

ELECTRICAL ENGINEERING

UNIT - I

Networks : Network Elements: Charge, Voltage, Current, Power, Energy, Circuit concept, Active and Passive circuit elements, Ideal, Practical and dependent sources and their V-I characteristics, Energy stored in Inductors and Capacitors, Kirchoffs Laws, Voltage and Current division, Nodal Analysis, Mesh Analysis, Star-Delta transformation and Source Transformation. Network Theorems: Linearity and superposition, Thevenin's and Norton's, Reciprocity, Compensation, Maximum power transfer theorems, Application of theorems to DC circuits.

UNIT-II

Power System Concepts: Introduction, three phase systems, three phase transformers, harmonics in three phase systems, multiphase systems, reactive power, the per unit system, power transfer and reactive power. **Control Systems Concepts:** Control system terminology, **Mathematical models of physical systems:** Formulation of differential equations for electrical systems Transfer functions of open and closed loop systems.

UNIT - III

Load Flows: Bus classification, nodal admittance matrix, development of load flow equations, iterative methods, Newton Raphson method, and comparison of solution methods.

Economic operation: Economic dispatch problem of thermal units without and with losses- Gradient method- Newton's method -Base point and participation factor method.

UNIT - IV

Frequency response Analysis of Linear Control Systems: Frequency response specifications, correlation between time and frequency response, Introduction to lead, lag, lead - lag compensation techniques in frequency domain. **State space analysis:** Introduction, the state transition matrix and its properties; Diagonalization; transformation to phase variable canonical form, diagonal canonical form, Jordan canonical form. Concepts of controllability and observability.

UNIT - V

Electric Drive: Definition, Components of electric drive system, Advantages and applications of drives, factors governing the selection of motors, classification of drives, Drive characteristics and nature of load conditions, selection of motor for particular drive, Dynamics of motor load combination, Multi quadrant operation, Nature, classification and components of load torques.

Text Books:

1. Willam H. Hayt Jr., and Jack E. Kemmerly, "Engineering Circuit Analysis" 5th Edition, McGraw Hill.
2. C. L. Wadhwa, "Electrical Power Systems" 6th Edition, New Age International Publishers.
3. M. Gopal, "Digital Control and State Variable Method", Tata McGraw Hill.
4. G. K. Dubey, "Fundamentals of Electrical Drives", Narosa Publishing house.
5. Allen J. Wood and Wollenberg B.F., "Power Generation Operation and control", John Wiley & Sons, Second Edition, 1996.

Reference Books:

1. M. E. Vanvalkenburg, "Network Analysis", 3rd Edition, PHI.
2. B.C.Kuo, "Automatic control systems", 5th Edition, Prentice Hall of India.

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PRINCIPAL
A.U. College of Engg. (A)
Visakhapatnam - 530 003

SYLLABUS FOR PRE-PHD EXAMINATION
DEPARTMENT OF MECHANICAL ENGINEERING, AUCE(A)

UNIT-1

- 1) : Stress, Strain, Stress- Strain curve, Lateral strain, Relationship between elastic constants
- 2) Types of loads, Types of supports, S.F. and B.M. diagrams for Cantilever, Simply supported

UNIT-2

- 3) Zeroth law of thermodynamics; Concept of equality of temperatures- Joule's experiments- First law and Second law of thermodynamics-
- 4) classification-comparison of two stroke and four stroke engines- comparison of S.I. and C.I. engines

UNIT-3

- 5) Principles of management- Growth of management thought, Functions of management, Principles of organization, Types of organization and committees.
- 6) Theories of motivation, Hawthorne studies, Discipline in industry, Promotion, Transfer, lay off and discharge, Labour turnover

UNIT-4

- 7) Scientific management – Productivity - Advantages of work study to management, Supervisors and workers
- 8) Principles of Motion Economy: Related to human body, work place, equipment.

UNIT-5

- 9) Types of productions, Production cycle, Product design and development, Process planning, Forecasting, Loading, Scheduling, Dispatching, Routing, Progress, Control,
- 10) Economics of plant location, Rural Vs Suburban sites, Types of layouts



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CHAIRMAN
Board of Studies
Dept. of Mechanical Engineering
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ANDHRA UNIVERSITY: A.U. COLLEGE OF ENGINEERING
NANOTECHNOLOGY

Syllabus
for
Qualifying Examination for PhD Submission
for (Full time, Part time and Extra Mural) in
Centre for Nanotechnology

NANOTECHNOLOGY

Fundamentals of nanotechnology: Introduction and emergence of Nanotechnology, Bottom-Up and Top-Down Approaches, Challenges in Nanotechnology; Introduction to Quantum wells, Quantum wires and Quantum dots; Introduction to solid state physics – Structures and Energy bands; Introduction to Physical, Electrical, Mechanical and Other properties of nanomaterials.

Synthesis of Nanomaterials: Types and strategies for synthesis of nanomaterials depending on end applications. *Zero-Dimensional Nanostructures:* Nanoparticles: Introduction, different strategies for synthesis of these nanomaterials and their technological applications; *One-Dimensional Nanostructures:* Nanorods and Nanowires: Introduction, different strategies for synthesis of 1D nanomaterials and their technological applications; *Two-Dimensional Nanostructures:* Thin Film: Introduction, different strategies for synthesis of 2D nanomaterials and their technological applications; *Special Nanomaterials and applications:* Introduction, different strategies for synthesis of special nanomaterials (e.g. carbon, micro and mesoporous, zeolites, core-shell structures, hybrid nanomaterials, nanocomposites etc.) and their technological applications.

Characterization of nanomaterials: Introduction, structural characterization, X-ray diffraction (XRD Powder/Single crystal), Small angle X-ray scattering (SAXS), scanning electron microscopy (SEM), transmission electron microscopy (TEM), scanning probe microscopy (SPM) – principle of operation, instrumentation and probes, Atomic force microscopy (AFM), Optical spectroscopy, luminescence spectroscopy, UV-vis spectroscopy (liquid and solid state), Infrared spectroscopy, Raman spectroscopy, X-ray photoelectric spectroscopy (XPS), Energy Dispersive X-ray Spectroscopy (EDS), Auger Electron Spectroscopy (AES).

Dr. S.V. NAIDU, M.Tech., Ph.D.
Co-ordinator in Centre for Nanotechnology
Professor & Head of the Department in (and page)
Chemical Engineering Department
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Andhra University, Visakhapatnam

Fabrication of nanomaterials: Top Down Approach - Planetary ball milling; Bottom Up Approach (Wet Chemical Synthesis Methods) - Microemulsion Approach, Aerosol synthesis, Spray pyrolysis, Electro chemical deposition, Gas phase Production Methods: Physical and Chemical Vapor Deposition techniques, Atomic Layer Deposition.

Applications of nanotechnology in various fields:

Medicine, Biology, Electronics and Communication systems, Optics, Agriculture, Food, Renewable energy, Solar energy, Fuel Cells, Solar cells, Batteries, Defence, Aerospace, Marine, Fuels, Coolants & Lubricants, Sensors, Sporting goods and fabric.

References:

1. Charles P. Poole, Jr. & Frank J. Owens, Introduction to Nano technology - John Wiley & Sons Inc. Publishers - 2006
2. Guozhong Cao, Nano structures and Nano materials: Synthesis, properties and applications - Imperial College press.
3. T. Pradeep, "NANO: The Essentials, Understanding Nanoscience and Nanotechnology", Tata McGraw-Hill Publishing Company Limited, 2007.



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Geo-Engineering Syllabus -

Qualifying Examination for Ph.D., in Geo-Engineering (Remote Sensing and GIS)

Unit-1. Fundamentals of Remote Sensing Introduction- Components, platforms: Remote Sensing of the Environment- the Remote Sensing process; Principles of electro-magnetic radiations-atmospheric windows, Energy matter interactions; Sensors, Platforms Remote Sensing Data Products; Multi-spectral Remote Sensing; Thermal infrared Microwave Remote Sensing.


Unit- 2. Photogrammetry and Digital image processing: Fundamentals of aerial photography- classification of aerial photography, scale, resolution, geometric characteristics of aerial photographs, photo recognition elements; Elements of visual interpretation; **Introduction to digital image processing**-data formats, errors, Image rectification and restoration; Image enhancement techniques; Image classification; Data merging and GIS integration; Hyperspectral Remote Sensing, Hyperspectral Image analysis; Digital change detection.

Unit-3:Fundamentals of Geographic Information Systems: Database models and modelling; Spatial data and database systems; Geographic data and data measurement map basics, basic geographic concepts; data structures and data input; Database management; Data Analysis. Global Positioning Systems;

Unit-4. Applications of remote sensing and GIS

Remote Sensing and GIS applications -agricultural applications, urban applications, water resources and related applications, urban mapping, disaster management. Vector and raster based spatial analysis;

Unit-5:Network analysis; Point pattern analysis; Surface analysis; Spatial modelling. Object oriented GIS; Mobile GIS; Spatial data mining; Customization and automation in GIS, cloud GIS, OLAP, SDSS, Free and open source tools and web resources, over view of Internet GIS.


Prof. P. Jagadeeswara Rao
Chairman, Board of Studies
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Syllabus -

SYLLABUS FOR PRE PHD EXAMINATION IN MARINE ENGINEERING Paper-II

Module _I: APPLIED MECHANICS AND DESIGN:

Engineering Mechanics: Free body diagrams and equilibrium; trusses and frames; virtual work; kinematics and dynamics of particles and of rigid bodies in plane motion, including impulse and momentum (linear and angular) and energy formulations; impact.

Strength of Materials: Stress and strain, stress-strain relationship and elastic constants, Mohr's circle for plane stress and plane strain, thin cylinders; shear force and bending moment diagrams; bending and shear stresses; deflection of beams; torsion of circular shafts; Euler's theory of columns; strain energy methods; thermal stresses.

Module _II: FLUID MECHANICS AND THERMAL SCIENCES

Fluid Mechanics: Fluid properties; fluid acceleration; differential equations of continuity and momentum; Bernoulli's equation; viscous flow of incompressible fluids; boundary layer; elementary turbulent flow; flow through pipes, head losses in pipes, bends etc.

Thermodynamics & Applications: cycles related to energy conversion. Power Engineering: Steam Tables, Rankine, Brayton cycles with regeneration and reheat. I.C. Engines: air-standard Otto, Diesel cycles. Refrigeration and air-conditioning: Vapour refrigeration cycle, heat pumps, gas refrigeration, Reverse Brayton cycle; impulse and reaction principles.

Module _III: MANUFACTURING AND INDUSTRIAL ENGINEERING

Engineering Materials: Structure and properties of engineering materials, heat treatment, stress-strain diagrams for engineering materials.

Machining and Machine Tool Operations: Mechanics of machining, single and multi-point cutting tools, tool geometry and materials, tool life and wear; economics of machining; principles of nontraditional machining processes; principles of work holding, principles of design of jigs and fixtures

Module _IV: BASICS OF NAVAL ARCHITECTURE & MARINE ENGINEERING

Floatation: Some physical fundamentals - Archimedes principle, laws of floatation stability and trim, forces acting on a ship (static condition in waves and during launching) The ship's form main dimensions, lines plan, coefficients and their meaning.

Basic Propulsion Systems: Propulsion machinery - development of ship propulsion, general arrangement of propulsion plants, main engines (Diesel engines, steam engines & turbines, gas turbines, Diesel-electric drive, nuclear power plants).

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Dr. I.N. Niranjan Kumar
B.E., M.Tech (IIT), Ph.D., FIE
PROFESSOR
Dept. of Marine Engineering
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SAKHAPATNAM-530 003, A.P., INDIA

Syllabus for Pre-Ph.D. Examination in Computer Science & Engineering

1. **Information and Network Security:** Introduction to Network Security, User Authentication Mechanisms and Public Key Infrastructure, Symmetric and Asymmetric Key Cryptographic Techniques, IP Security, Fire walls
2. **Computer Networks:** Basic concepts and types of Computer Networks, Design Issues in Networks, Internet/Transport Protocols, Network Devices, Virtual Private Networks.
3. **Advances in Software Engineering:** Principles of software engineering, Software Requirements Engineering, Software Architecture and Design, Software Quality Assurance and Testing, Software Project Management .
4. **Data Mining:** Research trends in Association analysis, Classification, Cluster analysis, and Outlier Analysis.
5. **Digital Image Processing:** Image processing basics, Filters, Image Segmentation Analysis, Image Restoration & Reconstruction, Image Compression .

References:

1. Network Security Essentials: Applications and Standards, William Stallings PEA.
2. Cryptography and Network Security, AtulKahate, Tata McGraw Hill
3. Computer Networks, Andrews S Tanenbaum,, Edition 5, PHI, ISBN:-81-203-1165-5
4. Software Engineering, Ian Sommerville, seventh edition, Pearson education, 2004.
5. Software Architecture: Perspectives on an Emerging discipline, Shaw, M.,Garlan, PHI.
6. Machine Learning, Tom Mitchell , McGraw Hill.
7. Introduction to Data Mining by Pang-Ning Tan, Michael Steinbach, Vipin Kumar.
8. Digital Image Processing and Computer Vision, Sonka, lavac, Boyle, Cenage Learning.
9. Digital Image Processing, R.C. Gonzalez, R.R. Woods(TMh).


Dr. Peri Srinivasa Rao
PROFESSOR
CHAIRMAN BOARD OF STUDIES
Computer Science & Systems Engineering
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Andhra University

Chemical Engg
Model Syllabus

Syllabus for eligibility test for Ph. D. Submission for the Department of Chemical Engineering,
A. U College of Engineering

Fluid Mechanics and Mechanical Operations:

Fluid statics, Newtonian and non-Newtonian fluids, shell-balances including differential form of Bernoulli equation and energy balance, Macroscopic friction factors, dimensional analysis and similitude, flow through pipeline systems, flow meters, pumps and compressors, elementary boundary layer theory, flow past immersed bodies including packed and fluidized beds, Turbulent flow: fluctuating velocity, universal velocity profile and pressure drop. Particle size and shape, particle size distribution, size reduction and classification of solid particles; free and hindered settling; centrifuge and cyclones; thickening and classification, filtration, agitation and mixing; conveying of solids.

Heat Transfer:

Steady and unsteady heat conduction, convection and radiation, thermal boundary layer and heat transfer coefficients, boiling, condensation and evaporation; types of heat exchangers and evaporators and their process calculations. Design of double pipe, shell and tube heat exchangers, and single and multiple effect evaporators.

Mass Transfer:

Fick's laws, molecular diffusion in fluids, mass transfer coefficients, film, penetration and surface renewal theories; momentum, heat and mass transfer analogies; stage-wise and continuous contacting and stage efficiencies; HTU & NTU concepts; design and operation of equipment for distillation, absorption, leaching, liquid-liquid extraction, drying, humidification, dehumidification and adsorption.

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[Signature]
HEAD OF THE DEPARTMENT
Department of Chemical Engineering
College of Engineering (A)
Andhra University

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P. RAJENDR. PRASAD
Professor & Chairman, Board of Studies
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DEPARTMENT OF ECE, AUCE(A)
Andhra University
Qualifying Examination for PhD Submission
ELECTRONICS AND COMMUNICATION ENGINEERING
SYLLABUS

UNIT-I: INTRODUCTION TO DSP

Properties of DFT, Overlap-Save, Overlap-Add Methods, Radix-2FFT, The Goertzel and Chirp Z Transformation Algorithms, Design of IIR Filters Using Butterworth & Chebyshev Approximations.

UNIT-II: MULTIRATE SIGNAL PROCESSING

Decimation by a Factor D, Interpolation by a Factor I, Sampling Rate Conversion by a Rational Factor I/D, Filter Design & Implementation for Sampling Rate Conversion, Applications of Multirate Signal Processing.

UNIT-III: ANTENNA THEORY

Antennas, Radiation Concept, Radiation Resistance of Dipole Antenna, Antenna Parameters, Friis Transmission Equation, Antenna Arrays, Analysis and Synthesis of Antenna Arrays, HF, UHF and VHF Antennas, Antenna Measurements.

UNIT-IV: APERTURE ANTENNA

Introduction, Pyramidal Horns-Design Procedure, Conical and Corrugated Horns; Aperture Corrugated Horns, Reflected Antennas-Parameters, Analysis of Front-Fed Parabolic Reflector, Feed Methods and Feed Types, Cassegrain Reflector Horns.

UNIT-V: SIGNAL STRUCTURE AND NAVIGATION PROBLEM

GPS Principle of operation using Trilateration concept, Receiver Position in two Dimensional and three Dimensional Plane, GPS Configuration, Space segment, Segment, Control Segment, User Segment, Satellite Signal Generation, Ephemeris Parameters in GPS.

UNIT-VI: STEADY STATE & TIME VARYING GPS RECEIVER STATE ESTIMATION


GPS Position Estimate with Least Squares, Weighted Least Squares, Dynamic Estimation Problem, Receiver Position Estimate with Kalman Filter, Overview of Kalman Filter.

TEXT BOOKS:

1. Discrete Time Signal Processing-Alan V Oppenheim & Ronald W Schaffer, PHI.
2. Constantine Balanis. A –“Antenna Theory-Analysis and Design”, 3rd Edition, John Wiley, 2005
3. G.S. Rao, “Global Navigation Satellite systems”, McGraw-Hill publications, New Delhi, Edition 2010.

REFERENCES:

1. Digital Signal Processing – S. Salivahanan, A. Vallavaraj, C. Gnanapriya, 2000 TMH8.
2. Samuel Silver Microwave Antenna – Theory And Design, Ieee Press, 1984.
3. B. Hoffman Wellenhof, H. Lichtenegger and J. Collins, “GPS-Theory and Practice”, Springer-Wien, New York (2001).


 Head of the Department
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 Prof. P. RAJESH KUMAR
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Andhra University College of Engineering
Department of Instrumentation Engineering
Qualifying Examination for PhD Submission
Syllabus for the Paper –II

Sensors and Signal Conditioning

Unit I

Resistive, Reactance and Self generating sensors:

Strain gauge, RTD, thermistor, potentiometer, magneto resistors, light dependent resistive sensors. Capacitive and inductive sensors. Thermocouple, piezoelectric and pyroelectric sensors, electrochemical sensors.

Unit II

Advanced sensors:

Smoke detectors and gas sensors. Environment sensing systems - chemical, air, wind sensors. Humidity and moisture sensors – capacitive sensors, electrical conductivity sensors, thermal conductivity sensors, optical hygrometer and oscillating hygrometer.

Unit III

Signal conditioning for resistive sensors:

Wheat stone bridge- balance measurements-deflection measurements sensitivity, linearity, analog linearization of resistive sensor bridges, Differential and Instrumentation amplifiers. Grounding and Isolation.

Unit IV

Signal conditioning for capacitive and inductive sensors:

AC bridges, carrier amplifiers and coherent detection.

Advanced Optical Instrumentation sensors:

Optical fibers-modal propagation, signal distortion on optical fibers, optical sources, photo receivers and detectors, fiber amplifiers, optical link design.

Unit V

Case studies:

Capacitance sensors for nondestructive moisture determination in grain, nuts and bio-fuel materials, Design of an impedance analyzer for moisture determination of in-shell peanuts, Microwave resonator measurements for moisture determination in individual grain kernels,

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Head of the Department of
Instrument Technology
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DEPARTMENT OF METALLURGICAL ENGINEERING
A.U.COLLEGE OF ENGINEERING (A)

SYLLABUS
QUALIFYING EXAMINATION OF Ph.D (Full Time and Part Time)

MECHANICAL BEHAVIOUR OF MATERIALS

Hardness test: Introduction, Brinell, Vickers and Rockwell hardness, Micro hardness.

Tension test: Engineering stress strain curve. True stress and true strain diagram. Ductility measurements. Typical stress strain diagrams. Yield point phenomenon.

Compression Test: Fundamentals of testing, applications.

Impact testing Charpy and Izod tests

Fracture: Introduction, types of fracture in metals. Brittle fracture and impact testing: The problems of brittle fracture. Notched bar impact tests, significance of transition temperature.

Creep and stress rupture: The creep curve. Stress rupture test. High temperature alloys.


Fatigue: Introduction, Stress cycles. The S-N diagram.

Text books:

1. *Mechanical Metallurgy, George E Dieter, Mc Grawhill.*
2. *Testing of Materials, A.V.K.Suryanarayana, Prentice Hall of India.*

Reference Books:

1. *Testing of Engineering Materials, Donald et.al., McGraw Hills.*
2. *Metals hand book*


Head of the Department of
Metallurgical Engineering

Pre-Ph.D Syllabus for Civil Engineering Scholars

Effects of force: tension, compression and shear. Stress as internally elastic resistance of a material – strain – property of elasticity – Hookes law – stress-strain diagrams. Characteristic strengths, Factors of safety and working stresses for materials and various types of application of load.

Effect of transverse force, Shear force, Bending moment and Axial thrust diagrams for a) Cantilever b) Simply supported

Bricks and Clay Products

Wood, Wood Based Products: Wood

Paints, Varnishes: Paints and Varnishes

Foundations: Types of Foundations: Strip, Isolated, Strap, Combined Footings, Raft – Mat – Slab and Beam Raft, Box Type Raft, inverted arch foundations, SHELL foundations, Grillage foundations – Minimum depth of foundation – Bearing capacity of soils

Types of cement concretes, ingredients and their characteristics. Cement concrete properties and relevant tests, storage, batching, mixing & Transporting . Concrete grades & mix designs upto M20 as per IS code. Introduction to polymer concrete and it's uses.

Introduction: Definition, scope and importance. Measuring and defining environmental development; indicators

Ecosystems : Introduction, types, characteristic features, structure and functions of ecosystems like Forest, Grass Land, Desert. Aquatic (Lake, rivers and estuaries)

Environmental and Natural Resources Management

Environmental Pollution

Environmental Problems in India

General : Loading standards as per IS 875, Grades of steel and cement. Stress-Strain characteristics of concrete and steel. Introduction to working stress method and Limit State Method (L.S.D.) of design

Introduction and Hydrological Aspects: Water Resources in India, Hydrology in water Resources Planning – Runoff and Flood estimates – Hydrologic Planning – Water budget equation –Irrigation needs and types of irrigation

Introduction to sanitation

Storm sewers

Bacteriology of sewage


Chairman, Board of Studies
Department of Civil Engineering
College of Engineering (A)
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