ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

FOR

M. Tech. (POWER ELECTRONICS)
(with effect from 2013-2014)
Course Objectives:

The students will be able to:
1. Understand the concept of 2-axis representation of an Electrical machine.
2. Know the concepts of representing transfer function model of a DC machine.
3. Understand the importance of 3-phase to 2-phase conversion.

UNIT – I

Basic Two-pole DC machine - primitive 2-axis machine - Voltage and Current relationship - Torque equation

UNIT – II


UNIT – III

Linear transformation - Phase transformation (a, b, c to α, β, ω) - Active transformation(α, β, ω to d, q ). Circuit model of a 3 phase Induction motor – Linear transformation - Phase Transformation - Transformation to a Reference frame - Two axis models for Induction motor.

UNIT – IV

Voltage and current Equations in stator reference frame - Equation in Rotor reference frame - Equations in a synchronously rotating frame - Torque equation-Equations in state-space form.

UNIT – V


TEXT BOOKS :
1. Thyristor control of Electric Drives - Vedam Subramanyam.
2. Analysis of electric machinery and Drive systems - Paul C.Krause , Oleg wasynezuk, Scott D.Sudhoff
MTPE 12 ANALYSES OF POWER ELECTRONIC CONVERTERS

Class: M.Tech. I Semester
Branch: EEE (Power Electronics)
Duration of University Examination: 3 Hours
Lectures: 4
University Examination: 100 Marks
Sessionals: 50 Marks

Course Objectives:
The students will be able to:
1. To analyze the performance of controlled
2. To understand designing concepts of AC-AC voltage controllers and Cycloconverters.
3. To learn the designing of DC-DC chopper circuits.
4. To understand and analyze PWM techniques for Inverters.

UNIT – I

Single Phase AC Voltage Controllers: Single phase AC voltage controllers with Resistive, Resistive-inductive and Resistive-inductive-induced e.m.f. loads - ac voltage controllers with PW Control - Effects of source and load inductances - Synchronous tap changers-Applications - numerical problems.

UNIT – II

Three Phase AC Voltage Controllers: Three phase AC voltage controllers - Analysis of controllers with star and delta Connected Resistive, Resistive-inductive loads - Effects of source and load Inductances - applications - numerical problems.


UNIT – III


UNIT – IV

UNIT – V

**Pulse Width Modulated Inverters (single phase):**

**Pulse Width Modulated Inverters (three phase):**
Three phase inverters - analysis of 180 degree condition for output voltage and current with resistive, inductive loads - analysis of 120 degree Conduction - voltage control of three phase inverters - sinusoidal PWM - Third Harmonic PWM - 60 degree PWM – space vector modulation - Comparison of PWM techniques - harmonic reductions - Current Source Inverter - variable d.c. link inverter - boost inverter - buck and boost inverter - inverter circuit design - advantages - applications - numerical problems.

**TEXT BOOKS:**
MTPE 13 MODERN CONTROL THEORY

Class: M.Tech. I Semester Lectures: 4
Branch: EEE (Power Electronics) University Examination: 100 Marks
Duration of University Examination: 3 Hours Sessionals: 50 Marks

Course Objectives:
The students will be able to:
1. Know the basic concepts of matrices, Eigen values and Eigen vectors.
2. Know the modeling of systems by using state space Analysis
3. Know the design of controllers for several classes of plants.
4. Know the Harmonic Analysis and Stability of Non-Linear Systems
5. Know the control problems such as dead bent control, external Disturbances and sensitivity problems in optimal linear regulators.

UNIT – I


UNIT – II

STATE VARIABLE ANALYSIS: Linear Continuous time models for Physical systems– Existence and Uniqueness of Solutions to Continuous-Time State Equations – Solutions of Linear Time Invariant Continuous-Time State Equations – State transition matrix and it’s properties.

CONTROLLABILITY AND OBSERVABILITY

UNIT – III

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

UNIT – IV


STATE FEEDBACK CONTROLLERS AND OBSERVERS
State feedback controller design through Pole Assignment – State observers: Full order and Reduced order
UNIT – V


TEXT BOOKS:

REFERENCE BOOKS:
Optimal control by Kircks
MTPE 14 POWER ELECTRONIC CONTROL OF DC DRIVES

Class: M.Tech. I Semester
Branch: EEE (Power Electronics)  University Examination: 100 Marks
Duration of University Examination: 3 Hours  Sessionals: 50 Marks
Lectures: 4

Course Objectives:
The students will be able to:
1. Design motor starting, braking and reversing electrical circuits.
2. Control Speed of the DC motor by using different controllers.
3. Design and modeling of current and speed controllers for DC motors
4. Determine drive system stability by calculating different system parameters.
5. Calculate harmonics and their associated problems.

UNIT – I

Controlled Bridge Rectifier (1-Φ) with DC Motor Load: Separately exited DC motors with rectified single-phase supply – single phase semi converter and single phase full converter for continuous and discontinuous modes of operation – power and power factor.

UNIT – II

Controlled Bridge Rectifier (3-Φ) with DC Motor Load: Three-phase semi converter and three phase full converter for continuous and discontinuous modes of operation – power and power factor – Addition of free wheeling diode- Three-phase double converter.

Three phase naturally commutated bridge circuit as a rectifier or as an inverter:
Three phase controlled bridge rectifier with passive load impedance, resistive load and ideal supply – Highly inductive load and ideal supply for load side and supply side quantities, shunt capacitor compensation, three phase controlled bridge rectifier inverter.

UNIT – III


Current and Speed Controlled DC Motor drives:

UNIT – IV

Chopper controlled DC Motor drives

Closed loop operation of DC Motor drives
UNIT – V

**Simulation of DC motor drives:** Dynamic simulations of the speed controlled DC motor drives – Speed feedback speed controller – command current generator – current controller.

**REFERENCES:**
MTPE 15A HIGH VOLTAGE DC TRANSMISSION
(Elective-I)

Class: M.Tech. I Semester Lectures: 4
Branch: EEE (Power Electronics) University Examination: 100 Marks
Duration of University Examination: 3 Hours Sessionals: 50 Marks

Course Objectives:
The students will be able to:
1. Learn the importance of HVDC transmission.
2. Analyze HVDC converters
3. Know the faults and protections required in HVDC system
4. Get idea of Harmonics and Filters
5. Know the concepts of multiterminal DC links.

UNIT – I
H.V.D.C. Transmission: General considerations, Power Handling Capabilities of HVDC Lines, Basic Conversion principles, static converter configuration.

UNIT – II
Static Power Converters: 3-pulse, 6-pulse and 12-pulse converters, converter station and Terminal equipment, commutation process, Rectifier and inverter operation, equivalent circuit for converter -special features of converter transformers. Harmonics in HVDC Systems, Harmonic elimination, AC and DC filters.

UNIT – III
Control of HVDC Converters and systems: constant current, constant extinction angle and constant Ignition angle control- Individual phase control and equidistant firing angle control, DC power flow control. Interaction between MV AC and DC systems - Voltage interaction, Harmonic instability problems and DC power modulation.

UNIT – IV
Multi-terminal DC links and systems; series, parallel and series parallel systems, their operation and control. Transient over voltages in HVDC systems: Over voltages due to disturbances on DC side, over voltages due to DC and AC side line faults.

UNIT – V
Converter faults and protection in HVDC Systems: Converter faults, over current protection - valve group, and DC line protection. Over voltage protection of converters, surge arresters.

REFERENCE BOOKS:
UNIT – I

Duality theorem – Dual simplex method – Sensitivity analysis - effect of changes in cost coefficients, Constraint constants, Addition/Deletion of variables and constraints

UNIT – II

Transportation problem – formulation – Initial basic feasible solution methods – Northwest, Least cost and Vogels methods, MODI optimization - Unbalanced and degeneracy treatment

UNIT – III


UNIT – IV


UNIT – V

Geometric programming – Polynomial – Arithmetic – Seameetric inequality – Unconstrained G.P – Constraint G.P with ≤ type constraint
Simulation: Definition – Types- steps- Simulation of simple electrical systems – Advantages and Disadvantages
TEXT BOOKS:
2. Operations Research - S.D.Sharma, Galgotia publishers

REFERENCES:
Course Objectives:
The students will be able to:
1. To learn the characteristics of modern power semiconductor devices.
2. To understand the operation of resonant converters.
3. To analyze the performance of different topologies of Multilevel Inverters.
4. To learn the concepts of DC power supplies.

UNIT – I

Modern power semiconductor devices: Modern power semiconductor devices – MOS turn Off Thyristor (MTO) – Emitter Turn Off Thyristor (ETO) – Integrated Gate-Commutated thyristor (IGCTs) – MOS-controlled thyristors (MCTs) – Static Induction circuit – comparison of their features.

UNIT – II


UNIT – III


Multilevel Inverters (continued)

UNIT – IV

UNIT – V


TEXT BOOKS:
Course Objectives:
The students will be able to:
1. Understand the concept of ladder programming.
2. Know the PLC programming for several Digital Logic Circuits.
3. Know the applications of PLC in industries.
4. Learn the operation of analog PLC.

UNIT – I
PLC Basics: PLC system, I/O modules and interfacing, CPU processor, programming equipment, programming formats, construction of PLC ladder diagrams, devices connected to I/O modules.

UNIT – II
PLC Programming: Input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill press operation. Digital logic gates, programming in the Boolean algebra system, conversion examples. Ladder diagrams for process control: Ladder diagrams and sequence listings, ladder diagram construction and flow chart for spray process system.

UNIT – III
PLC Registers: Characteristics of Registers, module addressing, holding registers, input registers, output registers.
PLC Functions: Timer functions and Industrial applications, counters, counter function industrial applications, Arithmetic functions, Number comparison functions, number conversion functions.

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

UNIT – V
Analog PLC operation: Analog modules and systems, Analog signal processing, multi bit data processing, analog output application examples, PID principles, position indicator with PID control, PID modules, PID tuning, PID functions.

REFERENCE BOOKS:
Course Objectives:
The students will be able to:
1. Know the characteristics and performance of solar cells.
2. Learn the principles of wind energy conversion
3. Know the energy conversion system through coal gasification, biomass and geothermal.
4. Learn the concepts of fuel cells and operation of batteries.

UNIT – I

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

UNIT – II


UNIT – III

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

UNIT – IV

Miscellaneous energy conversion systems: coal gasification and liquefaction, biomass conversion, geothermal energy, thermo electric energy conversion, principles of EMF generation, description of fuel cells. Co-generation and energy storage, combined cycle co-generation, energy storage. Global energy position and environmental effects: energy units, global energy position.. Environmental effects energy units, global energy position.

UNIT – V

Types of fuel cells, H2 – O2 Fuel cells, Application of fuel cells – Batteries, Description of batteries, Battery application for large power. Environmental effects of energy conversion systems, pollution from coal and preventive measures steam stations and pollution, pollution free energy systems.

TEXT BOOK
MTPE 16C DYNAMICS OF ELECTRICAL MACHINES
(Elective-II)

Class: M.Tech. I Semester                      Lectures: 4
Branch: EEE (Power Electronics)               University Examination: 100 Marks
Duration of University Examination: 3 Hours   Sessionals: 50 Marks

Course Objectives:
The students will be able to:
1. Learn various design and characteristics of electrical machines.
2. The electromechanical analogy of the electrical machines
3. The dynamics characteristics of DC machine with generalized machine theory.
4. Know and study the operation and dynamics characteristics of the induction motor.
5. The dynamic, Transient and steady state characteristics of synchronous machines.

UNIT – I

Basic Machine Theory: Electromechanical Analogy – Magnetic Saturation – Rotating field
machines – operations of synchronous motor – Power angle characteristics

UNIT – II

Electrodynamical equation and their solutions: Spring and Plunger system - Rotational motion
– mutually coupled coils – Lagrange’s equation – Application of Lagrange’s equation solution of
Electro dynamical equations.

UNIT – III

Dynamics of DC Machines: Separately excited d. c. generations – stead state analysis – transient
analysis – Separately excited d. c. motors – stead state analysis – transient analysis –
interconnection of machines – Ward Leonard system of speed control.

UNIT – IV

Induction Machine Dynamics: Induction machine dynamics during starting and braking –
accelerating time – induction machine dynamic during normal operation – Equation for
dynamical response of the induction motor.

UNIT – V

Synchronous Machine Dynamics: Electromechanical equation – motor operation – generator
operation – small oscillations – general equations for small oscillations – representation of the
oscillation equations in state variable form.

REFERENCE BOOKS:
Course Objectives:
The students will be able to:
1. Understand the advantages of closed loop control of electrical machines.
2. Know the control techniques for two and four quadrant operations of DC drives.
4. Know the application of power electronic converters voltage control.

1. Speed Measurement and closed loop control using PMDC motor
2. Thyristorised drive for PMDC Motor with speed measurement and closed loop control.
3. IGBT used single 4 quadrant chopper drive for PMDC motor with speed measurement and closed loop control.
4. Thyristorised drive for 1Hp DC motor with closed loop control.
5. 3 Phase input, thyristorised drive, 3 Hp DC motor with closed loop
6. 3 Phase input IGBT, 4 quadrant chopper drive for DC motor with closed loop control equipment.
7. Cycloconverter based AC Induction motor control equipment.
8. Speed control of 3 phase wound rotor Induction motor.
9. Single phase fully controlled converter with inductive load
10. Single phase half wave controlled converter with inductive load.
MTPE 18 SEMINAR

Class: M.Tech. I Semester          Sessionals: 100 Marks
Branch: EEE (Power Electronics)

The candidate should give an oral presentation before the Departmental Post-Graduate Review Committee (DPGRC) on any selected topic relevant to their specialization.

The students will submit a brief report as per specified format and present before the evaluation committee.

The seminar evaluation will be based on the day to day work report submission and presentation before the evaluation committee.
Course Objectives:
The students will be able to:
1. Draw torque speed characteristics for different control parameters by their equivalent circuit analysis.
2. Know different slip recovery drive schemes for speed control of I.M. at rotor side.
3. Study Victor control of Induction Motor Drive.
4. Study and draw characteristics of synchronous motor using UPF and constant flux linkage control.
5. Speed Control of variable Reluctance motor drive and brushless DC motor drive.

UNIT – I


UNIT – II


UNIT – III


UNIT – IV

UNIT – V

Variable Reluctance and Brushless DC Motor drives: Variable Reluctance motor drive – Torque production in the variable reluctance motor Drive characteristics and control principles – Current control variable reluctance motor service drive.

Brushless DC Motor drives: Three phase full wave Brushless dc motor – Sinusoidal type of Brushless dc motor- current controlled Brushless dc motor Servo drive

REFERENCES:
3. Power Electronics and Control of AC Motors – MD Murthy and FG Turn Bull pergman Press (For Chapters II, III, V ) 1st edition
MTPE 22 MICROPROCESSORS AND MICROCONTROLLERS

Class: M.Tech. II Semester
Branch: EEE (Power Electronics)  University Examination: 100 Marks
Duration of University Examination: 3 Hours  Sessionals: 50 Marks
Lectures: 4

Course Objectives:
The students will be able to:
1. Learn importance of microprocessors and microcontrollers.
2. Learn and understand architecture and programming of 8086 processor
3. Learn and understand interfacing techniques like memory and I/O interfacing
4. Learn the various data transfer techniques like programmed I/O, interrupt I/O and direct memory access.
5. Learn and understand architecture of advanced processors.

UNIT – I


UNIT – II


UNIT – III

Advanced Microprocessors: Intel 80386 programming model, memory paging, Introduction to 80486, Introduction to Pentium Microprocessors and special Pentium pro features. Basic peripherals & Their Interfacing:-Memory Interfacing (DRAM) PPI- Modes of operation of 8255, interfacing to ADC & DAC.

UNIT – IV

Special Purpose of Programmable Peripheral Devices and Their interfacing:-Programmable interval timer, 8253, PIC 8259A, display controller Programmable communication Interface 8251, USART and Exercises.

UNIT – V

Microcontrollers: Introduction to Intel 8-bit &16-bit Microcontrollers, 8051- Architecture, Memory organization, Addressing Modes and exercises. Hardware description of 8051: Instruction formats Instruction sets, interrupt Structure & interrupt priorities, Port structures &Operation linear counter Functions different Modes of Operation and Programming examples.

TEXT BOOKS:
1. The Intel Microprocessors, Architecture Programming & Interfacing by Barry B Brey
2. Advanceed Microprocessors by Kenrhith J Ayala, Thomson publishers
3. Microcontrollers by Kentrith J Ayala, Thomson publishers

REFERENCE BOOKS:
1. Microprocessors & Interfacing Programming & Hard ware by Douglas V. Hall
2. Microprocessors & Microcontrollers by Prof. C.R. Sarma
Course Objectives:
The students will be able to:
1. Learn the power flow in transmission system concepts.
2. Understand the operations of application voltage source converters
3. Learn the Objectives of shunt & Series compensation
4. Analyze the behavior of various FACTS devices

UNIT – I

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

UNIT – II

Voltage Source Converters: Single phase three phase full wave bridge converters transformer connections for 12 pulse 24 and 48 pulse operation. Three level voltage source converter, pulse width modulation converter, basic concept of current source Converters, comparison of current source converters with voltage source converters.

UNIT – III

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

UNIT – IV

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

UNIT – V

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

TEXT BOOK:
Course Objectives:
The students will be able to:
2. Understand methods of minimization like LMS algorithm, back propagation algorithms, single & multi layer perceptrons, self organized maps.
3. Learn the use of Fuzzy logic and fuzzy system implementation
4. Learn and understand associate memories.

UNIT – I

Introduction to Neural Networks

UNIT – II

Essentials of Artificial Neural Networks

UNIT – III

Multilayer Feed forward Neural Networks

UNIT – IV

Self-Organizing Maps (SOM) and Adaptive Resonance Theory (ART)
UNIT – V

Fuzzy Logic System Components and Applications


TEXT BOOK:
1. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by Rajasekharan and Pai – PHI Publication.

REFERENCE BOOKS:
3. Neural Networks – Simon Hykins , Pearson Education
4. Neural Engineering by C.Eliasmith and CH.Anderson, PHI
5. Neural Networks and Fuzzy Logic System by Bork Kosko, PHI Publications
MTPE 25A DIGITAL CONTROL SYSTEMS  
(Elective-III)
Class: M.Tech. II Semester  
Branch: EEE (Power Electronics)  
Duration of University Examination: 3 Hours

Lectures: 4  
University Examination: 100 Marks  
Sessionals: 50 Marks

Course Objectives:
The students will be able to:
1. The Z-transform of a function and mapping between S-plane and Z-plane.
2. The properties and computation of state transition matrix.
3. Understand the stability analysis of closed loop system in Z-plane.
4. Know the designing of state feedback controller.

UNIT – I

SAMPLING AND RECONSTRUCTION  Introduction sample and hold operations, Sampling theorem, Reconstruction of original sampled signal to continuous-time signal.
Z-PLANE ANALYSIS OF DISCRETE-TIME CONTROL SYSTEM  Z-Transform method for solving difference equations; Pulse transforms function, block diagram analysis of sampled-data systems, mapping between s-plane and z-plane: Primary strips and Complementary Strips.

UNIT – II

STATE SPACE ANALYSIS  State Space Representation of discrete time systems, Pulse Transfer Function Matrix solving discrete time state space equations, State transition matrix and its Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state – space equations
CONTROLLABILITY AND OBSERVABILITY  Concepts of Controllability and Observability, Tests for controllability and Observability. Duality between Controllability and Observability, Controllability and Observability conditions for Pulse Transfer Function.

UNIT – III


UNIT – IV


UNIT – V

STATE FEEDBACK CONTROLLERS AND OBSERVERS  Design of state feedback controller through pole placement – Necessary and sufficient conditions, Ackerman’s formula. State Observers – Full order and Reduced order observers.
Linear Quadratic Regulators  
Min/Max principle, Linear Quadratic Regulators, Kalman filters, State estimation through Kalman filters, introduction to adaptive controls.
TEXT BOOKS:
2. Digital Control and State Variable Methods by M.Gopal, TMH

REFERENCE BOOKS:
2. Digital Control Engineering, M.Gopal
Course Objectives:
The students will be able to:
1. Understand the effect of nonlinear loads and disturbances on sensitive loads.
2. Know the standards and classification of power quality disturbances
3. Known the causes and effects of interruptions
4. Understand the concepts of causes and measurement of voltage sag
5. Get knowledge on effects and mitigation of voltage sag.

UNIT – I

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

UNIT – II

Short Interruptions: Short interruptions – definition, origin of short interruptions, basic principle, fuse saving, voltage magnitude events due to re-closing, voltage during the interruption, monitoring of short interruptions, difference between medium and low voltage systems. Multiple events, single phase tripping – voltage and current during fault period, voltage and current at post fault period, stochastic prediction of short interruptions.

UNIT – III

Voltage sag – characterization – Single phase: Voltage sag – definition, causes of voltage sag, voltage sag magnitude, monitoring, theoretical calculation of voltage sag magnitude, voltage sag calculation in non-radial systems, meshed systems, voltage sag duration.
Voltage sag – characterization – Three phase: Three phase faults, phase angle jumps, magnitude and phase angle jumps for three phase unbalanced sags, load influence on voltage sags.

UNIT – IV


UNIT – V

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

**REFERENCE BOOK:**
Course Objectives:
The students will be able to:
1. Learn the design of FIR and IIR digital filter circuits.
2. Understand the computation of Fourier Transform and its application to tunable digital filter analysis.
3. Learn the quantization of digital filter signal.
4. Know the estimation of power spectrum.

UNIT – I


UNIT – II


UNIT – III


UNIT – IV


UNIT – V

REFERENCE BOOKS:
6. Digital Filter Analysis and Design Auntoniam – TMH.
Course Objectives:
The students will be able to:
1. Learn about the element’s of probability theory
2. Learn about the significance of reliability and hazard models.
3. Learn about the reliability logic diagrams.
4. Learn about the Discrete Markov chains and reliability evaluation of repairable systems.

UNIT – I


UNIT – II


UNIT – III


UNIT – IV


UNIT – V

Series systems, parallel systems with two and more than two components, Network reduction techniques. Minimal cutset/failure mode approach.

TEXT BOOKS:
MTPE 26B ENTERPRISE RESOURCE PLANNING
(ELECTIVE-IV)

Class: M.Tech. II Semester
Lectures: 4
Branch: EEE (Power Electronics)
University Examination: 100 Marks
Duration of University Examination: 3 Hours
Sessionals: 50 Marks

Course Objectives:
The students will be able to:
1. Understand the concept of business modeling.
2. Know the management domains in power plants.
3. Know the customer load control and market planning.
4. Understand the need for cost benefit analysis.

UNIT – I

General modes for ERP, Integrated management information; Benefits of ERP. Business modelling for ERP. Representative lists of various core processes and of entities forming data model.

UNIT – II

Problem statement; Key issues; Implementation methodology and guidelines. ERP Domain in power plants: Power plant management, Project management, Operation management, Maintenance Management, Fuel management, Materials management, Human resource management, Finance management, Safety management, and Environment management

UNIT – III

Introduction to IRP and DSM; Framework of DSM. Customer load control; Interruptible electric service; Various evaluation criteria, Rate design in DSM: Objectives, Time - of - use (TOU) rate.

UNIT – IV

Market planning, generic load - shape changes Evaluating DSM programs, an overview of detailed evaluation approach.

UNIT – V

Cost benefit analysis, consumer perspective, utility perspective, Customer acceptance of DSM programs. Strategic marketing, Marketing implementation strategies.

REFERENCES :
Class: M.Tech. II Semester  
Lectures: 4
Branch: EEE (Power Electronics)  
University Examination: 100 Marks
Duration of University Examination: 3 Hours  
Sessionals: 50 Marks

Course Objectives:
The students will be able to:
1. Analyze the design issues of embedded systems, Design simple embedded system.
2. Learn basic issues of microcontroller, architecture and programming of 8051.
3. Learn architecture of PSOC, configurable Analog blocks, Digital blocks and I/O Blocks.
4. Learn basics of real time operating system, RTOS compliers, assemblers, Linker/Locators and debugging techniques.
5. Learn concepts of advanced architectures like ARM, SHARC and Networked embedded systems.

UNIT – I


UNIT – II

Processor & Memory Organization: Structural units in a processor, Processor selection, Memory devices, Memory selection, Memory Allocation & Map; Interfacing

UNIT – III


UNIT – IV


UNIT – V

Hardware and Software Co-Design : Embedded system design and co design issues in software development, design cycle in development phase for Embedded System, Use of ICE & Software tools for development of ES, Issues in embedded system design.

REFERENCE BOOKS:
MTPE 27 ELECTRICAL SYSTEMS SIMULATION LAB

Class: M.Tech. II Semester  
Branch: EEE (Power Electronics) 
Lectures: 4

University Examination: 100 Marks 
Duration of University Examination: 3 Hours 
Sessionals: 50 Marks

Course Objectives:
The students will be able to:
1. Perform simulations study of stability of system.
2. Write a program for steady state and transient stability analysis of a power system,
3. Perform simulation for load frequency control of a single-area and two area systems.
4. Perform simulation analysis of various power electronic converters with different loads.

1. Write program and simulate dynamical system of following models:
   a) I/O Model
   b) State variable model
   Also identify time domain specifications of each.
2. Obtain frequency response of a given system by using various methods:
   (a) General method of finding the frequency domain specifications.
   (b) Polar plot
   (c) Bode plot
   Also obtain the Gain margin and Phase margin.
3. Determine stability of a given dynamical system using following methods.
   a) Root locus
   b) Bode plot
   c) Nyquist plot
   d) Liapunov stability criteria
4. Transform a given dynamical system from I/O model to state variable model and vice versa.
5. Obtain model matrix of a given system, obtain its diagonalize form if exists or obtain Jordon Canonical form of system.
6. Write a program and implement linear quadratic regulator
7. Design a compensator for a given systems for required specifications.
8. Conduct a power flow study on a given power system.
9. Design a PID controller.
10. Conduct a power flow study on a given power system network using Guass-Seidel iterative method.
11. Develop a program to solve Swing Equation.
12. Develop a Simulink model for a single area load frequency problem and simulate the same.
13. Develop a Simulink model for a two-area load frequency problem and simulate the same.
14. Design a PID controller for two-area power system and simulate the same.
15. PSPICE Simulation of Single phase full converter using RL and E loads.
16. PSPICE Simulation of Three phase full converter using RL and E loads.
17. PSPICE Simulation of Single phase AC Voltage controller using RL load.
18. PSPICE Simulation of Three phase inverter with PWM controller.
19. PSPICE Simulation of resonant pulse commutation circuit.
20. PSPICE Simulation of impulse commutation circuit.
MTPE 28 COMPREHENSIVE VIVA

Class: M.Tech. II Semester  University Examination: 100 Marks
Branch: EEE (Power Electronics)

The Viva includes question from all the subjects of first and second semesters with more emphasis on Power Electronics Concepts.
MTPE 31 INDUSTRIAL TRAINING

Class: M.Tech. III Semester  Duration: 8 Weeks
Branch: EEE (Power Electronics)  Sessionals: Satisfactory/ Not Satisfactory

The candidate should submit the report and present talk on the training undergone highlighting the contents of the Report before the Departmental Post-Graduate Review Committee (DPGRC).
The candidate will chose the topic of the Project Work in consultation with the Guide allotted. A report in the prescribed format is to be submitted that includes extensive survey of literature on the topic, highlighting the scope of the work. It should also state the methodology to be adopted and work involved in different modules of the Project Work. The report should clearly specify the expected outcome.

The candidate should submit the report and present talk on the work done, highlighting the contents of the Report before the Departmental Post-Graduate Review Committee (DPGRC).
MTPE 41 DISSERTATION & VIVA-VOCE

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<td>Sessionals: 100 Marks</td>
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<td>University Examination: 100 Marks</td>
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The candidate should submit the report and present talk on the work done, highlighting the conclusions drawn and outcome of the work before the Departmental Post-Graduate Review Committee (DPGRC).