1st Year, 1st Semester

CE 1103 Surveying

Reconnaissance Survey; Linear and Angular Measurements; Traverse Survey; Levelling and Contouring; Areas and Volumes; Heights and Distances; Curves (Horizontal, Transition, Vertical); Tacheometry; Astronomical Surveying; Photogrammetry; Project Surveying; Errors in Surveying.

Math 1103 Differential and Integral Calculus, Matrix

Definition and concept of limit; continuity and differentiability of functions; differentiation of different functions; successive differentiation; expansion of functions by different theorems; tangent and normal; maxima and minima; determination of curvature and their properties; curve tracing; partial differentiation. Integral Calculus: Integration by parts; standard integrals; integration by the method of successive reduction; Beta function; Gamma function; multiple integrals. Matrices: Definition of different kinds of matrices; algebra of matrices; inverse of a matrix; rank and elementary transformations of matrices; solution of systems of linear equations; eigenvalues and eigenvectors; Cayley–Hamilton theorem.

Chem 1101 Chemistry

Acids and bases; cements, silicates and limes; thermochemistry; electrochemistry; electronic configurations and properties of molecules; atomic structure and quantum theory; water and water pollution; polymer science; corrosion engineering.

Phy 1101 Physics I

Physical optics: Young's double slit experiment, displacement of fringes and its uses, Newton's rings, interferometers, diffraction of light, Fresnel and Fraunhofer diffraction, diffraction by single slit, diffraction from a circular aperture, resolving power of optical instruments, diffraction at double slit and n-slits diffraction grating, polarization, production and analysis of polarized light, Brewster's law, Malus law, polarization by double refraction. Waves and oscillations: simple harmonic oscillator and its differential equation, total energy and average energy, combination of simple harmonic oscillations, Lissajous figures, spring-mass system, calculation of time period of torsional pendulum, damped oscillation, determination of damping co-efficient, forced oscillation, resonance, two-body oscillations, reduced mass, differential equation of a progressive wave, power and intensity of wave motion, stationary wave. Heat and Thermodynamics: Temperature and Zeroth Law of Thermodynamics, Calorimetry, Thermal Equilibrium and Thermal Expansion, First Law of Thermodynamics, Specific Heat, Heat Capacities, Equation of State, Change of Phase, Heat Transfer, Second Law of Thermodynamics, Carnot Cycle, Efficiency, Entropy, Kinetic Theory of Gases, thermodynamic functions, Maxwell relations, Clausius Clapeyron equation, Gibbs phase rule, third law of thermodynamics.

CE 1106 Field Surveying

Chain Surveying, Plane Table Surveying, Theodolite Traverse Surveying, Levelling / Route Surveying, House Setting, Setting Out Simple Curves (Circular), Height Measurement, Tacheometry (Stadia), Contouring, GPS Surveying, Total Station Surveying.

CE 1100 Civil Engineering Drawing

Orthographic projection and multi-view drawings, Isometric and oblique projections, Sectional views and cutting planes, Dimensioning, tolerancing and annotation, Reinforcement detailing for beams and columns, Foundations and footing drawings, Site layout, plans and contour representation, Drawing standards, scales and sheet organization, Drawing submission, printing and presentation.

1st Year, 2nd Semester

CE 1201 Engineering Materials

Mechanical properties: stress, strain and toughness, Aggregates: properties, grading and testing, Cement chemistry and physical properties, Concrete: fresh properties and mix design basics, Steel: types, mechanical properties and uses, Masonry, timber and bituminous materials overview, Durability, deterioration and protection measures, Quality control, sampling and field/laboratory tests, Sustainable and alternative construction materials.

Hum 1201 English

English grammar: construction of sentences, Tense, Parts of Speech, WH-Questions, Modal Verbs, Types of English Sentences, Finite-Non-Finite Verb, Use of Punctuation Marks and some other grammatical problems, Free Hand Writing, Paragraph Writing, Composition Writing, Summary Writing, Famous Poems, Short stories written by some well-known classic writers, Letter Writing: Formal/Informal.

Math 1203 Vector Algebra, Vector Calculus, ODE

Vector Algebra: Scalar, vector and their representation to physical quantities, Dot and cross products and their application, Triple and multiple products. Vector Calculus: Formal definition of differentiation and integration and mechanics, Scalar point function and vector point function, Definition and physical interpretation of gradient of scalar function, divergence and curl of a vector function, Vector formula, Theorems of Gauss, Green and Stokes. Ordinary Differential Equation: Formation of differential equations, Solution of first order differential equations by various methods, Solution of differential equations of first order but higher degrees, Solutions of general linear differential equations of second and higher order with constant coefficients, Solution of Euler's homogeneous linear differential equations.

Phy 1201 Physics II

Structure of Matter: crystalline and non-crystalline solids, single crystal and polycrystalline solids, unit cell, crystal systems, coordination number, crystal planes and directions, packing factor, Miller indices, relation between interplanar spacing and Miller indices. Solid State Physics: Bragg's law, methods of determination of interplanar spacing from diffraction patterns, defects in solids including point and line defects, bonds in solids, interatomic distances, calculation of cohesive and

bonding energy, introduction to band theory. Electricity and Magnetism: Electric charge, Coulomb's law, the electric field, calculation of electric field strength, a dipole in an electric field, electric flux and Gauss's law, electric potential and electric potential energy, capacitors and capacitance, current and resistance, current density, Ampere's law, Faraday's law, Lenz's law, self-inductance and mutual inductance. Magnetic Properties of Matter: magnetomotive force, magnetic field intensity, classifications of magnetic materials, magnetization curves.

CE 1204 Computer Aided Drawing for Civil Engineers

CAD fundamentals: interface, layers and units, Drawing setup: templates, blocks and symbols, Orthographic and isometric drawing using CAD, Dimensioning, annotation and hatching in CAD, Detailing: reinforcement, footings, and sections, Plotting, scales and layout viewports, Drawing exchange formats and standards (DWG/DXF/PDF), Simple plan and elevation generation from sketches, CAD for site layout and utility plans, Drawing management and version control.

Phy 1202 Physics Sessional

Determination of the specific heat of a liquid by the method of cooling, Determination of the thermal conductivity of a bad conductor by Lee's method, Determination of the pressure co-efficient of air by constant volume air thermometer, Determination of the frequency of a tuning fork by Melde's apparatus, Determination of the focal length of a concave lens by auxiliary lens method, Measurement of unknown resistance and verification of the laws of resistance by P.O. (Post Office) box, Comparison of the EMF's of two cells by potentiometer, Determination of the mechanical equivalent of heat by electrical method, Determination of the radius of curvature of a plano-convex lens by Newton's ring method, Determination of threshold frequency for the photoelectric effect of a photocathode and the value of the Planck's constant, To plot thermo-electromotive force-temperature (calibration) curve for a given thermocouple, Determination of the melting point of a solid using the calibration curve, Determination of the specific rotation of sugar solution by a polarimeter, Determination of the temperature co-efficient of the resistance of the material of a wire, Determination of the refractive index of the material of a prism using spectrometer, Determination of the spring constant and the effective mass of a loaded spring.

1st Year, 3rd Semester

EEE 1365 Basic Electrical Engineering

Basic electrical network and its components, Fundamental concepts: charge, voltage, current, power, voltage source, current source, resistance, inductance, capacitance, electric field, Ohm's law, KVL, KCL, Faraday's law, etc. Electrical circuit simplification and solution methods: series, parallel, Thevenin's theorem, Norton's theorem, source transformation, superposition theorem, nodal analysis, mesh analysis. AC circuit analysis: instantaneous current, voltage and power, effective/rms current and voltage, average power, Sinusoidal single-phase RLC circuits: phasor algebra, balanced three-phase circuits. Electrical wiring for residential and commercial loads,

Introduction to transformers and induction motors, Introduction to power system: generation, transmission and distribution.

Math 1301 Laplace Transformation, Series, PDE

Laplace Transformation: Laplace transformation and application, Use of Laplace transformation in solution of ordinary and partial differential equations. Series Solution: Bessel function, Legendre function. Fourier series: even and odd functions, Fourier integral, Fourier transformation and their uses in solving boundary problems. Partial Differential Equations: Introduction, equation of the linear and non-linear first order standard forms, Linear equations of higher order, Equations of the second order with variable coefficients.

Ban 1301 বাংলা ভাষা ও সাহিত্য (Bengali Literature and Language)

ভাষা: বাংলা ধ্বনি/বাগ ধ্বনি (Phone/Speech Sound), বর্ণ (Letter), অক্ষর (Syllable), বাংলা ধ্বনির উচ্চারণ স্থান ও রীতি (Point of Articulation and Manner of Articulation), বাংলা উচ্চারণ- প্রমিত, আঞ্চলিক, বৈচিত্র, অপিনিহিতি, অভিশ্রুতি, স্বরসংগতি, শ্বাসাঘাত, স্বরভঙ্গি/স্বরতরঙ্গ, বাংলা ও ইংরেজির তুলনা, বাংলা লিখন দক্ষতা, সাধু/চলিত রীতি, বিরাম চিহ্ন প্রয়োগ, প্রমিত বাংলা বানানের নিয়ম, ব্যবহারিক বাংলা সংক্ষিপ্ত আলোচনা, সাহিত্য: স্বনামধন্য কবিতা, প্রবন্ধ, ছোট গল্প, নাটক ও অন্যান্য রচনা।

Hum 1302 English Skills Practices

Skimming, scanning, predicting, inferring; analysis and interpretation of texts, comprehension from different types of texts, Report Writing, Business Letter Writing, Essay Writing, Free Hand Writing, Poster Making, Short Story Writing, Listening Test, Oral Presentation, Movie Review listening to recorded texts, learning to take useful notes and answering questions, Role Playing, Dialogue in peer work, Pronunciation: Phonetics and Phonology.

CE 1302 Engineering Materials Sessional

Determination of initial and final setting times (Vicat), Test for compressive strength of cement mortar cubes, Sieve analysis of fine and coarse aggregates, Bulk density, unit weight and voids in aggregate, Specific gravity and water absorption of aggregates, Workability tests of fresh concrete (slump, compaction), Compression test of cylindrical and cubical concrete specimens, Concrete mix preparation and curing procedures.

Chem 1302 Inorganic Quantitative Analysis

Acids and bases; titration and its classification, Volumetric titration; titrimetric experiments, Water pollution and purification.

2nd Year, 1st Semester

CSE 2101 Introduction to Computer Fundamentals and Programming

Basic components of computer systems, Operating systems for computers, Introduction to Microsoft Office package, Programming concepts and algorithms, Internal representation of data, Elements of structured programming language: data types, operators, expressions, control structures, functions, pointers and arrays, Input and output, Concept of object-oriented programming (OOP), Encapsulation, inheritance, polymorphism and abstraction, Development of programs related to civil engineering.

Hum 2101 বাংলাদেশের অভ্যুদয়ের ইতিহাস(History of Emergence of Bangladesh)

ইস্ট-ইন্ডিয়া কোম্পানীর শাসন প্রতিষ্ঠা, বৃটিশ শাসন আমলে বাংলার সামাজিক, সাংস্কৃতিক ও রাজনৈতিক পরিবর্তন, বঙ্গ ভংগ ও তার প্রতিক্রিয়া, ১৯৪৭ সালে স্বাধীন ভারত ও পাকিস্তানের অভ্যুদয়, পূর্ব বাংলার পাকিস্তানি শাসন, ভাষা আন্দোলন (১৯৪৮-১৯৫২) ও একুশে ফেব্রুয়ারি, যুক্তফ্রন্ট ও ১৯৫৪ সালের নির্বাচন, ৬ দফা ও বাঙালি জাতীয়তাবাদী আন্দোলন, আগরতলা ষড়যন্ত্র মামলা, ১৯৬৯ এর গণ-অভ্যুত্থান, সত্তরের নির্বাচন, পাকিস্তানি শাসকদের ষড়যন্ত্র, ১৯৭১ এর মুক্তিযুদ্ধ ও স্বাধীন বাংলাদেশের অভ্যুদয়।

CE 2121 Engineering Geology and Geomorphology

Minerals: identification of minerals, common rock-forming minerals, physical properties of minerals, mineraloids; Rocks: types of rocks, cycle of rock change, earthquake and seismic map of Bangladesh; Structural geology: faults, types of faults, folds and fold types, domes, basins, erosional processes, quantitative analysis of erosional landforms; Fluvial features: channel development, channel widening, valley shape, stream terraces, alluvial flood plains, deltas and alluvial fans, channel morphology, channel patterns and the river basin, geology and geomorphology of Bangladesh; Coast and coastal features, tides and currents, and forces due to waves.

CE 2111 Engineering Mechanics

Force and force systems: vector representation, Concurrent force systems and resolution of forces, Resultant forces & equilibrium equations in 2D, Moment and couple; Varignon's theorem, Non-concurrent and distributed force systems, Collinear and parallel force systems; shear transfer, Centroid and center of gravity of areas, Moment of inertia and product of inertia, Friction: static and kinetic; ladder and wedge problems, Analysis of simple trusses (method of joints and sections).

CE 2106 Quantity Surveying

Principles of measurement and preparation of bills of quantities, Rate analysis and cost estimation procedures, Standard method of measurement and measurement codes, Valuation, tendering and contract price preparation, Control of variations and provisional sums, Work schedule, productivity

and preliminary cost planning, Introduction to building specifications and tender documents, Practical measurement exercises and sample BOQ.

CSE 2102 Computer Programing Sessional

Programming concepts and algorithms; internal representation of data, Elements of structured programming language: data types, operators, expressions, control structures, functions, pointers and arrays, input and output, Concept of Object-Oriented Programming (OOP): encapsulation, inheritance, polymorphism and abstractions, Development of programs related to civil engineering.

2nd Year, 2nd Semester

CE 2201 Professional Practices, Communication & Ethics

Professional ethics and moral responsibilities, Codes of conduct and professional standards, Engineers' role in society, Communication skills (oral, written, reports, proposals, presentations), Teamwork and leadership in engineering projects, Environmental protection and sustainability principles, Social and cultural responsibility, including local/global context, Risk, safety, and liability in engineering, Project management and planning, Critical thinking and ethical decision-making in engineering.

Hum 2201 Principles of Accounting

Accounting definition, accounting history, accounting elements, Accounting ethics & principles, the accounting equation, accounts, events and transactions, and the double entry mechanism, Accounting procedure: preparing Journal, Ledger, Trial Balance, Adjusted Trial Balance, preparing financial statements, Cash flow statement, adjusting entries, Cost in general: Cost sheet, objectives and classifications of cost, Variable, Semi-variable and Fixed cost, Overhead costs: allocation and apportionment, Product costing: cost sheet under job costing, operating costing and process costing, Costing by products and joint products, Marginal costing: tools and techniques, cost-volume-profit analysis, Designing the optimal product mix, Relevant costing: analysis, profitability within the firm, Guidelines for decision-making: short-run decisions, Long-run planning and control: capital budgeting, The master budget, flexible budget and standard cost, Variance analysis.

CE 2211 Mechanics of Solids I

Stress and strain, Elasticity: Hooke's law, Poisson's ratio and constitutive relations, Axial load and deformation of bars (thermal effects), Torsion of circular shafts and power transmission, Bending of beams: flexural formula and neutral axis, Shear stress distribution in beams; shear flow, Combined stresses and principal stresses, Transformation of stress and Mohr's circle, Deflection of beams: double-integration and Macaulay's method.

Math 2203 Probability and Statistics

Measures of central tendency and standard deviation, Moments, skewness and kurtosis, Elementary probability theory and discontinuous probability distribution, Continuous probability distributions, e.g., normal and exponential, Hypothesis testing and regression analysis, Measures of variability; Normal distribution; Standardization and z score, Standard errors; Statistical significance; Effect size and confidence intervals, Correlation; t Tests; One-way analysis of variance; Factorial analysis of variance, Repeated-measures analysis of variance; Regression; Chi-square test of independence, Factor analysis and reliability analysis; Data reduction techniques.

CE 2200 Details of Construction

Architectural vs structural drawings and interpretation, Concrete detailing: reinforcement layout and anchorage, Masonry and brickwork detailing (joints & bonding), Roof, floor and staircase construction details, Expansion joints, control joints and movement provisions, Waterproofing, damp-proofing and flashing details, Doors, windows and fenestration details in structures, Construction sequencing and temporary works detailing, Construction specification notes and as-built records.

CE 2212 Mechanics of Solids Sessional

Torsion test on circular shafts, Bending tests on beams: load-deflection measurement, Shear test apparatus and shear strength checks, Determination of elastic modulus and Poisson's ratio, Hardness testing and material property correlation, Fatigue or cyclic loading demonstration (if available), Data recording, plotting stress–strain curves and reporting.

2nd Year, 3rd Semester

CE 2303 Numerical Analysis

Review of ordinary differential equations, Power series solutions: Frobenius method, Legendre polynomials, Gamma function, Bessel functions, Integral forms of differential equations and engineering applications, Fourier analysis: Fourier series and their properties, Fourier integrals, Fourier transforms and applications in solving boundary value problems, Applications to partial differential equations: Diffusion equation, Wave equation, Laplace equation, Statistical Methods for Engineering: Random variables; discrete and continuous probability distributions, Functions of random variables and derived distributions, Expectations and moments, Parameter estimation: Method of moments, Maximum likelihood estimation, Bayesian analysis, Confidence intervals and hypothesis testing (including nonparametric tests), Simple and multiple linear regression; model selection, Uncertainty and reliability analysis, Project-level decision-making and quality control.

CE 2341 Fluid Mechanics

Development and scope of fluid mechanics, Fluid properties, Fluid statics, Kinematics of fluid flow: Fluid flow concepts and basic equations—continuity equation, energy equation, momentum equation and forces in fluid flow, Similitude and dimensional analysis, Steady incompressible flow in pressure conduits, Laminar and turbulent flow, General equation for fluid friction, Empirical equations for pipe flow, Minor losses in pipe flow, Pipe flow problems: pipes in series and parallel, branching pipes, pipe networks, Fluid measurement: Pitot tube, orifice, mouthpiece, nozzle, venturimeter, weir.

CE 2343 Open Channel Hydraulics

Introduction to open channel flows: Description, Classification, Geometric properties of channel sections, Velocity distribution coefficients, Pressure distribution in a channel section, The energy and momentum principle in open channel flows, Specific energy and computation of critical depth, Channel transitions, control and flow measurement, Uniform flow and its computations, Uniform flow in rigid boundary channels, Composite roughness of channels, Computation of normal depth and velocity, Hydraulic exponent for uniform flow and critical flow computation, Efficient channel cross section, Discharge computation in compound section, Analysis of non-uniform flow and computation of flow profiles: Gradually varied flow, General and Differential equation of GVF, Control sections, GVF in changing grads, Rapidly varied flow, Characteristics of rapid varied flow, Flow over sharp-crested weirs, Hydraulic jump analysis, Conceptual design of unlined channels.

CE 2311 Mechanics of Solids II

Stability of columns: Euler buckling and column curves, Plate and shell basics (introductory concepts), Shear center and unsymmetrical bending fundamentals, Thick cylinder theory and pressure vessels (intro), Nonlinear material behaviour (brief introduction), Beams on elastic foundations (Winkler model), Vibration fundamentals: single-degree-of-freedom systems.

CE 2342 Fluid Mechanics Sessional

Centre of pressure, Proof of Bernoulli's theorem, Flow through Venturimeter, Flow through orifice, Coefficient of velocity by coordinate method, Flow through mouthpiece, Flow over V-notch, Flow over sharp-crested weir, Fluid friction in pipe.

CE 2312 Structural Analysis and Design I Sessional

Deflection measurement and verification on beam models, Analysis of determinately supported trusses (physical models), Influence line experiments for moving loads, Simple column and footing load tests/demonstrations, Introduction to structural analysis software exercises, Preparation of short design-check reports and sketches.

3rd Year, 1st Semester

CE 3131 Environmental Engineering I

Sustainable Development Goal 6.1, Water quality requirement, Water supply sources, Water demand, Rainwater harvesting, Aquifer properties and ground water flow, Well hydraulics, Surface water collection and transportation, Water treatment: plain sedimentation, coagulation, flocculation, filtration, disinfection, miscellaneous treatment processes, Water distribution systems: analysis and design of distribution network, Water demand for rural communities; shallow hand tube well, deep tube well, deep set tara pumps for problem areas, Water well design; pumps and pumping machineries; fire hydrant; water meter, leak protection; unaccounted-for water.

CE 3121 Geotechnical Engineering I

Introduction to geotechnical engineering, Formation, type, and identification of soils, Soil composition, Soil structure and fabric, Index properties of soils, Engineering classification of soils, Soil compaction, Principles of total and effective stresses, Permeability and seepage, Stress–strain–strength characteristics of soils, Compressibility and settlement behavior of soils, Lateral earth pressure, Stress distribution.

CE 3111 Structural Analysis and Design I

Statical determinacy and indeterminacy of structures, Analysis of determinate beams, frames and trusses, Influence lines for beams and moving load effects, Approximate methods for indeterminate structures (three-moment), Slope-deflection and moment distribution methods, Introduction to stiffness/matrix methods (assembly concepts), Deflection methods and energy approaches (virtual work), Design philosophy and introduction to relevant codes.

CE 3113 Design of Concrete Structures I

Design philosophies: limit state vs working stress overview, Design of singly/doubly reinforced rectangular beams, Serviceability: deflection and crack control basics, Design of one-way slabs and slab reinforcement layouts, Design of short columns and column–footing interaction, Detailing rules for ductility and anchorage, Durability, cover requirements and exposure considerations, Worked design examples to code.

CE 3142 Open Channel Hydraulics Sessional

Determination of State of Flow in Open Channel, Flow Over a Broad Crested Weir, Flow Through a Venturi Flume, Flow Through a Parshall Flume, Flow Through a Cut-Throat Flume, Flow Beneath a Sluice Gate, Hydraulic Jump, Development of Generalized Specific Energy and Specific Force Curves, Velocity Distribution Profile in Laboratory Flume, Measurement of Discharge using Area Velocity Method.

CSE 3102 Engineering Computation Sessional

Introduction to hi-level computational programming tools, Application to numerical analysis: basic matrix computation, solving systems of linear equations, Non-linear equations, differential equations, interpolation and curve fitting, numerical differentiation, numerical integration, Application to engineering problems: solving problems related to mechanics, numerical solution of equation of motion.

3rd Year, 2nd Semester

Hum 3201 Engineering Economics

Economics and engineering; microeconomics and macroeconomics, Theory of demand and supply and their elasticities, Demand estimation; price determination; indifference curve technique, Theory of production; theory of cost and cost estimation, Market structure; national income accounting, depreciation, Circular flow of income and expenditure; cost-benefit analysis; payback period, NPV, IRR, inflation; economic feasibility of engineering undertakings.

CE 3211 Design of Concrete Structures II

Design of two-way slabs and flat plate systems, Design of continuous beams and slab–beam interactions, Design for shear and torsion in beams, Design of slender and short columns with ties/shear reinforcement, Foundation design basics: isolated and combined footings, Retaining wall design and soil–structure interaction basics, Strengthening and rehabilitation methods for RC members, Advanced detailing and design checks per code.

CE 3231 Environmental Engineering II

Sustainable Development Goal related wastewater and sanitation, Design and construct different onsite sanitation systems, Design and construct sanitary sewer, storm sewer, and sewerage systems (Conventional, SB and Simplified System), Conventional sewage treatment methods, Design of treatment plant (Preliminary, Primary and Secondary), Design and construction of Effluent Treatment Plant (especially Textile Industries), Waste Stabilization Pond Design, Biogas Plant Design.

CE 3251 Transportation Engineering I

Introduction to transportation engineering, Transportation system & modal classification, Transportation Planning Fundamentals (volume, speed, parking, origin–destination), Traffic Data Collection and Studies, Highway Capacity and LOS, Highway geometric design: Design Control, Cross-section elements, Horizontal & Vertical curves, sight distance, Intersection design: channelization, control, Traffic control devices, Highway materials (basic introduction), Terminals and Transport Facilities, Introduction to Pavement Engineering.

CE 3232 Environmental Engineering I Sessional

Determination of pH of water, Determination of Color of water, Determination of Turbidity of water, Determination of TS, TDS and TSS of water, Determination of CO_2, Determination of Alkalinity of water, Determination of Total Iron in water, Determination of Arsenic in water, Determination of Chloride of water, Determination of Biochemical Oxygen Demand, Determination of Chemical Oxygen Demand, Alum Coagulation, Break Point Chlorination, Determination of Total and Fecal Coliform in Water.

CE 3222 Geotechnical Engineering I Sessional

Field Identification Test, Specific Gravity Test, Grain Size Analysis (Sieve & Hydrometer), Atterberg Limit Test, Direct Shear Test, Unconfined Compressive Strength (UCS) Test, Falling Head Permeability Test, Compaction Test, Relative Density Test, Consolidation Test.

3rd Year, 3rd Semester

CE 3341 Hydrology, Irrigation and Flood Control

Hydrologic cycle, Hydrologic measurement: precipitation, evaporation, transpiration and stream flow, Rainfall-runoff relations, Hydrographs, Unit hydrographs, Plant-soil-water relationship, Consumptive use and estimation of irrigation water requirements, Quality of irrigation water, Design of irrigation canal systems, Flood and its causes, Methods of flood management: Structural and non-structural measures, Direct and indirect losses of flood, Flood damage assessment.

CE 3301 Project Planning and Construction Management

Professional ethics and moral responsibilities, Codes of conduct and professional standards, Engineers' role in society, Communication skills (oral, written, reports, proposals, presentations), Teamwork and leadership in engineering projects, Environmental protection and sustainability principles, Social and cultural responsibility, including local/global context, Risk, safety, and liability in engineering, Project management and planning, Critical thinking and ethical decision-making in engineering.

CE 3303 Socio-economic Aspects of Development Projects

Economics and Social Structure of Developing Countries, Development, Economic Growth and Structural Transformation, Socio-economic Indicators and Measurement Techniques, Human Development Concepts and Frameworks, Human Development Index (HDI) and Gender-related Development Index (GDI), Sustainable Development Concepts and Indicators, Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs), Productivity, Employment Generation and Livelihood Impacts, Land Loss, Land Use Patterns and Land Ownership Issues, Social Impact Assessment (SIA) Framework and Methodology.

CE 3313 Structural Analysis and Design II

Advanced indeterminate analysis using matrix methods, Flexibility and stiffness method applications to frames, Influence line and moving load analysis for indeterminate systems, Introduction to finite element method for beams and frames, Stability and second-order effects (P–Δ and geometric stiffness), Dynamic effects: basics of structural dynamics and response spectra, Design considerations for seismic and wind loads (intro), Design integration: analysis-to-design workflow using codes.

CE 3312 Bridge Design Sessional

Load testing models or scaled span demonstrations, Design checks for simple beam/plate bridge elements (mini-project), Shear and bending verification experiments or software exercises, Detailing of joints and bearings (drawings/CAD exercises), Prestressing lab demo or simple prestress calculation exercises, Field visit report (if possible) / bridge inspection checklist activity.

CE 3314 Building Design Sessional

Small-scale design project: column–beam–slab coordination, Architectural–structural integration and drawing production, Construction sequence and detailing workshop, Foundation layout and footing detailing exercises, Structural drawing set preparation and presentation critique.

4th Year, 1st Semester

CE 4115 Design of Steel Structures

Tension members: design and connection detailing, Compression members: columns and buckling design, Flexural members: beam design and lateral-torsional stability, Plate girders and built-up sections design basics, Beam–column connections: welded and bolted design concepts, Design of composite beams and slab–beam interaction (intro), Stability considerations and bracing systems, Steel design codes, detailing and fabrication considerations.

CE 4151 Transportation Engineering II

Pavement materials: bituminous binders, cement, aggregates, embankment material, soil stabilization, Mix design methods; low-cost roads, Flexible pavement: components, functions, design, and construction, Rigid pavement: components, functions, design, and construction, Pavement Components and Functions, Pavement Construction & Maintenance / Rehabilitation, Railway engineering: general requirements; rolling stock and tracks; stations and yards; points & crossings; signaling; maintenance operations.

CE 4105 Business and Career Development

Introduction to Business, Industry and Professional Practice, Fundamentals of Entrepreneurship and Innovation, Business Models and Startup Ecosystems, Organizational Structure and Workplace Culture, Business Communication Skills (Verbal, Written & Digital), Project Planning Basics for Career Advancement, Professional Networking and Personal Branding, Corporate Governance, Compliance and Workplace Regulations, Entrepreneurship Development in Bangladesh Context, Career Growth Strategies, Goal Setting and Long-term Planning.

CE 4152 Transportation Engineering Sessional I

Tests on bituminous materials, Tests on subgrade materials (soil), Tests on base and sub-base materials, Bituminous mix design, Roadway capacity / traffic capacity analysis, Use of analytical, simulation, and statistical computer packages.

CE 4114 Computer Aided Analysis and Design of Structures Sessional I

Model creation: nodes, elements, supports and loads, Static analysis of beams, frames and simple trusses (examples), Modal analysis: natural frequency extraction (basic), Design checks for members using software output (steel/RC), Result interpretation: stresses, deflections and support reactions, Report generation and drawing export for structural designs.

4th Year, 2nd Semester

CE 4221 Geotechnical Engineering II

Soil investigation techniques, Settlement computation, Types of foundations, Bearing capacity of shallow foundations, Bearing capacity of deep foundations, Settlement and distortion of foundations, Design and construction of footings, Design and construction of rafts, Design and construction of piles.

CE 4213 Prestressed Concrete

Principles of prestressing: methods and systems, Materials and behavior of prestressed concrete members, Analysis of prestressed sections: transformed section method, Losses in prestress and their estimation, Design of prestressed beams for flexure and shear, Serviceability checks: deflection and cracking in prestressed members, End anchorage, detailing and construction sequence for prestressed elements, Standards and practical examples of prestressed structures.

CE 4231 Environmental Engineering III

Solid Waste Management: sources and types of solid wastes, Physical and chemical properties of solid wastes, Solid wastes generation process, Collection of solid wastes, On-site waste handling, storage and processing, Transfer stations and transport, Ultimate disposal methods, Resources and energy recovery, Soil pollution, Industrial solid waste collection and disposal, Hazardous waste management.

CE 4223 Earth Retaining Structures

Foundations of structures subjected to lateral loads, Rigid earth retaining structures, Flexible earth retaining structures, Dewatering methods, Slurry-wall construction, Braced excavation, Sheet piles, Cofferdams, Caissons.

CE 4251 Transportation Engineering III

Pavement Management Systems (PMS), Pavement Evaluation and Condition Assessment, Pavement Strengthening and Rehabilitation Techniques, Highway Drainage Principles and Design, Drainage Structures for Roads and Highways, Airport Planning Fundamentals, Aircraft Characteristics Relevant to Airport Design, Airport Layout and Configuration (Landing Area, Terminals, Heliports), Geometric Design of Airport Runways and Taxiways, Airport Pavement Design, Airport Lighting, Marking, and Signage, Airport Drainage Design.

CE 4249 Ground Water Engineering

Groundwater in hydrologic cycle and its occurrence, Physical properties and principles of groundwater movement, Groundwater and well hydraulics, Groundwater resource evaluation, Groundwater levels and environmental influences, Water mining and land subsidence, Groundwater pollution and contaminant transport, Recharge of groundwater, Saline water intrusion in aquifers, Groundwater management.

CE 4216 Computer Aided Analysis and Design of Structures Sessional II

Nonlinear analysis basics and step-by-step demo (material/geometric), Design of RC and steel members using integrated design modules, Punching shear and slab checks using software outputs, Seismic load case modelling and response evaluation (intro), Optimization and parametric study exercises (mini-project), Documenting analysis workflow and preparing final reports.

CE 4232 Environmental Engineering Sessional II

Predict fresh water supply requirement, waste water discharge and sanitation requirement in rural and urban areas, Design of water treatment plant, Design house plumbing facilities, Design wells, sanitary sewers, storm water sewer and septic tanks, Design waste water treatment plants.

CE 4222 Geotechnical Engineering II Design Sessional

Computer-aided design of foundations, Computer-aided design of retaining walls, Computer-aided design of reinforced soils, Slope stability analysis, Techniques of soil improvement, Use of computers in geotechnical engineering.

CE 4252 Transportation Engineering Sessional II

Flexible highway pavement design, Rigid highway pavement design, Geometric design of road intersections & interchanges, Traffic studies (volume, capacity, etc.), Traffic design (signal, intersection layout).

CE 4246 Water Resources Engineering Sessional

Design of hydraulic structures, Design of river training works, Groundwater resource assessment and water well design.

4th Year, 3rd Semester

CE 4337 Spatial Data Analysis & Remote Sensing

Definition of GIS, Definition of data, database, and information, Techniques of data input, Digitizing geographical features, Database management in a GIS environment, Data manipulation techniques, Sub-model formation, Weighting and multi-criteria evaluation for site selection, GIS applications for environmental safeguarding, Definition of a map and map features, Characteristics of maps, Concept of layers, Topographical maps, Thematic maps, Attribute information and display information, Image enhancement, Image classification, GIS applications for resource identification, GIS applications in environmental planning and management.

CE 4339 Environmental and Social Impact Assessment

Definition, aims and objectives of Environmental Impact Assessment (EIA), EIA Methodologies, Environmental issues in development projects, Initial Environmental Examination (IEE), Impact identification, prediction, analysis and evaluation, Environmental Management Plan (EMP), EIA Guidelines, Organization of EIA, Definition of social impact assessment, aims and objectives, social impact in development project, Impact identification assessment, Key informant interview, Focus group discussion, Case studies.

CE 4311 Introduction to Composite Structures

Behavior of composite beams and slabs; shear connectors, Design of composite beams for bending and shear, Composite columns and stability considerations, Long-term effects: shrinkage, creep and composite interaction, Connection detailing and fabrication considerations, Case studies: composite bridges and building examples, Codes and design recommendations for composite structures.

CE 4333 Environmental Engineering IV

Environment pollution and its control, Water pollution: sources and types of pollutants, Waste assimilation capacity and ecological balance of streams, Dissolved oxygen modelling, Ground-water pollution, Marine pollution, Industrial pollution and heavy metal contamination, Detergent pollution and eutrophication, Pollution control measures: water quality monitoring and management, Air pollution: sources and types of pollutants, Air pollution meteorology, Effects of various air pollutants on human health, materials and plants, Global warming and greenhouse effects, Air pollution monitoring and controlling measures.

CE 4327 Soil-Water Interaction

Introduction to soil–water interaction problems, Permeability, Capillarity, Soil suction, Seepage analysis, Effects of water currents, Effects of wave action, Theories of filter design, Revetment design, Geotechnical design of landfills.

CE 4353 Transportation Engineering IV

Analysis of Traffic Flow Characteristics, Introduction to Microscopic Simulation & Intelligent Transportation Systems (ITS), Non-Motorized Transport (NMT) Issues & Road Safety, Urban Transport Problems & Trends, Road Network Planning, Transit & Para-Transit Modes: Characteristics & Operation, Planning of Transit Networks, Estimation of System Costs & Benefits (Transit), Pricing, Financing & Evaluation of Transit Systems, Transit User Attitudes, Policies & Strategies for Transit Development, Freight Traffic Planning & Management, Selected Transport Case Studies, Congestion Management, Safety Management in Transport, Environmental Issues & Sustainable Transport.

CE 4347 Hydraulic Structures

Principles of hydraulic structures design, Types of hydraulic structures, Design of dams, barrages, weirs, spillways, energy dissipators, and spillway gates, Cross drainage works.