Building engineering syllabus

Building engineering examinations

Group A - Compulsory examinations (seven required)

07-Bld-A1 Elementary Structural Analysis


Structural Analysis II: Analysis of statically indeterminate structures: the methods of consistent deformations, slope deflection, and moment distribution. Application of virtual work principles. Introduction to matrix methods.

07-Bld-A2 Elementary Structural Design

Structural Design I: Basis for limit states design. Code requirements. Structural steel design: tension and compression members, beams and beam-columns. Connections. Introduction to the design of timber members.


07-Bld-A3 Construction Engineering

Construction Engineering: The nature of construction and the environment in which the industry works; organizational structures for project delivery; construction contracts and documents; introduction to construction processes: excavation and site works, foundation layout, concrete form design, concrete, steel, timber, and masonry construction; project planning, scheduling, and control; construction safety.

Project Management for Construction: Introduction to project management techniques in construction, including project delivery methods, construction contracts, cost estimating and bidding planning and scheduling, cash flow analysis, project tracking and control.

Labour and Industrial Relations in Construction: The study of labour legislation with special emphasis on the construction industry, union organization, the theory and practice of negotiations, mediation, contract administration, and arbitration. Review of actual contracts.


07-Bld-A4 Building Engineering Systems


HVAC System Design: Principles of HVAC system design and analysis; component and system selection criteria including room air distribution, fans and air circulation, humidifying and dehumidifying processes, piping and ducting design. Air quality standards. Control systems and techniques; operational economics.

Thermal Analysis of Buildings: Two- and three-dimensional steady-state and transient conductive heat transfer together with convection and radiation as applied to building materials and geometries. Heating and cooling load analysis, including
building shapes, construction type, solar radiation, infiltration, occupancy effects, and daily load variations. Applications for thermal load analysis. Introduction to heat exchangers.

Building Acoustics: Noise control criteria and regulations, instrumentation, noise sources, room acoustics, walls, barriers and enclosures, acoustical materials and structures, vibration and noise control systems for buildings.

Building Illumination: Production, measurement and control of light, design of lighting systems. Design in respect to daylighting. Integration of lighting systems with mechanical systems.

07-Bld-A5 Building Science


07-Bld-A6 Geotechnical Materials and Analysis


07-Bld-A7 Building Envelope Design


Group B - Optional examinations (three required)

07-Bld-B1 Computer Programming


07-Bld-B2 Advanced Structural Analysis


07-Bld-B3 Advanced Structural Design


Design of Reinforced Concrete Structures: Design of long columns, columns subjected to biaxial bending, two-way slabs,
flat plates, girders, and shells. Design of frames, shear-walls, and prefabricated structures. Prestressed concrete: losses, short- and long-term deflections; design requirements for shear, flexure, bond, and anchorage.


07-Bld-B4 Modern Building Materials


07-Bld-B5 Fire and Smoke Control in Buildings

Fire and Smoke Control in Buildings: Topics treated include fire and smoke control; failure mechanisms of building enclosure illustrated by case studies; code requirements for enclosure systems; systems approach for fire safety.

07-Bld-B6 Building Energy Conservation Technologies


07-Bld-B7 Indoor Air Quality

Indoor Air Quality: Elements of indoor air quality, physical/chemical characteristics of contaminants, health effects, standard requirements. Estimation of the levels of indoor air contaminants in buildings. Design of ventilation systems for pollutant control. Air pollution due to outdoor air supply through ventilation systems. Effect of outdoor air pollution on indoor air quality.

07-Bld-B8 Control Systems in Buildings


07-Bld-B9 Building Services


Building Service Systems: Principles of building service systems, including electrical, gas, communications, service-water supply and distribution; introduction to plans, codes, and standards for utility distribution systems.