English and Communication (1.0)

● Language Learning Strategies- Developing study skills (library skills, using the Internet for language learning and dictionary skills), developing a realistic plan for independent learning, practicing critical self-reflection of learning styles and strategies. ● Reading - Locating the main idea (skimming), identifying specific information (scanning), identifying topic sentences, distinguishing between relevant and irrelevant information and making predictions. ● Speaking - Using appropriate greetings, introductions in social situations, starting, continuing and ending a short conversation, participating in discussions, and presenting ideas and information in a clear and logical way. ● Listening - Predicting, listening for gist, listening for detail, taking notes and summarising information. ● Writing - Writing in a simple and clear style, planning the writing and organising it in a logical way to suit the purpose and the reader, writing clear paragraphs and editing for accuracy, brevity, and clarity in language.

Mathematics I (1.0)

● Introductory Topics - Review of relevant Secondary 5 Mathematical topics, Trigonometric functions, Trigonometry formulae, Logarithmic and exponential functions. ● Differential Calculus - Concepts of limits and continuity, Derivatives of functions, Differentiation rules, Applications. ● Integral Calculus - , Indefinite integrals, Standard integrals, Integration by substitution, Integration by parts, Integration by partial fractions, Definite Integral as the limit of a sum, Applications. ● Complex Numbers - Basic properties, Argand diagrams. ● Vectors - Vectors and scalars, Basic operation of 2-D and 3-D vectors, Scalar and vector products.

Introduction to Computing B (0.5)

● Computer Architecture and System Software - Overview of computer concepts. Input and output devices. Data representation. Internal and external memories. Operating systems and system software. Data communications and Internet. Computer ethics and computer viruses. ● Personal Computer Software Packages - Windows environment. Word-processing. Spreadsheet. Graphical presentation. Database management systems.

Construction Materials (1.0)

● Introduction to Science of Materials - Overview of atomic and molecular structure of solid materials. Crystal structure and related engineering properties. ● Mechanical Properties - Elastic behavior. Concepts of stress and strain. Elastic limit, proportional limit. Young's modulus, Poisson's ratio. Yield stress. Ultimate strength, permanent set, inelastic behavior, strain hardening. Ductility and brittleness. Tensile and compressive strength. Safe working stress, factor of safety. Creep and fatigue. Hardness, wear resistance Impact strength, toughness. ● Metals - Ferrous metals: plain carbon steel and cast iron; stainless steel. Properties and application. Non-ferrous metals: aluminum, copper, brass, bronze, lead, zinc. Properties and applications. ● Concrete - Hydration of cement. Types of cement and their applications. Types and properties of aggregate. Fresh and hardened properties of concrete. Basic concreting operation. ● Timber - Types and structure of timber, effect of moisture, stress grading. Preservative treatment. Applications. ● Bituminous Mixtures - Bitumen binder, viscosity, effect of temperature, asphalts and macadam, road tar. Properties and applications.

Construction Technology I (1.0)

● External Works - Earthwork: cut and fill. Trenching and shoring. Drainage works. Road construction. Various types of retaining walls. Temporary works: hoarding and fencing, site offices and other site set-up, access scaffolding. ● Substructure - Shallow foundations: pad footings, strip footings, combined footings and raft foundations. Piled foundation: construction techniques of various types of piles. Piers, caissons and barrettes. Various types of cofferdams, sheet piling. Basement excavation and lateral support. Ground water control. Basement construction and waterproofing. Shoring and underpinning. ● Superstructure - Reinforced concrete framed structures. Various structural floor systems. Reinforced concrete details of columns, beams, walls and slabs. Basic formwork and falsework. Structural steelworks: steel sections and structural connections. Load-bearing walls, shear walls, non-load-bearing walls. External walls,

curtain wall systems. Stairs and roof construction. Suspended false ceilings. Raised floor systems. ● Legislation Related to Site Work and Construction Safety - Building regulations and procedures related to site work. Construction Site (Safety) Regulations and other relevant legislation. Safety on lifting appliances, passenger and material hoists, access scaffolds and working platforms. Safety in excavation works. Use of personal protective equipment. Potential hazards. Prevention and reporting of accidents.

Introduction to Electrical and Mechanical Services (0.5)

● Review of Simple Circuits - Electrical quantities, energy, power, resistance, voltage, current. Simple treatment of inductance and capacitance. Ohm's Law. ● Alternating Current Circuits and Machines - Frequency, phase, period. Pharos diagram. Power, voltage & current measurement. Three phase power supplies and distribution. Basic motor/generator principles. Selection of motor types. ● Building Services (Electrical) - Power distribution for various types of buildings and construction sites. Earthing and grounding practice. Overview of building wiring practice and regulations. Safety practices. Overview of Fibre optics, Satellite communications. ISDN. ● Safety in Electrical Services - Fundamental requirements for safety. Protection against electric shock, overcurrent. Application of protective measures for safety. Local legislation & practices. ● Heat Transfer - Types of heat transfer: conduction, convection and radiation. Applications in the building environment. ● Building Services (Mechanical) - Introduction to heating, ventilation and air conditioning systems. Pumps and piping systems.

Engineering Surveying I (1.0)

● Scope and Principles of Engineering Surveying - Branches of surveying. Errors. Precision. Accuracy. ● Distance Measurement - Tapes. Base line measurement by steel tape and EDM. Methods of standardisation and corrections. Chain surveying. ● Levelling - Levelling instruments – Laser levels, Digital levels and Automatic levels. Ordinary Levelling Booking and reduction of observations. "Flying" levelling. Reciprocal levelling. Inverted staff readings. Two peg test. Effects of Earth curvature and refraction. Sources of errors. ● Angular Measurement - Types, structures and applications of theodolites and total stations. Measurement and reduction of vertical and horizontal angles. Temporary adjustments of theodolites. Tachometry. ● Traversing - Closed traverse. Open traverse. Bearings. Traverse computations. Methods of traverse adjustments. ● Contouring, Areas and Volumes - Gradients. Contours. Longitudinal sections and cross-sections. Trapezoidal rule. Simpson's rule. Areas from plans. Volumes from contours. Volumes from section. Cuttings and embankments.

Construction Drawing (1.0)

● Drawing Techniques - Drawing office routine and techniques. Drawing layout and presentation. Techniques in the use of line types, abbreviations, symbols, size and scale of drawings. Application of grid lines, labelling and dimensioning. Plans, levels, sections and elevations. Standards and codes of practice. Introduction to typical set of construction drawings. Understand geometric terms and geometric shapes. Geometric construction including division of lines and angles, polygons, circles, tangents, curves, ellipses, conic sections. ● Descriptive Geometry - Orthographic projections. Spatial representation of points, lines, planes and solids. Determination of true lengths, true angles and true shapes and other properties of objects. Sections. Multi-views and auxiliary views. Intersection and surface developments. ● Pictorial Drawing - Isometric and oblique drawings. Perspective drawings. Free hand sketches. ● Computer-aided Drafting - Hardware and software requirements. Backup requirements. Basic commands and functions to produce elementary construction drawings using CAD system. Application in detailing of construction works. ● Production Drawings - Introduction to presentation techniques of construction drawings. Translation of preliminary sketches into properly scaled working drawings. Understanding the use of standard drawings. Preparation of reinforced concrete and structural steelwork drawings in accordance to relevant standards and practice for Civil/Structural Engineering. Preparation of construction drawings from site layout plans to component details. Pictorial presentation of architectural drawings. Understanding submission drawings. Application of CAD in production drawings.

Structural Mechanics (1.0)

● Statics - Equilibrium of forces. Resolution of force components. Concepts of free body diagrams. Force polygons. Support reactions of determinate structures. ● Properties of Arbitrary Cross Sections - Centroid. Moment of inertia. Radius of gyration. Polar moment of inertia. Parallel-axes Theorem. ● Plane Trusses - Analysis of trusses : Method of joints. Method of sections. Method of inspection. ● Beams - Bending moment and shear force diagrams for beams. Relationship between bending moment, shear force and load. Deflected shapes, points of inflection. Beam deflection tables. ● Stress and Strain - Normal stress and shear stress. Elastic constants. Poisson's ratio. Hooke's Law. Allowable stresses. Stress-strain curves. Saint-Venant's principle. ● Stresses in Beams - Axial, shear and bending stresses. Stress distribution in beams. ● Combined Stresses - Mohr's Circle. Principal stresses. Principal planes.

Civil Engineering Construction (0.5)

● Earthwork - Trench, bulk and rock excavation techniques and precautions. Impact of public utilities and adjacent buildings. Cut & fill slope, methods of slope stabilization, slope protection. ● Deep Excavation and Basement Construction - Various basement construction methods, top-down and bottom-up approaches, temporary and permanent lateral supporting systems. Water control system in deep excavation and basement construction. Slurry wall construction. ● Marine works - Land reclamation. Deep filling. Construction of piers & jetties, and dolphins. Construction of fendering systems, breakwaters, shore protection works. Construction of submarine pipelines & outfalls. ● Prestressed and Precast Concrete - Pre-tensioning and post-tensioning, prestressing methods, comparison and production. Precast concrete construction: advantages and disadvantages, manufacture, transportation and erection. Application of precast and prestressed structures.

Measurement and Documentation (0.5)

● Standard Method of Measurement - Standard Method of Measurement for Civil Engineering Works (Hong Kong Government). Various types and formats of bills of quantities. The functions of bills of quantities. Preliminaries and preambles. Contingencies, prime cost rates, provisional sums and prime cost sums. ● Bills of Quantities - General principles of measurement. Procedures in preparing bills of quantities. Formats and abstracts of taking off. Measurement of simple civil engineering works including earthworks, retaining walls, drainage, substructures and superstructures. ● Specifications - Purpose and principles of specification writing. The function, source and format of specification. Various types and typical clauses of specification.