CURRICULAM AND SYLLABUS
(w.e.f. Academic Year 2008-09)

FOR

MASTER OF TECHNOLOGY
IN
POWER SYSTEMS ENGINEERING

ACHARYA NAGARJUNA UNIVERSITY
NAGARJUNA NAGAR
GUNTUR DIST.
# M.Tech. (Power Systems Engineering)

ACHARYA NAGARJUNA UNIVERSITY  
NAGARJUNA NAGAR  

FOUR SEMESTER M.TECH DEGREE COURSE  
IN  
POWER SYSTEMS ENGINEERING  

CURRICULUM & DETAILED SYLLABI

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Course Number</th>
<th>Subject</th>
<th>Periods/week</th>
<th>Internal</th>
<th>End Semester</th>
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</thead>
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<tr>
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<td>Marks</td>
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### First Semester

1. MT/PSE/PEPS 511  
   Optimization Techniques  
   Periods/week: 4  
   Internal marks: 30  
   Duration: 3  
   Marks: 70

2. MT/PSE/PEPS 512  
   Modern Control Theory  
   Periods/week: 4  
   Internal marks: 30  
   Duration: 3  
   Marks: 70

3. MT/PSE/PEPS 513  
   Solid State Power Converters  
   Periods/week: 4  
   Internal marks: 30  
   Duration: 3  
   Marks: 70

4. MT/PSE/PEPS 514  
   Advanced Power System Protection  
   Periods/week: 4  
   Internal marks: 30  
   Duration: 3  
   Marks: 70

5. MT/PSE/PEPS 515  
   Computer Methods in Power Systems  
   Periods/week: 4  
   Internal marks: 30  
   Duration: 3  
   Marks: 70

6. MT/PSE 516  
   High Voltage Engineering  
   Periods/week: 4  
   Internal marks: 30  
   Duration: 3  
   Marks: 70

7. MT/PSE 551  
   Power Systems Lab  
   Periods/week: --  
   Internal marks: 25  
   Duration: 3  
   Marks: 50

8. MT/PSE 552  
   Simulation Lab – I  
   Periods/week: --  
   Internal marks: 25  
   Duration: --  
   Marks: --

**TOTAL**  
24  
6  
230  
--  
470

### Second Semester

1. MT/PSE/PEPS 521  
   Flexible AC Transmission Systems  
   Periods/week: 4  
   Internal marks: 30  
   Duration: 3  
   Marks: 70

2. MT/PSE/PEPS 522  
   Power System Stability  
   Periods/week: 4  
   Internal marks: 30  
   Duration: 3  
   Marks: 70

3. MT/PSE/PEPS 523  
   Operation & Control of Power Systems  
   Periods/week: 4  
   Internal marks: 30  
   Duration: 3  
   Marks: 70

4. MT/PSE 524  
   Electrical Distribution Systems  
   Periods/week: 4  
   Internal marks: 30  
   Duration: 3  
   Marks: 70

5. MT/PSE 525  
   Elective-I  
   Periods/week: 4  
   Internal marks: 30  
   Duration: 3  
   Marks: 70

6. MT/PSE 526  
   Elective-II  
   Periods/week: 4  
   Internal marks: 30  
   Duration: 3  
   Marks: 70

7. MT/PSE 561  
   Simulation Lab – II  
   Periods/week: --  
   Internal marks: 25  
   Duration: 3  
   Marks: 50

8. MT/PSE 562  
   Seminar  
   Periods/week: --  
   Internal marks: 25  
   Duration: --  
   Marks: --

**TOTAL**  
24  
6  
230  
--  
470

### Third Semester

1. MT/PSE 611  
   Project Seminar  
   Periods/week: --  
   Internal marks: 50  
   Duration: --  
   Marks: --

**TOTAL**  
--  
--  
50  
--  
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### Fourth Semester

1. MT/PSE 621  
   Project Presentation  
   Periods/week: --  
   Internal marks: 50  
   Duration: --  
   Marks: 100

**TOTAL**  
--  
--  
50  
--  
100
List of Electives:

Electives – I

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>MT/PSE 525/1</td>
<td>Power systems planning in deregulated environment</td>
</tr>
<tr>
<td>MT/PSE 525/2</td>
<td>Reliability Engineering</td>
</tr>
<tr>
<td>MT/PSE 525/3</td>
<td>Digital Control Systems</td>
</tr>
<tr>
<td>MT/PSE 525/4</td>
<td>HVDC Transmission Systems</td>
</tr>
<tr>
<td>MT/PSE 525/5</td>
<td>Renewable Energy Resources</td>
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Electives – II

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>MT/PSE 526/1</td>
<td>Fuzzy Logic &amp; Neural Networks</td>
</tr>
<tr>
<td>MT/PSE 526/2</td>
<td>Embedded Systems</td>
</tr>
<tr>
<td>MT/PSE 526/3</td>
<td>Computer Networks</td>
</tr>
<tr>
<td>MT/PSE 526/4</td>
<td>Data Base Management Systems</td>
</tr>
<tr>
<td>MT/PSE 526/5</td>
<td>Microprocessors &amp; Microcontrollers</td>
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- 1st class with distinction – 70% and above.
- 1st class – 60% to 70%.
- 2nd class – 40% to 60%.
- 40% Marks compulsory in university examinations.
- Other rules and regulations will be as per Acharya Nagarjuna University.
MT/PSE/PEPS 511  OPTIMIZATION TECHNIQUES

UNIT I

LINEAR PROGRAMMING: Definition and Scope of Operations Research, Mathematical formulation of the problem, graphical method, Simplex method, artificial basis technique, Degeneracy, alternative optima, unbounded solution, infeasible solution.

UNIT II


UNIT III

PROJECT PLANNING THROUGH NETWORKS: Arrow(Network) Diagram representation. Rules for constructing an arrow diagram, Pert and CPM, Critical path calculations, earliest start and latest completion times, Determination of critical path, determination of floats, Probability considerations in project.

UNIT IV


DYNAMIC PROGRAMMING: Characteristics of D.P. model, solution of optimal sub-division problem.

Text Books:
2. Introduction to Operations Research – Hiller and Liberman

Reference Books:
1. Introduction to operations Research-Phillips, Ravindran, James Solegerg,
3. Operations Research – Gupta and Hira
4. Pert and CPM principles and applications – L.S.Srinadh
UNIT I  STATE VARIABLE ANALYSIS


UNIT II  NONLINEAR SYSTEMS

UNIT III  STABILITY ANALYSIS

UNIT IV  OPTIMAL CONTROL

TEXT BOOKS:
1. Modern Control System Theory by M.Gopal – New Age International -2/E

REFERENCES:
1. Design of Feedback Control Systems by Stefani et.al. – Oxford – 4/E

* CONTINUOUS-TIME SYSTEMS ONLY
MT/PSE/PEPS 513 SOLID STATE POWER CONVERTERS

UNIT-I
LINE COMMUTATED CONVERTERS:

UNIT-II
AC VOLTAGE CONTROLLERS:
CYCLO CONVERTER:
Single phase – bridge type- R & RL loads- 3 phase bridge type principle of operation & wave forms.

UNIT-III
INVERTERS:

UNIT-IV
VOLTAGE CONTROL OF SINGLE PHASE INVERTERS:
single PWM – Multiple PWM – sinusoidal PWM – modified PWM – phase displacement Control – Advanced modulation techniques for improved performance – Trapezoidal, staircase, stepped, harmonic injection and delta modulation – Advantage – application
VOLTAGE CONTROL OF THREE PHASE INVERTERS:
sinusoidal PWM – Third Harmonic PWM – 60 degree PWM – space vector modulation – Comparison of PWM techniques – harmonic reductions

TEXT BOOKS:
UNIT-I:
Need for protection systems: Nature and causes of faults, types of faults, effects of faults, fault
statistics, evolution of protective relays, zones of protection, primary & back up protection,
essential qualities of protection, classification of protective relays and schemes, automatic
reclosing, CT, PT, summation transformer, phase-sequence current segregating network.

UNIT-II:
Direct transfer tripping, permissive under-reach and over-reach transfer tripping schemes –
carrier acceleration & carrier blocking scheme. Use of optical fibers for protection schemes.

UNIT-III:
Static Relays: Advantages of static relays, working principles of static impedance, static
reactance using phase comparator, static distance, static over current, static differential relay
using amplitude comparator, use of sampling comparator.

UNIT-IV:
Microprocessor based protection relays – Working principles of µP based over current,
impedance, reactance directional, reactance (distance) & mho relays – digital relaying
algorithms, various transform techniques employed like discrete Fourier, Walsh-Hadamard,
Haar, microprocessor implementation of digital distance relaying algorithms – protection of lines
against lightning & traveling waves.

TEXT BOOKS:
1. T.S.M.Rao – Power System Protection : Static Relays With Microprocessor
   Applications – Tata McGraw-Hill.
   Hill.

REFERENCE BOOKS:
   John Wiley & Sons.
5. Microprocessors & Microcomputer Development Systems: Designing Microprocessor
   Based System – by M.Rafiquzzaman.
MT/PSE/PEPS 515  COMPUTER METHODS IN POWER SYSTEMS

UNIT-I:
Network Matrices and Modeling: Introduction, linear transformation techniques (bus, branch, loop frame of references), single phase modeling of transmission lines, off-nominal transformer tap representation, phase shift representation, 3-phase models of transmission lines, modeling of loads, representation of synchronous machines

UNIT-II:
Power flow solutions: Review of power flow equations - GS, NR and FDC methods of solving power flow equations, power flow methods for contingency
Three Phase Load Flows: Formulation of three phase power flow equations, Fast-decoupled three phase algorithm and computer program structure

UNIT-III:

UNIT-IV:
Zbus methods in Contingency Analysis: Adding and removing multiple lines (current injection methods), piece wise solution of interconnected systems, analysis of single and multiple contingencies, external system representation for fault and contingencies by Ward and REI approaches.

TEXT BOOKS:

REFERENCES:
1. Nagarath & Kothari Modern power system analysis 3rd Edition, TMH.
UNIT I:
Conduction and Breakdown in Gases:
Ionization process, Twonsend’s current growth equation, current growth in the secondary processes, Twonsend’s criterion for breakdown, streamer theory of breakdown in gases, Paschen law, breakdown in non uniform fields and corona discharge.

Generation of High Voltage and Currents:
Generation of high D.C., alternating voltages, impulse voltages, generation of impulse currents, tripping and control of impulse generators

UNIT II:
Measurement of high voltage and currents:
Measurement of high d.c. voltages, Measurement of high a.c. and impulse voltages, Measurement of high d.c., a.c. and impulse currents. Cathode Ray Oscilloscope for impulse voltage and current measurements.

UNIT III:
Testing of Materials and Apparatus
Measurement of D.C. resistivity, measurement of dielectric constant and loss factor, partial discharge measurements, testing of insulators, bushing, circuits breakers, transformers and surge diverters.

Over Voltage Phenomenon Insulation Coordination:
Causes of over voltage, lighting phenomenon, switching over voltages and power frequency over voltages in power systems,

UNIT IV:
Insulation Coordination:
Principle of insulation coordination on high voltage and extra high voltage power systems. Gas insulated substations: Advantages of Gas Insulated Substations, Comparison of Gas Insulated substations and Air Insulated Substations, Design and Layout of Gas Insulated Substations, Description of Various components in GIS.

TEXT BOOKS:
1. High Voltage Engineering by M.S.Naidu and V.Kamaraju – TMH.
2. High Voltage Engineering fundamentals by Kuffel and Zungel, Elsavier Publications
3. Switchgear By BHEL, TMH

REFERENCES:
2. High Voltage Technology by ALSTOM
3. Gaseous Dielectrics by Arora, TMH
MT/PSE 551  POWER SYSTEMS LAB

List of Experiments*

1. Evaluation of ABCD parameters for transmission line
2. Sequence reactances and fault studies on synchronous machine
3. Surge Impedance Loading limits of transmission line
4. Voltage control by capacitor compensation and tap changing transformers
5. Active and Reactive power control of synchronous machine connected to infinite bus
6. Line and load compensation of power system network
7. Characteristics of electromagnetic relays
8. Implementation of microprocessor based relays
9. Characteristics of static relays
10. Study of 3-phase bridge converter
11. Study of characteristics of Dual converter
12. Study of single-phase inverter
13. Study of PWM controlled 3-phase inverter
14. H.V. testing of insulators
15. High voltage testing of Cables
16. Study of corona phenomenon

*Any eight experiments to be completed
List of Experiments*

1. Solution of simultaneous algebraic equations of Electrical network
2. Solution of simultaneous differential equations of a given network
3. Formation of incidence matrices
4. Formation of network matrices by singular or nonsingular transformations
5. Formation of $Y_{bus}$ by inspection method
6. Formation of $Z_{bus}$ by step by step algorithm using MATLAB
7. Fault analysis in power system using matrix method
8. Simulation of electric networks using MATLAB
9. Simulation of transmission line using MATLAB
10. Power flow solution using Gauss seidel method
11. Simulation of 1-phase diode bridge rectifier
12. Simulation of 1-phase controlled rectifier
13. Simulation of Single Phase AC voltage Controller
14. Transfer function analysis of given system using Simulink
15. State space analysis of a control system using MATLAB
16. Conversion of the given state system into a suitable diagonal form

*Any eight experiments to be completed
UNIT-I
FACTS Concept and General system Considerations:

Power Flow in AC system - definitions on FACTS - Basic types of FACTS Controllers. Converters for Static Compensation – Basic concept of voltage-sourced converters. Single phase, three phase full wave bridge converters operation, 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-II
Static Shunt Compensators:
SVC and STATCOM - Operation and Control of TSC, TCR, STATCOM - Comparison between SVC and STATCOM - STATCOM for transient and dynamic stability enhancement.

UNIT-III
Static Series Compensation:
GCSC, TSSC, TCSC and SSSC - Operation and Control - External System Control for series Compensators - SSR and its damping - Static Voltage and Phase Angle Regulators - TCVR and TCPAR - Operation and Control.

UNIT-IV
UPFC and IPFC:
The unified Power Flow Controller – Operation - Comparison with other FACTS devices - control of P and Q - Dynamic Performance - Special Purpose FACTS controllers - Interline Power flow Controller - Operation and Control.

TEXT BOOKS:
2. FACTS Controllers in power transmission and Distribution, K.R.Padiyar, New Age Int. Publisher, 2007

REFERENCE BOOKS:
1. Power Electronics by Ned Mohan et. al., John Wiley & sons
2. Reactive Power Control in Electric Systems by T.J.E. Miller, John Wiley & sons
MT/PSE/PEPS 522 POWER SYSTEM STABILITY

UNIT – I

UNIT – II

UNIT – III

UNIT – IV

TEXT BOOKS:

REFERENCES:
1. Anderson P.M., and Foud A.,”Power system control and stability” Galgotia publications
2. Taylor C.W. “Power systems voltage stability”, TMH
MT/PSE/PEPS 523 OPERATION AND CONTROL OF POWER SYSTEMS

UNIT-I:

UNIT-II:
Load frequency control: Definition of control area – single area control – Block diagram representation – steady state analysis – dynamic response – proportional plus integral control of single area block diagrams – AGC multi area system – modeling – static and dynamic response – tie line bias control – Inter connected systems.

UNIT-III:
Computer control of power systems: Energy control centre – various levels – SCADA system – computer configuration functions – monitoring – data acquisition and controls – EMS system – expert system applications for power system operation.

UNIT-IV:

TEXT BOOKS:
1. Allen J. Wood and Bruce F. Wollenberg “Power Generation, Operation & Control” 2rd edition, John Wiley and Sons.

REFERENCES:
MT/PSE 524  ELECTRICAL DISTRIBUTION SYSTEMS

UNIT – I
**Distribution systems planning:** Planning and forecast techniques - Present and future role of computers in distribution system planning - Load characteristics Definitions load growth – tariffs - Diversified demand method.

UNIT – II
**Distribution transformers:** Types - Regulation and Efficiency - Use of monograms for obtaining efficiency - distribution factors – KW KVA Method of determining regulation.
**Design of sub transmission lines and distribution substations:** Introduction – sub transmission systems - distribution substation – Sub station bus schemes - description and comparison of switching schemes – sub station location and rating - Application of network flow techniques in rural distribution networks to determine optimum location of sub-station.

UNIT – III
**Design considerations on primary systems:** Introduction - types of feeders - voltage levels - Radial type feeders - feeders with uniformly distributed load and non-uniformly distributed loads.
**Design considerations of secondary systems:** Introduction - secondary voltage levels - Secondary banking - existing systems improvement.
**Distribution system Protection:** Basic definitions - over current protection devices - fuses, automatic circuit reclosures, automatic line sectionalizers - objectives of distribution system protection - coordination of protective devices - Fuse to Fuse co-ordination, Fuse to circuit breaker coordination, Reclosure to circuit breaker co-ordination.

UNIT-IV
**Voltage drop and power loss calculations:** Three phase primary lines - non 3 phase primary lines - 4 wire multi grounded primary lines - copper loss - Distribution feeder costs - loss reduction and voltage improvement in rural distribution networks.
**Applications of Capacitors to distribution systems:** Effect of series and shunt capacitors - Power factor correction - economic justification for capacitors - a computerized method to determine the economic power factor - Procedure to determine the best and optimum capacitor location
**Distribution System Voltage Regulation:** Basic definitions - Quality of service - voltage control - line drop compensation.

**TEXT BOOKS:**
2. *Dr. V. Kamaraju “Electrical distribution systems”,* Right Publishers .

**REFERENCE BOOK:**
MT/PSE 525/1 POWER SYSTEMS PLANNING IN DEREGULATED ENVIRONMENT

UNIT – I
INTRODUCTION
Power industry restructuring - Electricity market models - Electricity market fundamentals for planning purpose

UNIT – II
POWER SYSTEM PLANNING FUNDAMENTALS & RELIABILITY

UNIT - III
SHORT TERM LOAD AND PRICE FORECASTING
Short term load forecasting - Short term market price forecasting - Regression models for load forecasting - Artificial neural networks for load forecasting - Other approaches for forecasting such as data mining approaches; Issues in load and price forecasting.

UNIT - IV
NEW CHALLENGES OF POWER SYSTEM PLANNING IN A DEREGULATED ENVIRONMENT
Deterministic vs probabilistic approaches - Probabilistic power system reliability assessment - Probabilistic power system security assessment and Probabilistic power system planning.

TEXT BOOKS:

REFERENCES:
MT/PSE 525/2  RELIABILITY ENGINEERING

UNIT-I
Elements of Probability theory: Introduction, rules for combining probabilities of events, Bernoulli’s trials; probability distributions: Random variables, density and distribution functions- Binomial, Poisson, normal and exponential distributions; expected value and standard deviation of Binomial distribution and exponential distribution – Bath tub curve.

UNIT-II
Reliability of engineering systems:
Component reliability, hazard models, reliability analysis of networks with nonrepairable components- series, parallel, series- parallel configurations and non-series-parallel configurations- minimal tie-set, minimal cut-set and decomposition methods, reliability measures, MTTF, MTTR, MTBF.

UNIT-III
Markov Chains:
Introduction; transition probabilities and the stochastic transition probability matrix; classification of states; evaluation of limiting state probabilities; Markov processes – one component repairable system, time dependent probability evaluation using Laplace Transform approach, evaluation of limiting state probabilities using STPM; two component repairable modes - frequency and duration concept-evaluation of frequency of encountering state, mean cycle time for one, two component repairable models, evaluation of cumulative probability and cumulative frequency of encountering merged states.

UNIT-IV
Power system reliability:
Generation system reliability analysis- reliability model of generation system, recursive relation for unit addition and removal, load modeling, merging of generation model with load model, evaluation of transition rates for merged state model; cumulative probability, cumulative frequency of failure evaluation; LOLP. LOLE. Expected value of the Demand not served E (D)
Distribution system reliability analysis- radial networks, weather effects on transmission lines; evaluation of load and energy indices
Composite system reliability – decomposition method

TEXT BOOKS:
3. An introduction to reliability and maintainability engineering by Sharles E.Ebeling, TMH

REFERENCE BOOKS:
1. Reliability modelling in electric power systems by J.Endrenyi, John Wiley & sons, NY
3. Probability, Random variables and Stochastic processes by Athanasios Papoulis and S.Unnikrishna Pillai, TMH
UNIT – I
SAMPLING AND Z-PLANE ANALYSIS
Introduction, sample and hold operations, Sampling theorem, Reconstruction of original sampled signal to continuous-time signal. Review of Z-transforms
Z-Transform method for solving difference equations; Pulse transforms function, block diagram analysis of sampled – data systems, mapping between s-plane and z-plane: 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 it’s Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state – space equations
Concepts of Controllability and Observability, Tests for controllability and Observability. Duality between Controllability and Observability, Controllability and Observability conditions for Pulse Transfer Function.

UNIT – III
STABILITY ANALYSIS

DESIGN OF DISCRETE TIME CONTROL SYSTEM BY CONVENTIONAL METHODS

UNIT – IV
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

TEXT BOOKS:
2. Digital Control and State Variable Methods by M.Gopal, TMH

REFERENCE BOOKS:
2. Digital Control Engineering, M.Gopal
UNIT I:
H.V.D.C. Transmission: General considerations, Power Handling Capabilities of HVDC Lines, Basic Conversion principles, static converter configuration.

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.

UNIT II:
Harmonics in HVDC Systems, Harmonic elimination, AC and DC filters.

Control of HVDC Converters and systems: constant current, constant extinction angle and constant Ignition angle control., DC power flow control.

UNIT III:
Interaction between HV AC and DC systems – Voltage interaction, Harmonic instability problems and DC power modulation.

Multi-terminal DC links and systems; series, parallel and series parallel systems, their operation and control.

UNIT IV:
Transient over voltages in HVDC systems : Over voltages due to disturbances on DC side, over voltages due to DC and AC side line faults

Component Models for the Analysis of AC/DC Systems; Modelling of DC Network, Modelling of AC Networks, Modelling of DC Links, Solution of DC Load Flow..

TEXT BOOKS:
1. HVDC transmission by Adamson and Hingorani.

REFERENCE BOOKS:
UNIT-I
Principle of Renewable Energy:
Comparison of renewable and conventional energy sources - Ultimate energy sources - natural energy currents on earth - primary supply to end use - Spaghetti & Pie diagrams - energy planning - energy efficiency and management.

UNIT-II
Solar Radiation:

UNIT-III
Wind energy:
Planetary and local winds - vertical axis and horizontal axis wind mills - principles of wind power - maximum power - actual power - wind turbine operation - electrical generator.

UNIT-IV
Energy from Oceans:
Ocean temperature differences - principles of OTEC plant operations - wave energy - devices for energy extraction – tides - simple single pool tidal system.

Geothermal energy:

TEXT BOOKS:
1. Renewable Energy Sources by John Twidell & Toney Weir : E&F.N. Spon

REFERENCE BOOKS:
1. Power plant technology by EL-Wakil, Mc Graw-Hill
UNIT – I
Fuzzy logic: Classical & Fuzzy Sets - Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

Fuzzy Logic System Components Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

UNIT – II

Unit–III

UNIT IV
Fuzzy logic applications: Fuzzy logic control and Fuzzy classification specific applications to power systems load frequency control, fault diagnosis.

TEXT BOOKS:
2. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by Rajasekharan and Rai – PHI Publication.

REFERENCES:
2. Neural Engineering by C.Eliasmith and CH.Anderson, PHI
UNIT – I

Hardware Fundamentals: Terminology, Gates, A few other basic considerations, Timing Diagrams, Memory.

Advanced Hardware Fundamentals: Micro Processors, Buses, Direct Memory Access, interrupts, other common parts, Built-ins on the Micro Processor, conventions used on the Schematics.

Interrupts: Micro Processor Architecture, Interrupt Basics, the shared data problem, Interrupt Latency.

UNIT – II

Introduction to Real Time Operating Systems: Tasks and Task states, Tasks and data Semaphores and shared data.

UNIT – III
More Operating System Services: Message Queues, Mail boxes and pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS environment.

Basic Design Using a Real Time Operating System: Overview, Principles, An Example, Encapsulating Semaphores and Queues, Hard Real Time Considerations, Saving Memory Space, Saving Power.

UNIT – IV
Embedded Software Development Tools: Host and Target Machines, Linker/Locators for Embedded Software, Getting Embedded Software into the target System.

Debugging Techniques: Testing on Host Machine, Instruction Set Simulators, the assert macro, using Laboratory Tools.

TEXTBOOKS:

REFERENCE BOOKS:
UNIT-I

UNIT-II
Network protocols - Network switching methods - Network Architecture - OSI model - Purpose layered design – Error detection and correction - Data link protocols - sliding window protocols - data compression techniques.

UNIT-III
Local Area Networks - Medium access methods - IEEE 802. x standards - Wide Area Networks - Routing Algorithms - Network Interconnectivity - Bridges and Gateways. Congestion control algorithms.

UNIT-IV

TEXT BOOKS :

REFERENCES:
MT/PSE 526/4 DATABASE MANAGEMENT SYSTEMS

UNIT-I
Databases and Database users
Database systems, concepts and Architecture
Data Modeling using the Entity-Relationship model

UNIT-II
The Relational Data Model, Relational constraints, and the Relational Algebra
SQL-The Relational Database standard.
ER and EER – to – Relational mappings, and other relational languages.

UNIT-III
Functional Dependencies and Normalizations for Relational Database
Relational Database Design Algorithms and Further Dependencies
Database system Architectures and the system catalog

UNIT-IV
Transactions Processing Concepts
Concurrency Control Techniques

TEXT BOOK:

REFERENCE BOOKS:
UNIT – I
**Microprocessors:** Introduction to Microcomputers and Microprocessors, Introduction to 8086 microprocessor family, 8086 internal architecture, Addressing modes, Programming the 8086, Instruction descriptions, Assembler directives.

UNIT – II
**Digital & Analog Interfacing:** Addressing memory and ports in Microcomputer system, 8086 interrupts and Interrupt Responses, Programmable parallel ports and Handshake input/output, Interfacing a microprocessor to keyboards.

D/A converter operation, Interfacing and applications, A/D converter specifications types and interfacing.

UNIT – III
**Programmable Devices:** Introduction to programmable peripheral devices: 8253/8254, 8259, 8251. The DMA data transfer, RISC Vs CISC, RISC properties, RISC evaluations, overview of RISC development and current schemes.

UNIT – IV
**8051 Microcontrollers:** Introduction to 8 bit and 16 bit microcontrollers; 8031/8051 microcontroller architecture and memory organization, Addressing modes, Instruction formats, CPU timings, Interrupt structure and interrupt priorities; port structures and operations. Accessing internal and external memories, Timer / Counter functions and different modes of operations. Interfacing of stepper motor, LED display, and robotic control.

TEXT BOOKS:

REFERENCE BOOKS:
4. The Intel Manuals – Microcontrollers Manual MC 8031/8051
5. Malvino Leech – Microprocessors.
List of Experiments*

1. Power flow solution by NR method.
2. Power flow solution by FDC.
3. Contingency studies using load flows for generator & line outages.
5. Transient stability study of SMIB.
6. Contingency studies using Z_{bus}.
7. Simulation of State Estimator for power flow using WLSE method
8. Simulation of single area load frequency control.
9. Simulation of two area load frequency control.
10. Simulation of power system stabilizer.
12. Design of LQR state feedback for a given system
13. Design of State feedback controller and observer through Pole assignment.
14. PSPICE Simulation of Three phase full converter using RL & E loads.
15. PSPICE Simulation of Three phase inverter with PWM controller.
16. PSPICE Simulation of resonant pulse commutation circuit.

* Any eight experiments to be completed
Nine important differences between syllabus and curriculum are presented in this article. One such difference is that the syllabus is described as the summary of the topics covered or units to be taught in the particular subject.

Difference Between Syllabus and Curriculum. Last updated on May 18, 2017 by Surbhi S. When it comes to education, the two concepts which pop up in our mind which are commonly misconstrued are syllabus and curriculum. Syllabus vs Curriculum One should carefully understand the difference between syllabus and curriculum as they are two important words in the field of education.

Difference Between Syllabus and Curriculum. June 5, 2011 Posted by koshal. Syllabus vs Curriculum. One should carefully understand the difference between syllabus and curriculum as they are two important words in the field of education that are often confused as if they mean the same. Strictly speaking, they are two different words that give different meanings. The terms syllabus and curriculum are often used interchangeably. We have listed similarities and differences between syllabus and curriculum.

Syllabus Vs. Curriculum. What is syllabus? Syllabus is basically a document that defines the subject. It explains the things you need to know about a subject. When a student starts a specific subject in a class, he needs to know about the subject. The syllabus is the document which guide towards the subject. What is included in syllabus? Curriculum and syllabus are two essential components in any educational program. Curriculum is the set of courses, coursework and their content offered at a school or another educational institute. Syllabus is the focused outline of a subject. Therefore, the main difference between curriculum and syllabus is that curriculum is a set of guidelines set out for educators whereas a syllabus is a more descriptive list of concepts that are to be taught in a class. What is a Curriculum.