativity and group decision making . Dynamics of OB –II Stress and Conflict: Meaning and

types of stress –Meaning and types of conflict - Effect of stress and intra-individual conflict - strategies to cope with stress and conflict.

Unit-4: Dynamics of OB –III Power and Politics: Meaning and types of power – empowerment - Groups Vs. Teams – Nature of groups –dynamics of informal groups – dysfunctions of groups and teams – teams in modern work place.

Unit-5: Leading High performance: Job design and Goal setting for High performance- Quality of Work Life- Socio technical Design and High performance work practices - Behavioural performance management: reinforcement and punishment as principles of Learning –Process of Behavioural modification - Leadership theories - Styles, Activities and skills of Great leaders.

References

- Luthans, Fred: Organizational Behaviour 10/e, McGraw-Hill, 2009
- McShane: Organizational Behaviour, 3e, TMH, 2008
- Nelson: Organizational Behaviour, 3/e, Thomson, 2008.
- Newstrom W.John & Davis Keith, Organisational Behaviour-- Human Behaviour at Work, 12/e, TMH, New Delhi, 2009.
- Pierce and Gardner: Management and Organisational Behaviour: An Integrated perspective, Thomson, 2009.
- Robbins, P.Stephen, Timothy A. Judge: Organisational Behaviour, 12/e, PHI/Pearson , New Delhi, 2009.
- Pareek Udai: Behavioural Process at Work:,Oxford &IBH, New Delhi, 2009.
- Schermerhorn: Organizational Behaviour 9/e, Wiley, 2008.
- Hitt: Organizational Behaviour,Wiley, 2008
- Aswathappa: Orgganisational Behaviour,7/e,Himalaya, 2009
- Mullins: Management and Organisational Behaviour, Pearson, 2008.
- McShane,Glinow: Organisational Behaviour--Essentials, TMH, 2009.
- Ivancevich: Organisational Behaviour and Management, 7/e, TMH, 2008.

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IV Year B.Tech. II-Sem

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Open Elective – III
(ME0861) FUNDAMENTALS OF ROBOTICS

Pre-Requisites: None

Course outcomes:
After this completion of this course, the student should be able to understand thre basic components of robots, differentiate types of robots and robot grippers, model forward and inverse kinematics of robot manipulators, analyse forces in links and joints of a robot, programme a robot to perform tasks in industrial applications, design intelligent robots using sensors.

Unit 1
Robotics-Introduction-classification with repect to geometrical configuration (Anatomy) , Controled system & chain type:. Serial manipulator & Parallel Manipulator. Components of Industrail robotics-Precesion of movement-resolution, accuracy & repeatability-Dynamic characteristics- speed of motion, load carrying capacity & speed of response-Sensors-Internal sensors: Position sensors,& Velocity sensors,External sensors: Proximity sensors, Tactile Sensors, & Force or Torque sensors.

Unit 2
Grippers - Mechanical Gripper-Grasping force-Engelberger-g-factors-mechanisms for actuation, Magnetic gripper , vaccume cup gripper-considerations in gripper selection & design . Industrial robots spefications.Selection based on the Application.

Unit 3

Kinematics-Manipulators Kinematics, Rotation Matrix, Homogenous Transformation Matrix, D-H transformation matrix, D-H method of assignment of frames. Direct and Inverse Kinematics for industrial robots. Differential Kinematicsfor planar serial robots

Unit 4

Trajectory planning: Joint space scheme- Cubic polynomial fit-Obstacle avoidance in operation space-cubic polynomial fit with via point, bleding scheme. Introduction Cartesian space scheme.

ontrol- Interaction control, Rigid Body mechanics, Control architecture- position, path velocity and force control systems, computed torque control, adaptive control, and Servo system for robot control.

Unit 5

Programming of Robots and Vision System-Lead through programming methods-Teach pendent- overview of various textual programming languages like VAL etc.

Machine (robot) vision:

Textbooks:

1. Fu, K.S., Gonzalez, R.C., and Lee, C.S.G., *Robotics control, Sensing, Vision and Intelligence*, McGraw-Hill Publishing Company, New Delhi, 2003.
2. Industrail Robotics/Grover/ McGraw hill
3. Robotics/ Mittal and Nagarath/ TMH

REFERENCE BOOKS:

1. Robot Dynamics and Controls / Spony and Vidyasagar / John Wiley

2. Robot Analysis and control Asada and Slotine / Wiley Inter-Science

3. Introduction to Robotics / John J Craig / Pearson Education

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IV Year B.Tech. II-Sem

L	T	P	C
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Open Elective – III
(ME0862) NON CONVENTIONAL ENERGY SOURCES

Pre-requisites: None

Course Outcomes:

At the end of the course, the student will be able to identify renewable energy sources and their utilization. Understand the basic concepts of solar radiation and analyze the working of solar and thermal systems. Understand principles of energy conversion from alternate sources including wind, geothermal, ocean, biomass, biogas and hydrogen. Understand the concepts and applications of fuel cells, thermoelectric convertor and MHD generator. Identify methods of energy storage for specific applications

UNIT – I

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

SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT - II

SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, sensible, latent heat and stratified storage, solar ponds. Solar applications - solar heating/cooling techniques, solar distillation and drying, photovoltaic energy conversion.

WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

UNIT - III

BIO-MASS: Principles of Bio-Conversion, Anaerobic /aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C. Engine operation, and economic aspects.

UNIT – IV

GEOTHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy, potential in India.

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

UNIT –V

DIRECT ENERGY CONVERSION: Need for DEC, Carnot cycle, limitations, Principles of DEC. Thermo-electric generators, Seebeck, Peltier and Joule Thompson effects, figure of

merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator, MHD engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principle, faraday's laws, thermodynamic aspects, selection of fuels and operating conditions.

TEXT BOOKS:

1. Renewable Energy Resources / Tiwari and Ghosal / Narosa
2. Non- conventional Energy Sources / G.D. Rai
3. Biological Energy Resources/ Malcolm Fleischer & Chris Lawis.

REFERENCE BOOKS:

1. Renewable Energy Sources / Twidell & Weir
2. Solar Energy / Sukhame
3. Solar Power Engineering / B.S. Magal Frank Kreith & J.F. Kreith
4. Principles of Solar Energy / Frank Krieth & John F Kreider
5. Non-Conventional Energy / Ashok V Desai / Wiley Eastern
6. Non-Conventional Energy Systems / K Mittal / Wheeler
7. Renewable Energy Technologies / Ramesh & Kumar / Narosa

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L	T	P	C
3	0	0	3

Open Elective – III

(ME0863) ASPECTS OF HEAT TRANSFER IN ELECTRICAL/ELECTRONICALLY CONTROLLED UNITS

Pre-requisites: None

Outcomes: After the course student should be able to analyse conduction, convection and radiation heat transfer modes, heat generation, conduction and dissipation in electronically controlled units.

UNIT-I

Conduction Heat transfer: Modes of heat transfer, Fourier's law of steady state heat conduction (one dimensional conduction), thermal conductivity and its unit, conduction through slab or plane wall, hollow cylinders and spheres conduction through composite walls and hollow cylinders and spheres with multi-layers, Convective heat transfer, Newton's law of cooling, electrical analogy and overall heat transfer coefficient, numerical problems

UNIT-II

Convective and radiation Heat transfer:

Dimensional analysis as a tool for experimental investigation, Buckingham pi theorem and method, radiation and radiation properties of surfaces, black body, emissive power, Stefan Boltzmann's law, emissivity, monochromatic emissive power and monochromatic emissivity, grey body, Kirchoff's law, Wien's displacement law, numerical problems.

UNIT – III

Cooling of Electronic equipment:

Introduction and history, manufacturing of electronic equipment, cooling load of electronic equipment, thermal environment, electronics cooling in different applications, conduction cooling, air cooling: natural convection and radiation, air cooling: forced convection, liquid cooling, immersion cooling, heat pipes, cooling of chips, PCBs, computers, logic chips etc.

UNIT – IV

Refrigeration and Air conditioning: Introduction to refrigeration, necessity and applications, unit of refrigeration and cop, Principle of vapour compression and absorption system – Layout of typical domestic refrigerator – Window and Split type room Air conditioner.

UNIT-V

Heat pipes: structure – operation - construction - thermal resistance- performance characteristics - effects of working fluid and operating temperature, wick - selection of material - pore size, applications.

Text books:

1. Heat Transfer- A practical approach by Yunus A. Cengel,Tata Mc Graw-Hill Edition
2. Heat Transfer – A conceptual approach – P.K.Sarma & K.Rama Krishna/New age
3. A course in Refrigeration and Air conditioning – SC Arora and & Domkundwar / Dhanpatrai

Reference books:

1. Fundamentals of Engineering, Heat and mass transfer – R.C. Sachdeva/New Age
2. Heat & mass Transfer – D.S.Kumar/S.K.Kataria & sons

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IV Year B.Tech. II-Sem

L	T	P	C
3	0	0	3

(OPEN ELECTIVE –III)

(EC0861) PRINCIPLES OF COMPUTER COMMUNICATIONS AND NETWORKS

Prerequisite : Nil

Course Objectives:

- To understand the concept of computer communication.
- To learn about the networking concept, layered protocols.
- To understand various communications concepts.
- To get the knowledge of various networking equipment.

UNIT-I

Overview of Computer Communications and Networking :

Introduction to Computer Communications and Networking , Introduction to Computer Network , Types of Computer Networks, Network Addressing, Routing , Reliability, Interoperability and Security, Network Standards, The Telephone System and Data Communications.

UNIT-II

Essential Terms and Concepts :

Computer Applications and application protocols, Computer Communications and Networking models, Communication Service Methods and data transmission modes, analog and Digital Communications , Speed and capacity of a Communication Channel, Multiplexing and switching, Network architecture and the OSI reference model.

UNIT-III

Analog and Digital Communication Concepts :

Representing data as analog signals, representing data as digital signals, data rate and bandwidth reduction , Digital Carrier Systems.

UNIT-IV

Physical and data link layer Concepts:

The Physical and Electrical Characteristics of wire, Copper media, fiber optic media, wireless Communications. Introduction to data link Layer , the logical link control and medium access control sub-layers.

UNIT-V

Network Hardware Components:

Introduction to Connectors, Transreceivers and media convertors, repeaters, network interference cards and PC cards, bridges, switches, switches Vs Routers.

Text Books:

1. Computer Communications and Networking Technologies, Michel A. Gallo and William H. Hancock, Thomson Brooks / Cole.

Reference Books:

1. Principles of Computer Networks and Communications, M. Barry Dumas, Morris Schwartz, Pearson.

Course Outcomes:

- The student can get the knowledge of networking of computers, data transmission between computers.
- Will have the exposure about the various communication concepts.
- Will get awareness about the structure and equipment of computer network structures.

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IV Year B.Tech. II-Sem

L	T	P	C
4	1	0	4

(IT0861) WEB TECHNOLOGIES
(Common to CSE)

COURSE OBJECTIVES

- To learn the basic web concepts and Internet protocols
- To introduce XML and processing of XML data
- To introduce client side scripting with Javascript and DHTML
- To introduce server side programming with Java Servlets and JSP

UNIT-I: INTRODUCTION: Web Essentials - Clients, Servers and Communication:

The Internet, Basic Internet Protocols: TCP/IP, UDP, DNS, The World Wide Web: Hypertext Transport Protocol, HTTP Request Message, HTTP Response Message, Web Clients, Web Servers.

Markup Languages - HTML: Basic Tags, Forms, Style sheets

UNIT-II: Client-Side Programming - Introduction to JavaScript, JavaScript in Perspective, Basic Syntax, Variables and Data Types, Statements, Operators, Literals, Functions, Objects, Arrays, Built-in Objects, JavaScript Debuggers.

Host Objects - Browsers and the DOM: Introduction to the Document Object Model, Intrinsic Event Handling, Modifying Element Style, The Document Tree, DOM Event Handling.

UNIT-III: Server-Side Programming - Java Servlets: Servlet Architecture, Servlets Generating Dynamic Content, Servlet Life Cycle, Parameter Data, Sessions, Cookies, URL Rewriting, Case Study.

UNIT-IV: Representing Web Data XML: XML Documents and Vocabularies, XML Versions and the XML Declaration, XML Namespaces, DOM-Based XML Processing, Event-oriented Parsing: SAX, Transforming XML Documents, Selecting XML Data: XPath, Template-based Transformation: XSLT, Displaying XML Documents in Browsers, Case Study.

UNIT-V: Separating Programming and Presentation - JSP Technology: Introduction to Java Server Pages, Running JSP Applications, Basic JSP, JavaBeans Classes and JSP, Tag Libraries and Files, Support for the Model-View-Controller Paradigm, Case Study.

TEXT BOOKS

1. WEB TECHNOLOGIES: A Computer Science Perspective, Jeffrey C. Jackson, Pearson Education.

REFERENCES

1. Deitel H.M. and Deitel P.J., "Internet and World Wide Web How to program", Pearson International, 2012, 4th Edition.
2. J2EE: The complete Reference By James Keogh, McGraw-Hill.
3. Bai and Ekedhi, The Web Warrior Guide to Web Programming, Thomson.
4. Paul Dietel and Harvey Deitel, "Java How to Program", Prentice Hall of India, 8th Edition.
5. Web Technologies, Black Book, Dreamtech Press.
6. **Gopalan N.P and Akilandeswari J, "Web Technology", Prentice Hall of India.**

COURSE OUTCOMES

1. Ability to create dynamic and interactive web sites
2. Gain knowledge of client side scripting using javascript and DHTML.
3. Demonstrate understanding of what is XML and how to parse and use XML data
4. Able to do server side programming with Java Servlets and JSP

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L	T	P	C
3	0	0	3

OPEN ELECTIVE-III
(CS0861) SIMULATION & MODELING

PREREQUISITES:

1. A course on “Computer Oriented Statistical Methods”

COURSE OBJECTIVES:

1. introduce students to the simulation and modeling techniques ; and The goal is to introduce students to basic simulation methods and tools for modeling and simulation of continuous, discrete and combined systems.
2. Provide students with opportunities to develop basic simulation and modeling skills with respect to carrying out research projects using any simulation method on the computer.

SYLLABUS:

UNIT-I

System Models and Studies

System Models: Concepts of a System, System Environment, Stochastic Activities, Continuous and Discrete Systems, System Modeling, Types of

Models, Static Physical Models, Dynamic Physical Models, Static Mathematical Models, Dynamic Mathematical Models, Principles Used in Modeling.

System Studies: Subsystems, A Corporate Model, Environment Segment, Production Segment, Management Segment, The Full Corporate Model, Types of System Study, System Analysis, System Design, System Postulation.

UNIT-II

Random Numbers

Random Number Generation: Properties, Generation of Pseudo- Random Numbers, Techniques of generating random numbers, tests for random numbers

Random-Variate Generation: Inverse-Transform Technique, Acceptance-Rejection Technique, Special Properties.

UNIT-III

Simulation of Continuous and Discrete Systems

Simulation of Continuous Systems: A chemical reactor, Numerical integration vs. continuous system simulation, Selection of an integration formula, Runge-Kutta integration formulas, Simulation of a servo system, Simulation of a water reservoir system, Analog vs. digital simulation.

Discrete System Simulation: Fixed time-step vs. event-to-event model, On simulating randomness, Generation of random numbers, Generation of non-uniformly distributed random numbers, Monte- Carlo computation vs. stochastic simulation.

UNIT-IV

System Simulation

Simulation of Queuing Systems: Rudiments of queuing theory, Simulation of a single-server queue, Simulation of a two-server queue, Simulation of more general queues.

Simulation of a Pert Network: Network model of a project, Analysis of activity network, Critical path computation, Uncertainties in activity durations, Simulation of activity network, Computer program for simulation, Resource allocation and cost considerations.

UNIT-V

Simulation Experimentation

Design and Evaluation of Simulation Experiments: Length of simulation runs, Variance reduction techniques, Experimental layout, Validation. Simulation Languages: Continuous and discrete simulation languages, Continuoussimulation languages, Block-structured continuous simulation languages, Expression-based languages, Discrete-system simulation languages, GPSS.

TEXT BOOKS:

1. System Simulation, Geoffrey Gordon, Prentice-Hall of India Private Limited,

Second Edition, 1978. (for Unit-I: Chapters 1 and 2)

2. Discrete-Event System Simulation, Jerry Banks, John S. Carson II, Barry L. Nelson, David M.Nicol, Pearson, Fifth Edition, 2010. (for Unit-II: Chapters 7 and 8)

3. System Simulation with Digital Computer, Narsingh Deo, Prentice-Hall of India Private Limited, 1979. (for Unit-III to V: Chapters 2 to 5 and 7,8).

REFERENCE BOOK:

1. System Modeling and Simulation: An Introduction, Frank L. Severance, Wiley Publisher, 2005

COURSE OUTCOMES:

1. Acquire proficiency in constructing a model for a given system/set of data.
2. Knowledge of simulation principles. The ability to create simulation models of various types. Basic knowledge of simulation system principles.
3. Ability to generate and test random number variants and employ them in developing simulation models.
4. Ability to implement System Simulation of Queuing Systems theory.
5. Ability to implement Simulation Experimentation Design and Evaluation of Simulation Experiments