

101908/CO900D BASICS OF CIVIL & MECHANICAL ENGINEERING

Course Contents and Lecture Schedule

No	Topic	No. of Lectures
1	Module 1 (6 hours)	
1.1	Relevance of Civil Engineering and Responsibility of Civil Engineer, Major Disciplines of Civil Engineering and Different Constructed facilities	1
1.2	Selection of site for buildings, building rules and regulations: Relevance of NBC, KBR (Interior and exterior open spaces & Site plan), CRZ norms	1
1.3	Building area: Plinth area, built up area, floor area, carpet area and floor area ratio for a building as per KBR	2
1.4	Numericals for Building Area Calculation	2
	Module 2 (8 hours)	
2.1	Properties and uses of stones, soil, timber and bricks	2
2.2	Properties and uses of bitumen, cement and other binders,	2
2.3	Properties and uses of gypsum, aggregates, water, steel, aluminium, glass, ceramics, plastics, thermal and acoustic insulating materials,	2
2.4	Properties and uses of, construction chemicals and composite materials.	2
3	Module 3 (12 hours)	
3.1	Surveying & GIS	1
3.2	Earthwork and Equipment, Types of Foundations, load bearing and framed structures	2
3.3	Brick masonry and random rubble masonry	2
3.4	Types of roofs and floors,	1
3.5	MEP, HVAC, elevators, escalators and ramps, fire safety for buildings	2
3.6	Concepts of sustainable construction: Green buildings ratings, Green materials, energy systems, water management and environment for green buildings.	2
3.7	Components of roads and highways, components of bridges	2

4	Module 4 (8 hours)	
4.1	Analysis of thermodynamic cycles: Carnot, Otto, and Diesel cycle- Derivation of efficiency of these cycles, Problems to calculate heat added, heat rejected, net work and efficiency	4
4.2	IC Engines: CI, SI, 2-Stroke, 4-Stroke engines. Listing the parts of different types of IC Engines, efficiencies of IC Engines(Description only)	2
4.3	Air, Fuel, cooling and lubricating systems in SI and CI Engines, CRDI, MPFI. Concept of hybrid engines	2
5	Module 5 (9 hours)	
5.1	Refrigeration: Unit of refrigeration, reversed Carnot cycle, COP, vapour compression cycle (only description and no problems)	1
5.2	Definitions of dry, wet & dew point temperatures, specific humidity and relative humidity, Cooling and dehumidification, Layout of unit and central air conditioners.	1
5.3	Description about working with sketches : Reciprocating pump, Centrifugal pump, Pelton turbine, Francis turbine and Kaplan turbine. Overall efficiency, Problems on calculation of input and output power of pumps and turbines (No velocity triangles)	4
5.4	Description about working with sketches of: Belt and Chain drives, Gear and Gear trains, Single plate clutches	3
6	Module 6 (7 hours)	
6.1	Manufacturing Process: Basic description of the manufacturing processes – Sand Casting, Forging, Rolling, Extrusion and their applications.	2
6.2	Metal Joining Processes: List types of welding, Description with sketches of Arc Welding, Soldering and Brazing, and their applications	1
6.3	Basic Machining operations: Turning, Drilling, Milling and Grinding Description about working with block diagrams of: Lathe, Drilling machine, Milling machine	3
6.4	CNC Machine, Principle of CAD/CAM, Rapid and Additive manufacturing	1