

LINGAYA'S UNIVERSITY

SYLLABUS FOR ENTRANCE TEST FOR INTEGRATED DOCTORAL OF PHILOSOPHY
PROGRAMME - PH.D.

DEPTT- CIVIL ENGINEERING

1. **ENGINEERING MECHANICS:** System of coplanar forces, centroids and moment of inertia, friction, kinematics of particle, kinematics of rigid bodies, momentum and energy principles.
2. **STRENGTH OF MATERIALS:** Shear forces and bending moment, simple stresses and strains, shear stresses in beams, principle stresses and strains, direct and bending stresses, columns and struts.
3. **FLUID MECHANICS:** Fluid statics, pressure measurement, buoyancy & floatation, fluid kinematics, fluid dynamics, flow measurement, orifices, mouth pieces, notches, weirs, flow through pipes, dimensional analysis and models, laminar flow, turbulent flow in pipes, boundary layer theory, flow through channels, rapidly varied flow, open channel flow.
4. **SURVEYING:** Measurement of horizontal distance, chain surveying, measurement of angles, measurement of elevations, theodolite surveying, tacheometric surveying, curves.
5. **THEORY OF STRUCTURES:** Fixed beams, continuous beams, moving loads influence lines, strain energy, columns, arches, Suspension bridges.
6. **CONCRETE TECHNOLOGY:** Cement, aggregates, water, admixtures, fresh concrete, properties of hardened concrete, concrete mix design.
7. **GEOTECHNICAL ENGINEERING:** Structure of soil, the three phases system, index properties of soils, classification of soils, permeability of soils, compressibility, compaction, shear strength, exploration and in situ soil measurement.
8. **WATER RESOURCES ENGINEERING:** Hydrology, precipitation, infiltration, evaporation and evapotranspiration, run-off, hydrographs, floods, ground water hydrology, irrigation.
9. **ENVIRONMENTAL ENGINEERING:**
 - a. **WATER SUPPLY ENGINEERING:** Introduction to Water Supply, Quality of Water, Sources of water, Raw Water Conveyance, Treatment of Water, Distribution of water.
 - b. **SANITARY ENGINEERING:** Sewage and Sewerage, Sewer Design, Sewer Appurtenances, Sewer Pumping, Waste Water Characteristics, Sewage Treatment, Effluent Disposal.

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DEPTT. OF MANAGEMENT

Sections: 5 (10 questions from each section)

Max Marks: 100

1. READING COMPREHENSION

A passage to be set with questions to be answered

2. REASONING (Including Mathematical)

Number Series; Letter Series; Codes
Relationships; Classification

3. LOGICAL REASONING & DATA INTERPRETATION

Understanding the structure of Arguments
Deductive and Inductive reasoning
Verbal Analogies
Sources, interpretation of data
Quantitative Analysis
Graphical representation and mapping of data

4. PEOPLE AND ENVIRONMENT

People and environment interaction
Sources of Pollution,
Natural Hazards and mitigation

5. GENERAL KNOWLEDGE & BUSINESS AWARENESS

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DEPTT.- ELECTRONICS & COMMUNICATION ENGINEERING

1. **NETWORK THEORY:** The Venin and Nortan's Theorem, maximum power transfer Laplace and Z transform, wye-delta transformation, time domain and frequency domain analysis of RLC circuits.
2. **ANALOG AND DIGITAL CIRCUITS:** Characteristics and equivalent circuit of diodes, BJT, JFET, MOSFET, BIASING, Amplifiers- single, multistage, differential, operational. Boolean Algebra, Logic gates, Logic families (DTL, TTL, ECL CMOS), Combinational and sequential circuits.
3. **COMMUNICATION SYSTEMS:** Fourier analysis of signals, Fourier transform, LTI systems, Analog modulation amplitude and angle modulation and demodulation systems, PCM, DPCM, Delta modulation, ASK, FSK, PSK, Time division and frequency division multiplexing.
4. **MICROPROCESSORS AND MICROCONTROLLERS:** 8085 and 8086- architecture, Programming, Memory and I/O interfacing, 8051 microcontroller, CISX and RICS architecture.
5. **ANTENNA AND MICROWAVES:** Transmission lines, Characteristic impedance, Wave guides, Modes in rectangular guides, Boundary conditions, Dipole antennas, Antenna arrays, Radiation pattern, Reciprocity theorem.
6. **DIGITAL SIGNAL PROCESSING:** Discrete time signals, Sampling of time signals, Digital filters, Multirate Digital Signal Processing.
7. **WIRELESS COMMUNICATION:** Cellular networks, Wireless LAN, Bluetooth, Spread Spectrum multiple access, GSM, CDMA.

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DEPTT. - MECHANICAL ENGINEERING

- 1 Equilibrium of rigid bodies; Kinematics and Dynamics of particles and of rigid bodies in plane motion; Kinematics and Dynamics of plane mechanisms; Static and dynamic balancing
- 2 Bending and shear stresses; Deflection of beams; thin and thick cylinders; torsion; theories of failure; Design of machine elements
- 3 Free and forced vibrations of single degree of freedom systems; Effect of dampening; Vibration Isolation; Resonance
- 4 Laws and applications of thermodynamics; Air standard cycles; Steam power cycles; Flow through pipes
- 5 Combustion in SI and CI engines; Engine Performance; Refrigeration systems; Psychometric processes; Turbines, Compressors and pumps
- 6 Unconventional Machining Process; CAD/CAM, CNC; Mechanics of Metal Cutting; Metal forming; Casting processes; Powder Metallurgy Joining Processes;
- 7 Production Planning & Control; SQC; Time & Motion study; Motion economy; break even analysis; Linear optimization models