



Ref. No.

Dated: 28.06.2024

CORRIGENDUM

This corrigendum is issued to rectify amendments in the syllabus for the entrance examination of the PhD program offered by the **Skill Department of Green Technology** for the academic year 2024-25.

For Candidates having graduation/post-graduation in **mechanical engineering/production engineering/industrial engineering**, the Syllabus of Ph.D. Entrance Test is as follows: -

Thermodynamics: Thermodynamic systems and processes; properties of pure substances, behaviour of ideal and real gases; zeroth and first laws of thermodynamics, calculation of work and heat in various processes; second law of thermodynamics; thermodynamic property charts and tables, availability and irreversibility; thermodynamic relations.

Heat-Transfer: Modes of heat transfer; one dimensional heat conduction, resistance concept and electrical analogy, heat transfer through fins; unsteady heat conduction, lumped parameter system, Heisler's charts; thermal boundary layer, dimensionless parameters in free and forced convective heat transfer, heat transfer correlations for flow over flat plates and through pipes, effect of turbulence; heat exchanger performance, LMTD and NTU methods; radiative heat transfer, Stefan-Boltzmann law, Wien's displacement law, black and grey surfaces, view factors, radiation network analysis.

Compressors and Heat Engines: Air and gas compressors; vapour and gas power cycles, concepts of regeneration and reheat. I.C. Engines: Air-standard Otto, Diesel and dual cycles.

Refrigeration and air-conditioning: Vapour and gas refrigeration and heat pump cycles; multistage refrigeration systems, vapour absorption refrigeration systems, properties of moist air, psychrometric chart, basic psychrometric processes.

Hydraulic Machines: Impulse and reaction principles, velocity diagrams, Pelton-wheel, Francis and Kaplan turbines.

Solar Thermal: Solar radiation, Flat Plate Collectors; Concentrating Collectors; Solar Air Heating System Solar Drying, Solar Cooker; Solar Pond, Solar Distillation, Solar Detoxification. Solar Cooling System, Central Receiver Systems, Parabolic Trough Systems, Solar Furnaces.

Non-conventional energy sources: wind energy, wind turbines, wind energy storage, geothermal energy, ocean energy.

For Candidates having graduation/post-graduation in **Electrical Engineering**, the Syllabus of Ph.D. Entrance Test is as follows: -

Basic Electrical and Circuit Analysis:

AC and DC Circuit Analysis, series and parallel resonance, nodal analysis, mesh analysis, time domain and frequency domain analysis of simple RLC circuits, power factor, star and delta connected loads, thevenin theorem, Norton theorem, superposition theorem, maximum power transfer theorem, reciprocity theorem.

Electrical Machines:

Transformers, D.C Machines: DC motor and DC generator, Induction Machines: Single phase and Three phase Induction Motor, Synchronous Machines: Synchronous motor and Synchronous generator, Industrial Applications of electrical machines.

Control Systems:

Introduction to control systems, Mathematical Models of Physical Systems, Representation of Control Components, Time domain analysis and design specification of linear systems: Concepts of Stability and Routh Hurwitz Criterion, Root Locus Technique, Frequency Response Analysis and Stability Studies in Frequency Domain, Design and Compensation Technique, Introduction to State Variable Approach.

Power Systems:

Per Unit system, Distribution systems, electrical design of overhead lines, mechanical design of overhead lines, insulators, insulated cables, transmission and performance, corona, inductive interference; short circuit analysis, protective relays, protective relaying schemes - protection of feeders & transmission lines, transformers and alternators, circuit interruption devices.

Power Electronics and Drives:

Familiarization with semiconductor devices including Diode, Thyristor, BJT, MOSFET, IGBT, GTO, TRIAC, DIAC, Operation and analysis of: Uncontrolled and Controlled Rectifier, DC-DC Converters, Inverters, Cycloconverters, AC voltage Regulators, Different switching topologies, Basic applications of PE Converters in Home appliances & Industry, Drives for E-vehicles

-sd-
Dean, Academic Affairs