

MINIMUM CORE SUBJECT AREAS: GAS ENGINEERING

AREA	SUBJECTS / DESCRIPTION	RECOMMENDED CONTACT HOURS
A recommendation of 40 hours from each area in Group 1 and 120 hours total from at least 3 out of 6 areas in Group 2.		
Group 1: 40 hours from each area below:		
1. Engineering Mechanics	- stress and strain, bending & deflections, torsion, thin-walled pressure vessels, kinematics, kinetics, orbital mechanics, principles of momentum & energy, elasticity, thermal stress, energy methods, finite element method, plastic analysis, fracture mechanics, etc.	40
2. Thermodynamics	- laws of thermodynamics, pure substances, ideal gases, phase changes, enthalpy, entropy, adiabatic processes, reversible & irreversible processes, basics of cycles, Rankine cycles, properties of gas mixtures, psychrometry, etc.	40
Group 2: 120 hours total from at least 3 out of 6 areas below:		
1. Fluid Mechanics	- properties of fluids, laminar & turbulent flows, Euler & Bernoulli equations, Reynolds number, drag coefficients, two-dimensional potential flows, pipe & channel flows, boundary layer flows, compressible flows, dimensional analysis, Navier-Stokes equations, etc.	
2. Materials Engineering	- structure & bonding of materials, phase diagrams, diffusion, plastic deformation, theories of fracture and fatigue, thermal stresses, heat treatment of steels, polymers and plastics, corrosion, materials for high temperature applications, high specific strength materials, advanced alloys, composite & ceramic materials, etc.	
3. Heat Transfer	- water-steam properties, Rankine cycles, Fourier's law of conduction, Newton's law of cooling, convection, radiation, air conditioning, fuels and combustion, internal combustion engines, refrigeration, heat exchangers, etc.	
4. Energy Management	- energy sources & environmental impact, renewable energy, energy efficiency, energy conversion systems, waste heat recovery, energy storage, energy & carbon audits, energy saving & carbon reduction, etc.	
5. Engineering Management	- project planning, scheduling & control, contract documents, estimation & tendering, project management, site supervision, claims & ADR, quantitative analysis of management including inventory control, linear programming & queueing theory, etc.	
6. Engineering Controls	- rigid-body dynamics, modelling techniques, numerical simulation, energy systems, frequency domain analysis, linear control design, computer control system, state-space theory, material selection, power transmission systems, computer-aided manufacture, etc.	