



## **Philadelphia University**

### **Faculty of Engineering and Technology Civil Engineering Department 2011-Plan Courses Description**

**Course No.: 0670202**

**Course Title: Engineering Statistics**

**Credit Hrs: 2**

**Prerequisite Course: 0250102**

Introduction to engineering statistics, presentation and treatment of data; theory of probabilities; random variables; probability distributions (continuous and discrete); sampling theory; statistical estimation; testing hypothesis; correlation and regression analysis.

**Course No.: 0670211**

**Course Title: Statics**

**Credit Hrs: 3**

**Prerequisite Course: 0250102**

Force vectors, Statics of particles, rigid bodies, equivalent systems of forces, centroids and centers of gravity, analysis of structures, frames, machines and trusses, Internal force (shear and moment diagram), friction, moments of inertia.

**Course No.: 0670212**

**Course Title: Strength of Materials**

**Credit Hrs: 3**

**Prerequisite Course: 0670211**

Stress, Strain, Stress-Strain relationship, Axial load, Torsion, Bending, Transverse Shear, stress and strain transformation, deflection of beams, buckling of columns.

**Course No.: 0670213**

**Course Title: Strength of Materials Lab.**

**Credit Hrs: 1**

**Prerequisite Course: 0670212**

Tensile test, Shear force and bending moment test, Impact test, Fatigue test, Creep test, Hardness test, Deflection of beams, Buckling.

**Course No.: 0670214**

**Course Title: Construction Materials**

**Credit Hrs: 3**

**Prerequisite Course: 0250102**

The structure of material, powerful atomic and energy relationship, structure and properties of the nucleus, Electron shells, and Radioactivity, General classification and structure of materials, atomic of bonds, solid state structure, metallic crystals and defects, polymers structure, Elastic and plastic deformation, crack, creep, fatigue. Bonding materials, cement testing and aggregate testing, water quality, admixtures, fresh concrete properties, concrete operation mixing, handing, placing, compacting concrete, curing concrete, design of concrete mixes, testing of concrete and bricks.

**Course No.: 0670216**

**Course Title: Construction Materials Lab**

**Credit Hrs: 1**

**Prerequisite Course: 0670214**

Tests of Cement at Construction site, Fineness of Cement, Normal Consistency, Initial and final Setting time, Density and Specific Gravity of cement, Slump Test, Flow Table test, Compressive Strength, Tensile Test, Sieve Analysis, Specific gravity and Absorption for Coarse aggregate, Specific Gravity and Absorption For fine aggregate.

**Course No.: 0670231**

**Course Title: Engineering Geology**

**Credit Hrs: 3**

**Prerequisite Course: 0250102**

A study of earth materials, Formation of rock, Surface feature, Analysis of agents of weathering, Erosion, soil investigation, Diastrophism and their effect on engineering construction.

**Course No.: 0670261**

**Course Title: Surveying**

**Credit Hrs: 3**

**Prerequisite Course: 0250102**

Principles of surveying, Distance measurement, Chain surveying, Electronic distance measurement, Angle measurement, Coordinates geometry, Traverse surveying, Leveling, Profile and cross- sections, Contouring, Areas and volumes, earth works, Design and setting out horizontal and vertical curves.

**Course No.: 0670262**

**Course Title: Surveying Lab**

**Credit Hrs: 1**

**Prerequisite Course: 0670261**

Pacing and taping, Layout of buildings using theodolites, Angles measurement and coordinates geometry using theodolites, Traverse survey using total stations, Running a leveling network using levels, Determination of irregular areas using Planimeter device, Loop and link traverse, Measurement of horizontal distances of building using theodolite, Measurement of vertical distances using theodolite .

**Course No.: 0670311**

**Course Title: Structural Analysis I**

**Credit Hrs: 3**

**Prerequisite Course: 0670212**

Structural forms, types of supports, degree of determinacy, reactions, determinate structures, plane trusses, space trusses, shear and moment diagrams for beams and frames, three hinged arches, influence lines for beams and trusses, deflections.

**Course No.: 0670312**

**Course Title: Structural Analysis II**

**Credit Hrs: 3**

**Prerequisite Course: 0670311**

Analysis of statically indeterminate structures force method; slope deflection method; moment distribution method; stiffness method of structural analysis, plastic method.

**Course No.: 0670323**

**Course Title: Pavement Design**

**Credit Hrs: 3**

**Prerequisite Course: 0670324**

Types of Pavement, Asphaltic pavement materials, Reclamation and cumulative properties of layered construction of roads, Axle Loads, Design of hot asphalt mixture using the Marshall test, Pavement maintenance.

**Course No.: 0670322**

**Course Title: Highway Engineering Lab**

**Credit Hrs: 1**

**Prerequisite Course: 0670323**

Tests on asphalt : Penetration, Softening point , Flash and fire points, Ductility and Viscosity, Aggregate properties by blending of aggregate using L.A.A.V and CBR Test, Marshall mix design for asphalt mixture, Specific gravity for asphalt mixture , Skid resistance for surface layer.

**Course No.: 0670324**

**Course Title: Geometric Design of Highway**

**Credit Hrs: 3**

**Prerequisite Course: 0670261**

Design control and criteria; Characteristics of driver, pedestrian, vehicle and the road; sight distance; horizontal and vertical alignment; cross-section elements; super elevation attainment; earthwork computations; mass haul diagram; highway classification; intersections and interchanges; drainage design.

**Course No.: 0670331**

**Course Title: Soil Mechanics**

**Credit Hrs: 3**

**Prerequisite Course: 0670231**

Composition and structure of soils, Phase relations and index properties, Soil classification, Soil compaction, Principle of effective stress, Stresses due to self weight, Stresses due to applied loads,

Soil shear strength, Soil permeability, One dimensional seepage, Consolidation theory

**Course No.: 0670332**

**Course Title: Soil Mechanics Lab**

**Credit Hrs: 1**

**Prerequisite Course: 0670331**

Water content, Specific gravity of soil particles, Liquid limit, Plastic Limit, Consolidation test, Compaction test, Density in field by sand cone, Permeability test (constant and variable head), Unconfined test, Direct shear test.

**Course No.: 0670343**

**Course Title: Environmental Engineering**

**Credit Hrs: 3**

**Prerequisite Course: 0212101**

Environmental system overview, Conservation theory, Material balance, State of Mixing, Reactor types, Water quality and Wastewater characteristics, Water quality standards, Water pollution, Water and wastewater treatment systems; objectives of primary, secondary and tertiary treatment; Air pollution, Acid rain, Ozone depletion and global warming; Air pollution control devices.

**Course No.: 0670381**

**Course Title: Fluid Mechanics**

**Credit Hrs: 3**

**Prerequisite Course: 0670211**

Fundamental Fluid properties, Basic units. Pressure and its Measurement, Fluid Statics, Force on plane & Inclined and Curved Submerged Surface, Floatation. Fluid Kinematics, Control Volume Approach, Differential and Integral Continuity Equation, Energy Equations, Application of Bernoulli equation, Momentum Principle and its Applications.

**Course No.: 0670382**

**Course Title: Fluid Mechanics Lab**

**Credit Hrs: 1**

**Prerequisite Course: 0670381**

Fundamental Fluid properties, Basic units., Pressure and its Measurement, Fluid Statics, Force on plane & Inclined and Curved Submerged Surface, Floatation. Fluid Kinematics, Control Volume Approach, Differential and Integral Continuity Equation, Energy Equations, Application of Bernoulli equation, Momentum Principle and its Applications.

**Course No.: 0670411**

**Course Title: Reinforced Concrete (1)**

**Credit Hrs: 3**

**Prerequisite Course: 0670312**

Properties of concrete and steel, cracked and uncracked sections, strength design for bending, stress block, singly and doubly reinforced sections, rectangular sections, T-sections, shear design, bond requirements, development length, one-way and ribbed slabs, approximate methods for two-way slabs, short columns and interaction diagrams.

**Course No.: 0670412**

**Course Title: Reinforced Concrete (2)**

**Credit Hrs: 3**

**Prerequisite Course: 0670411**

Ultimate strength versus unified design approaches, tension- and compression-controlled members, strain limits. Serviceability analysis, deflection and cracking control. Analysis and design for torsion. Slender columns. Analysis of building frames, simplifications, idealization. Two-way slabs, direct design method, equivalent frame method. Design of stairs.

**Course No.: 0670413**

**Course Title: Steel Structures**

**Credit Hrs: 3**

**Prerequisite Course: 0670312**

Structural Steel Design, Design of structural steel elements in bridges and building structures, plate girders, and other built-up members, beams and slender columns, and connections, detailing of steel structures; computer applications.

**Course No.: 0670421**

**Course Title: Transportation Engineering**

**Credit Hrs: 3**

**Prerequisite Course: 0670324**

Transportation systems; transportation system and elements; traffic flow theory; transport demand forecasting; environment impact, traffic studies; traffic safety; capacity and level of service concept capacity analysis of multilane, two lane and freeway; capacity analysis of signalized and unsignalized intersections; traffic signal coordination; computer applications in traffic.

**Course No.: 0670441**

**Course Title: Hydraulics**

**Credit Hrs: 3**

**Prerequisite Course: 0670381**

Flow in pipes, Pipes Networks Analysis, Open Channel Fundamentals, Open Channel Flow Analysis, Classification of Flow, (Uniform Flow), Critical Flow (Supercritical, Subcritical), Gradually Varied Flow, Water Surface Profile Analysis, Rapid Varied Flow (Hydraulic Jump), Dimensional Analysis, Similitude in Engineering, Pumps, Turbines.

**Course No.: 0670442**

**Course Title: Hydraulics Lab**

**Credit Hrs: 1**

**Prerequisite Course: 0670441**

Conducting the following Experiments: Osborne Reynolds Demonstration, Impact of Jets, Orifice and free jet flow, Dead Weight Pressure, Metacentric Height, Ground Water Flow and Well abstraction unit, Energy Loss in Hydraulic Jump, Flow Over Weirs, Rainfall Hydrograph, Water Hammer.

**Course No.: 0670443**

**Course Title: Sanitary Engineering**

**Credit Hrs: 3**

**Prerequisite Course: 0670343**

Water use trends and forecasting, capacity requirements, water demands, population projection; Water treatment engineering design parameters, treatment processes, mechanisms, principles, types, and design. Wastewater treatment engineering design parameters, preliminary treatments, sedimentation, clarification, biological treatment.

**Course No.: 0670444**

**Course Title: Sanitary Engineering Lab**

**Credit Hrs: 1**

**Prerequisite Course: 0670443**

Preparation of solutions, acids-bases titration, water analysis including: solid, alkalinity, turbidity, hardness, conductivity, biochemical and chemical oxygen demand determination, and JAR test for coagulations and flocculation process.

**Course No.: 0670472**

**Course Title: Engineering Economics**

**Credit Hrs: 3**

**Prerequisite Course: 250102**

Concept of engineering economy. Understand the concept of time value money, simple and compound interest. Feasibility study and choice proper option among several alternatives. Inflation, depletion, and depreciation calculations. Cost of owning, operating equipment and Taxes. Breakeven, Minimum Cost life, and replacement analysis.

**Course No.: 0670517**

**Course Title: Pre-Stressed Concrete**

**Credit Hrs: 3**

**Prerequisite Course: 0670412**

The behavior of concrete and steel under sustained load. Analysis and design of pre-tensioned and post-tensioned reinforced concrete members, and designing these members into the integral structure. The aim of this course is Calculating stresses in a composite system with a precast prestressed concrete beam and a cast in place concrete slab at various stages of construction and service. Also Computing camber, deflections, and cracking of prestressed concrete beams.

**Course No.: 0670519**

**Course Title: Bridge Engineering**

**Credit Hrs: 3**

**Prerequisite Course: 0670412**

Materials of bridge construction; bridge loads and design philosophy; design of reinforced concrete bridges; design of prestressed concrete bridges; design of steel bridges; design of plate-girder and continuous steel beam bridges; inspection, rehabilitation and maintenance of bridges; bridge-type selection criteria.

**Course No.: 0670522**

**Course Title: Airports and Railways Engineering**

**Credit Hrs: 3**

**Prerequisite Course: 0670421**

The course intends to introduce the nature of civil aviation and Airports, Aircraft characteristics related to airport design, components of airport and the characteristics for each component, design the pavement of airport, introduction of Railways.

**Course No.: 0670531**

**Course Title: Foundation Engineering**

**Credit Hrs: 3**

**Prerequisite Course: 0670331**

Introduction to foundation types, review of main chapters of soil mechanics (stresses, consolidation, shear strength. Soil site Exploration, Bearing Capacity, Factors to consider in foundation design, Design of Retaining Walls.

**Course No.: 0670541**

**Course Title: Hydrology**

**Credit Hrs: 3**

**Prerequisite Course: 0670441**

Introduction to Hydrology, Hydrological Cycle, Precipitation, Evaporation, Types of Rainfall, Rainfall Measurements, Hydrograph Analysis, Unit Hydrograph, Frequency and Peak Flow Analysis, Flood Routing, Reservoir Sizing, Introduction to Ground Water, Ground Water Flow Equations and Types of Aquifers.

**Course No.: 0670459**

**Course Title: Practical Training**

**Credit Hrs: 0**

**Prerequisite Course: 90 hrs.**

Field training which the civil engineering students should undergo in reputable factories or companies in the private or public sectors. The training is for a period of eight consecutive weeks (280 hr.).

**Course Title: Liquid and solid waste management**

**Credit Hrs: 3**

**Prerequisite Course: 0670443**

Waste definition, classification in the context of EU legislation; waste types; Integrated waste management, Waste treatment technology: incineration and other treatment; Examples for waste management practices in developing countries and developed countries; Waste generation in Jordan and sludge management.

**Course No.: 0670551**

**Course Title: Graduation Project (1)**

**Credit Hrs: 1**

**Prerequisite Course: 120 hrs.**

The course is a requirement for level 5 of civil engineering students. It introduces the basic principles and analysis of scientific research and technical report writing.

**Course No.: 0670552**

**Course Title: Graduation Project (2)**

**Credit Hrs: 2**

**Prerequisite Course: 0670551**

Continuation of project (1) (writing a technical report and the project drawings and details).

**Course No.: 0670553**

**Course Title: Special Topics in Civil Engineering**

**Credit Hrs: 3**

**Prerequisite Course: 120 hrs.**

Three Credit Hours given in any topic chosen in civil engineering.

**Course No.: 0670571**

**Course Title: Project management**

**Credit Hrs: 3**

**Prerequisite Course: 0670412**

Define project management and the role of management, project management concept, and determine project parties and responsibilities of each part. Project planning and plan the work: perform WBS, estimate activity duration, and establish relationships among the project activities. Perform network analysis and scheduling calculations, and determine critical path of the project. Tracking progress and evaluate the project status. Perform earned value analysis to control schedule and cost variances.

**Course No.: 0670572**

**Course Title: Specifications, Contracts, and Quantities Surveying.**

**Credit Hrs: 3**

**Prerequisite Course: 0670412**

Understand construction contracts' characteristics and features, contractual procedures, project delivery methods, type of contracts, contract's documents, and bill of quantities (BOQ). Be familiar with Jordanian construction contracts for construction projects. Understand specifications in construction projects and Jordanian specifications. Quantify several quantities in construction projects and able to prepare BOQ.