Department of Civil and Environmental Engineering

University of Cyprus

Undergraduate Prospectus 2014-2015

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INTRODUCTION

Civil and Environmental Engineering plays a significant role in building modern society in a sustainable future. It deals with the design, construction, management and maintenance of the infrastructure on which society relies. In addition to the buildings in which we live and work, the roads and the bridges we use everyday, society depends on civil and environmental engineers for providing clean water, energy, waste management and to protect the natural environment.

The Department of Civil and Environmental Engineering provides high quality degree programs at both undergraduate and postgraduate levels. The students study in a dynamic environment and have the opportunity to work with and learn from research teams at the forefront of science and technology. These programs emphasize fundamental principles in order to produce young engineers that are able to assume leading positions within a rapidly changing environment, full of problems, challenges and opportunities.

There are professional opportunities for civil and environmental engineers in both private and public sectors. Graduates may pursue careers in design, construction, maintenance, construction management of buildings and infrastructure, as well as in research and development.

UNDERGRADUATE DEGREE PROGRAM

The Department covers the traditional areas of Civil Engineering such as structures, building materials, earthquake engineering, construction management, geotechnical engineering, transportation, hydraulics as well as environmental issues such as protection of water resources, air pollution and management of solid and liquid waste. These areas have a direct impact on health and safety, tourism and local economy. The combination of Civil and Environmental Engineering disciplines in one department is appropriate since most of these areas are overlapping and have an impact on each other.

The program of studies at the Department of Civil and Environmental Engineering of the University of Cyprus is based on the European Credit Transfer and Accumulation System (ECTS), which has been adopted by the University. The ECTS is a student-centered system based on the student workload required to achieve the objectives of a program by attaching credit units to its components.

The program of studies is based on building strong foundations in Mathematics, Physics and Mechanics during the first two years, which are necessary for studying the applied and advanced topics covered during the following years. During the third year, the students take applied courses in the field of Civil and Environmental Engineering. The fourth year offers students the flexibility to choose from a wide array of advanced courses in Civil and Environmental Engineering according to their individual interests. Additionally, it contains the capstone design project, a comprehensive Civil and Environmental Engineering project the subject of which is set each year to cover a wide spectrum of areas within the discipline.

The Department offers an undergraduate Bachelor of Science (B.S.) degree in Civil and Environmental Engineering.

DEGREE RECOGNITION

The degree (B.S.) in Civil and Environmental Engineering is fully recognized by the Scientific and Technical Chamber of Cyprus (STCC), enabling the holder to become a member of STCC according to the applicable terms and thus to obtain the professional status and privileges of a Civil Engineer.

ACADEMIC ADVISING

Upon admission to the undergraduate studies in Civil and Environmental Engineering and before the first day of registration, each undergraduate student is assigned an academic advisor among the faculty of the CEE Department.

The academic advisor is the official contact point between the faculty and the student, helping the student to choose the courses that will allow him to successfully fulfill the requirements of the undergraduate program of studies.

AREAS OF RESEARCH

Research in the Department of Civil and Environmental Engineering focuses on the following areas:

- Construction Materials
- Structural and Earthquake Engineering
- Construction Management
- Computer-Aided Civil Engineering
- Geotechnical Engineering
- Transportation Systems
- Management of Water Resources
- Environmental Fluid Mechanics
- Solid and Liquid Waste Management
- Environmental Pollution Control
- Environmental Management Systems
- Subsurface Remediation

SCHEDULE OF CEE CURRICULUM, 240 ECTS units

FIRST YEAR

Fall Semester, 30 ECTS			Spring Semester, 30 ECTS		
CEE	101 Engineering Mechanics	5 ects	ARH	123 Computer aided Technical Drawing	5 ects
MAS	025 Mathematics for Engineers I	5 ects	CEE	113 Land Surveying	5 ects
MAS	029 Elements of Linear Algebra	5 ects	CEE	121 Structural Analysis I	5 ects
PHY	134 Physics for Engineers	5 ects	MAS	026 Mathematics for Engineering II	5 ects
CS	033 Intro. to Programming Principles for Engineers	5 ects	MAS	030 Introduction to Probabilities and Statistics	5 ects
ENG	100 General Advanced English	5 ects	ENG	104 Academic English: Technical Writing	5 ects

SECOND YEAR

Fall Semester, 30 ECTS			Spring Semester, 30 ECTS		
CEE	220 Structural Analysis II	5 ects	CEE	201 Numerical Methods in Engineering	5 ects
CEE	230 Strength of Materials	5 ects	CEE	221 Matrix Structural Analysis	5 ects
CEE	232 Strength of Materials - Laboratory	2.5 ects	CEE	231 Construction Materials	5 ects
CEE	270 Fluid Mechanics for CEE	5 ects	CEE	233 Construction Materials - Laboratory	2.5 ects
CEE	272 Fluid Mechanics Laboratory	2.5 ects	CEE	251 Soil Mechanics	5 ects
MAS	027 Mathematics for Engineers III	5 ects	CEE	253 Soil Mechanics - Laboratory	2.5 ects
XXX	xxx Free elective Course	5 ects	XXX	xxx Free elective Course	5 ects

THIRD YEAR

Fall Semester, 30 ECTS			Spring Semester, 30 ECTS		
CEE	310 Construction Management I	5 ects	ARH	331 Building Technology	5 ects
CEE	320 Dynamics of Structures	5 ects	CEE	325 Computer-Aided Structural Analysis	5 ects
CEE	340 Design of Reinforced Concrete Members	5 ects	CEE	341 Design of Reinforced Concrete Structures	5 ects
CEE	342 Design of Steel Structures	5 ects	CEE	353 Foundation Engineering	5 ects
CEE	370 Hydraulics	5 ects	CEE	371 Hydrology	5 ects
CEE	381 Introduction to Environmental Engineering	5 ects	CEE	383 Environmental Impact Assessment	5 ects

FOURTH YEAR

Fall Semester, 30 ECTS			Spring Semester, 30 ECTS		
CEE	400 Earthquake Engineering	5 ects	CEE	461 Road Design and Construction	5 ects
CEE	460 Transportation Engineering	5 ects	CEE	xxx Restricted elective course	5 ects
CEE	xxx Restricted elective course	5 ects	CEE	xxx Restricted elective course	5 ects
CEE	xxx Restricted elective course	5 ects	CEE	xxx Restricted elective course	5 ects
XXX	xxx Restricted elective course	5 ects	XXX	xxx Free elective Course	5 ects
CEE	490 Thesis: Capstone Design Project I	5 ects	CEE	491 Thesis: Capstone Design Project II	5 ects

Restricted Elective Courses

Civil Engineering			Environmental Engineering		
CEE	401 Software Development for Eng. Applications	5 ects	CEE	401 Software Development for Eng. Applications	5 ects
CEE	411 Construction Management II	5 ects	CEE	470 Water Resource Management	5 ects
CEE	432 Masonry Building Materials	5 ects	CEE	477 Coastal Engineering	5 ects
CEE	441 Advanced Topics in the Design of Steel Structures	5 ects	CEE	480 Wastewater Management	5 ects
CEE	442 Prestressed Concrete	5 ects	CEE	483 Flow Transport Processes in Env. Engineering	5 ects
CEE	450 Geomechanis	5 ects			
CEE	451 Engineering Geology	5 ects			
CEE	475 Design of Hydraulic Systems	5 ects			

DEGREE REQUIREMENTS

The course of study leading to B.S. degree in Civil and Environmental Engineering requires the completion of at least of 240 ECTS units, distributed as shown in the schedule of the CEE curriculum.

A student is awarded the B.S. degree in Civil and Environmental Engineering when he/she completes all the mandatory courses (195 ECTS), three free elective courses (15 ECTS) and six restricted elective courses (30 ECTS). The free elective courses should be taken from at least two different Schools of the University of Cyprus other than School of Engineering and they are meant to expose the student to different disciplines. The restricted elective courses belong to a group of CEE courses which are meant to offer specialization in advanced subjects within the CEE discipline.

Additionally, it is required to distribute the six restricted elective courses as follows:

- Three (3) restricted elective courses related to Civil Engineering to be selected from the following list:
    - CEE 401 Software Development for Engineering Application
    - CEE 411 Construction Management II
    - CEE 432 Masonry Building Materials
    - CEE 441 Advanced Topics on the Design of Steel Structures
    - CEE 442 Prestressed Concrete
    - CEE 450 Geomechanics
    - CEE 451 Engineering Geology
    - CEE 475 Design of Hydraulic Systems
    - CEE 496 Advanced Topics in Civil Engineering
    - CEE 497 Advanced Topics in Civil Engineering

- Three (3) restricted elective courses related to Environmental Engineering to be selected from the following list:
    - CEE 401 Software Development for Engineering Application
    - CEE 470 Water Resource Management
    - CEE 477 Coastal Engineering
    - CEE 480 Wastewater Management
    - CEE 483 Flow Transport Processes in Environmental Engineering
    - CEE 494 Advanced Topics in Environmental Engineering
    - CEE 495 Advanced Topics in Environmental Engineering

It should be noted that Independent Studies (CEE 492 and CEE 493) are only offered for exchange program students.

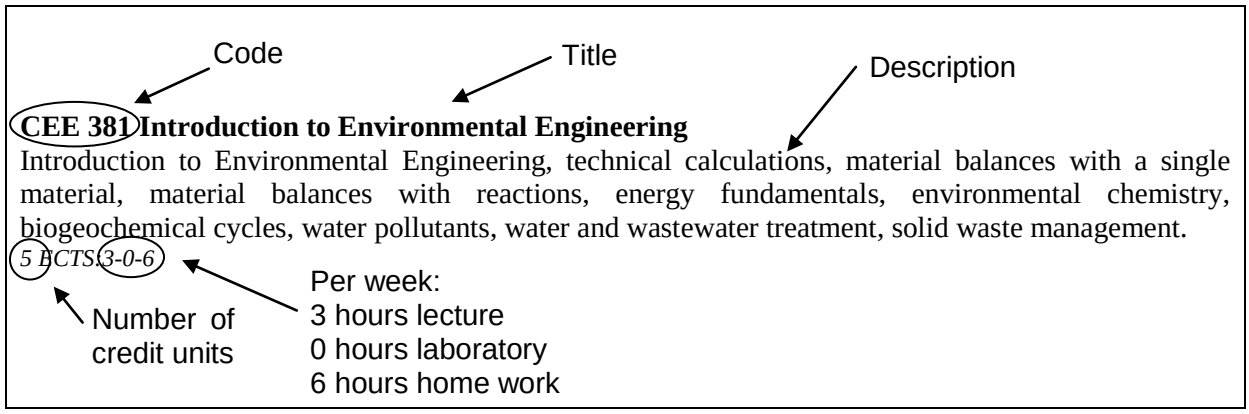
Under special circumstances and after prior approval by the Undergraduate Committee of the CEE Department, following a written request by the student signed by his/her academic advisor, a student can be credited up to 5 ECTS, in addition to the 15 ECTS of the required free elective courses, that correspond to restricted elective course offered by another department or a graduate course offered by the Department of Civil and Environmental Engineering.

Within the terms of an exchange program and only after prior approval by the Board of the CEE Department, following a written request by the student, an undergraduate student can attend up to two semesters at another University with study load per semester ranging between 25 and 30 ECTS.

A transferred undergraduate student can be credited up to 120 ECTS units from her/his undergraduate studies prior to the transfer after the approval by the Undergraduate Committee of the CEE Department, following a justified petition by the student, signed by his/her academic advisor.

COURSE DESCRIPTIONS

Example of course description



Required CEE Courses

First Academic Year

Fall Term

CEE 101 Engineering Mechanics

Principle of Mechanics. Types of loads, structures and supports. Inner and outer products, product of three vectors, moment of force. Collinear, coplanar and parallel forces, calculation of resultant force and moment, body equilibrium, translation and rotation. Determination of support reactions. Calculation of axial force, shear force and moment diagrams in beams. Determination of center of gravity and moments of inertia. Normal and shear stresses and strains, elastic modulus, shear modulus, Poisson's ratio. Distribution of normal and shear stresses in a cross-section.
5 ECTS:3-0-6

Spring Term

CEE 113 Land Surveying

Introduction. Coordinate Systems. Measurement methods and units. Basic surveying equipment. Errors and calculations. Levelling. Control Surveys. Principles of Distance and Angle measurements. Theodolites and their use. Setting out. Earthwork quantities. Topography and mapping. Global Positioning Systems (GPS). Geographical Information Systems (GIS). Applications of surveying in the construction industry. Practical Exercises on campus: Levelling; Total stations; GPS.
5 ECTS:3-2-4

CEE 121 Structural Analysis I

Types of structural systems. Forces and types of loads. Supports. Equations of static equilibrium. Free-body diagrams. Internal forces. Stability and determinacy of structures. Complex structures. Principle of superposition. Symmetric structures. Analysis of determinate trusses. Stability and determinacy of trusses. Method of joints. Method of sections. Analysis of determinate beams and frames. Internal forces in plane beams and frames. Bending-moment, shear-force and axial-force curves. Relationship between load and internal forces. Elastic curve of beams and frames. Cables. Arches. Influence lines for determinate trusses, beams and frames. Geometric methods for computing deflections in determinate structures.
5 ECTS:3-0-6

Second Academic Year

Fall Term

CEE 220 Structural Analysis II

Differences between determinate and indeterminate structures. Indeterminacy of structures. Energy methods for computing deflections. The flexibility method. Concept of a redundant. Released structure. Elastic curve of indeterminate structures. Compatibility equation. Flexibility coefficients. Support settlements. Temperature change. Fabrication errors. Elastic supports. Symmetric structures. Kinematic indeterminacy of structures. Degrees of freedom. The slope-deflection method. Free and restrained joints. Slope-deflection equations. Fixed-end moments. Stiffness coefficients. Moment distribution method (Cross). Influence lines for indeterminate beams and frames. The Müller-Breslau principle.
(Prerequisite: *CEE 121*)
5 ECTS:3-0-6

CEE 230 Strength of Materials

Stress and strain definitions, elastic behavior of solids. Axial loading. Engineering beam bending theory. Engineering theory of torsion. Stress, strain analysis, plane and 3D analysis. Skew bending. Bending and compression. Shear and torsion of thin-walled cross-sections due to bending. Buckling and stability of beams. Uniaxial elasto-plastic behavior of solids. Elasto-plastic behaviour under axial loading, bending and torsion of beams. Yield and failure: von Mises and Mohr-Coulomb.
5 ECTS:3-0-6

CEE 232 Strength of Materials – Laboratory

Introduction. Methods and Standards of testing materials. Material properties and mechanical behaviour. Ductility and Brittleness. Failure mechanisms. Laboratory Tests: Measurement of dimensions. Tension, compression, hardness, torsion, shear, bending and fatigue tests. Creep, relaxation and impact testing. Non-destructive testing. Sensors and strain gauges.
2.5 ECTS:0-2-3

CEE 270 Fluid Mechanics for Civil and Environmental Engineers

Introduction to Fluid Mechanics and its applications. Fluid statics, control volume approach, mass conservation and steady flow momentum equation, Bernoulli's theorem, curved streamlines. Laminar and turbulent flow, boundary layer, friction in laminar and turbulent flow. First law of thermodynamics; flow heat transfer. Similarity, dimensional analysis, model tests.
(Prerequisites: *PHY134*)
5 ECTS:3-0-6

CEE272 Fluid Mechanics – Laboratory

Introduction to Health and Safety Issues for Fluid Mechanics experiments. Flow visualization techniques. Fluid viscosity measurement. Hydrostatic force measurement on inclined surfaces. Measurement of drag force on spheres in settling. Investigation of laminar and turbulent flow characteristics. Investigation of jet impact. Investigation of Bernoulli's theorem. Measurement of lift and drag in wind tunnel.
(Prerequisites: *PHY134*)
2.5 ECTS:0-2-3

Spring Term

CEE 201 Numerical Methods in Engineering

Computer arithmetic. Approximation, round-off and truncation errors. Solution of nonlinear equations. Solution of systems of linear equations using direct and iterative methods. Matrix inversion. Solution of systems of nonlinear equations. Matrix eigenvalues and eigenvectors. Interpolation using polynomial functions and splines. Least-squares regression. Numerical differentiation and integration.

Differential equations – initial value problems. Software implementation and usage with numerical applications in problems from the area of civil and environmental engineering.
5 ECTS:3-0-6

CEE 221 Matrix Structural Analysis

Introduction to flexibility methods. Analysis of determinate and indeterminate trusses and frames with the flexibility methods. Graphical solution with the flexibility methods. Stiffness matrices for springs, bars and beams. Transformation matrices. Local and global coordinate systems. Analysis with the direct stiffness method. Boundary conditions. Inclined supports. Constraints. Graphical solution using the stiffness method. Software implementation of the direct stiffness method. Elements with member-end releases. Static condensation. Introduction to analysis using a professional structural analysis program. Inclined supports.
(Prerequisite: *CEE 220*)
5 ECTS:3-0-6

CEE 231 Construction Materials

Introduction to the major materials used in construction. Materials engineering concepts. Nature of materials. Physical and mechanical properties of materials. Aggregates. Aggregate properties. Portland cement. Cement-based materials. Concrete components and microstructure. Properties of fresh and hardened concrete. Strength, durability, and failure mechanisms. Proportioning concrete mixes. Quality control. Special concrete mixes. Steel and other metals. Structural and reinforcing steel. Wood. Masonry. Composites.
5 ECTS:3-0-6

CEE 233 Construction Materials – Laboratory

Laboratory experiments for aggregates, concrete, steel, wood, and composites.
2.5 ECTS:0-2-3

CEE 251 Soil Mechanics

Introduction to soil mechanics. Soil formation classification and mineralogy. Characteristics and engineering properties of soil: density, strength and deformability, water content, Atterberg limits, permeability and seepage. Sub-surface soil investigation. Soil-water movement. Mechanical behavior of a soil element. Description of the state of stress at a point in soil. Effective stress, consolidation, and soil strength, Mohr circle. Stress-strain relationships under different loading conditions. Unconfined and triaxial compression. Simple shear and shear strength of a soil element. Mohr-Coulomb failure criterion. Applications: Slope stability.
5 ECTS:3-0-6

CEE 253 Soil Mechanics – Laboratory

Soil classification methods. Determination of physical and mechanical properties of soils. Laboratory tests: determination of plasticity and liquidity limits, compaction test, sand cone test, measurement of hydraulic conductivity, direct shear test, consolidation test, triaxial compression test.
2.5 ECTS:0-2-3

Third Academic Year

Fall Term

CEE 310 Construction Management I
(Open elective course)

Selection, operational analysis, utilization and replacement of equipment for civil engineering works. Engineering economy. Project planning, scheduling and controlling. Budgeting, resource and cost allocation, cost control and time-cost tradeoff analysis of construction projects. CPM/PERT analysis. Health and safety measures during construction. Term project using specialized computer software for construction applications.

5 ECTS:3-0-6

CEE 320 Dynamics of Structures

Dynamic loading. Inertia forces. Single-degree-of-freedom systems. Equation of motion. Fundamental frequency. Stiffness for linearly elastic systems. Damping. Free and forced vibration of single-degree-of-freedom systems. Dynamic response to harmonic, periodic and arbitrary excitations. Numerical evaluation of dynamic response. Earthquake response of single-degree-of-freedom linear systems. Response spectrum. Elastic design spectrum. Free vibration of multi-degree-of-freedom systems. Natural frequencies and mode shapes. Mass and stiffness matrices. Forced vibration of multi-degree-of-freedom systems. Method of modal superposition. Response spectrum analysis.
(Prerequisite: *CEE 220*)
5 ECTS:3-0-6

CEE 340 Design of Reinforced Concrete Members

Introduction to reinforced concrete and design process. Safety factors and loading. Materials. Flexural design of rectangular and T-Beams. Shear and torsional design. Columns. Interaction diagrams. Laboratory experiments: construction and testing of reinforced concrete beams.
(Prerequisites: *CEE 121*, *CEE 230*)
5 ECTS:3-0-6

CEE 342 Design of Steel Structures

Introduction to steel structures technology. Iron, steel and aluminum alloys. Properties of structural steels. Methods of welding. Loadings on steel structures. Design criteria. Design of members that are in tension, compression, shear, bending and torsion. Design of steel connections. Static and dynamic analysis of steel trusses and frames. Design of steel structures. Modern steel design codes.
(Prerequisite: *CEE 230*)
5 ECTS:3-0-6

CEE 370 Hydraulics

Fundamental laws of fluid mechanics. Fluid properties. Laminar and turbulent flows. Basic principles of hydraulic engineering. Hydraulic measurements. Pipe and open channel flows. Water demand and supply.
5 ECTS:3-0-6

CEE 381 Introduction to Environmental Engineering

Introduction to Environmental Engineering, technical calculations, material balances with a single material, material balances with reactions, energy fundamentals, environmental chemistry, biogeochemical cycles, water pollutants, water and wastewater treatment, solid waste management.
5 ECTS:3-0-6

Spring Term

CEE 325 Computer-Aided Structural Analysis

Software implementation of the basic static and dynamic structural analysis methods. Construction of response spectra. Numerical simulation of shake-table experiments. Computer-based spectral and dynamic analysis of buildings. Usage of structural analysis software for the static and dynamic analysis of structures. Simulations of buildings under earthquake excitations. Foundations and elastic supports. Structural analysis software development. Utilization of specialized structural analysis software and special topics in computer-aided engineering. Introduction to finite element methods.
(Prerequisite: *CEE 221*, *CEE 320*)
5 ECTS:3-0-6

CEE 341 Design of Reinforced Concrete Structures

Development, anchorage and splicing of reinforcement. Serviceability. Continuous beams and one-way slabs. Moment redistribution. Different types of slabs. Elastic analysis of slabs. Yield line

analysis of slabs. Design of slabs. Footings. Deep beams and corbels. Retaining walls. Basic concepts of seismic design of reinforced concrete structures.
(Prerequisite: *CEE 340*)
5 ECTS:3-0-6

CEE 353 Foundation Engineering

Foundation design principles. Selection of foundation type. Bearing capacity and settlements of shallow foundations. Admissible settlements of structures. In-situ tests for the design of foundations. Spread footings, combined footings, beams on elastic foundations, raft foundations. Retaining walls and earth pressure theories. Slope stability. Deep foundations. Piled foundations and construction methods. Bearing capacity and settlements of piles.
(Prerequisite: *CEE 251 or CEE 253*)
5 ECTS:3-0-6

CEE 371 Hydrology

Overview of hydrological cycle. Precipitation, evaporation, infiltration, runoff analysis, flood routing and the water balance. Statistical procedures in hydrology. Urban hydrology. Introduction to mathematical models of medium and large watersheds. Application of hydrology to design of outlet works and flow control structures.
5 ECTS:3-0-6

CEE 383 Environmental Impact Assessment

Environmental impact assessment from projects and anthropogenic activities. Cyprus and European legislative framework. Methodologies for the estimation of the impact on air, soil, water, flora and fauna. Case studies related to the construction, energy, agricultural and industrial sector.
5 ECTS:3-0-6

Fourth Academic Year

Fall Term

CEE 400 Earthquake Engineering

Fundamentals of Engineering Seismology. Faults, earthquakes and seismic waves. Accelerograms and characterization of ground motion. Site effects and directivity. Elastic and inelastic response of oscillators. Elastic and inelastic response spectra. Design spectrum. Ductility and strength-reduction factor. Seismic response of multi-degree-of-freedom systems using modal response analysis. Principles of earthquake resistant design and Eurocode 8 provisions. Introduction to structural control and seismic isolation. Term project.
(Prerequisite: *CEE 320*)
5 ECTS:3-0-6

CEE 460 Transportation Engineering

Application of physical laws of motion and energy as they relate to calculations of resistances to motion, power, and energy requirements. Acceleration-deceleration limits. Capacity of various modes of transportation. Techniques of analysis and planning for transportation services. Demand-supply interactions. Evaluation of transportation alternatives. Integrated model systems. Demand estimates for transportation system. Location, design, and operations of transportation facilities. People participation in decision making; proposal writing.
5 ECTS:3-0-6

CEE 490 Thesis: Capstone Design Project, I

The project (a two-semester senior capstone design experience in civil engineering) is intended to serve as a capstone experience in preparing students to address challenging engineering problems, and requires student collaboration and integration of their engineering knowledge from various thematic

areas. In the first semester, a project involving integration of the civil engineering subdisciplines will be described and presented. Working groups will be established and students will work on preparing engineering design and environmental impact assessment studies for the project. Lectures will be devoted to particulars of the project, presenting specialized topics and specific design applications that may not have been addressed in other courses. During the first semester, each group will be expected to prepare and present a preliminary professional proposal for design and construction of the project, including an environmental impact study.
(Prerequisite: *Senior status or advisor's approval, CEE 341, CEE 342, CEE 353, ARH 331*)
5 ECTS:1-2-6

Spring Term

CEE 461 Road Design and Construction

Theories of flexible and rigid pavements pavement design. Equivalent wheel loads. Strength tests. Frost and high temperature action. Spatial design. Methods of road tracing and design. Earthwork: sections, earth movements and distribution. Environmental concerns. Practices in monitoring, maintaining, and rehabilitating flexible and rigid pavement systems.
5 ECTS:3-0-6

CEE 491 Thesis: Capstone Design Project, II

This is the second semester of a two-semester senior capstone design experience in civil engineering. Lecture sessions will be used to present specialized material of relevance to the project(s) assigned and to allow student groups to present progress reports on their work. Each group will be expected to prepare a complete design report addressing all assigned aspects of the project, with functional design drawings and specifications, environmental studies, construction schedules, cost estimates, and health and safety plans. All projects will include a written report, and they will be verbally presented and defended. The projects must be of sufficient depth and incorporate the state-of the-art in the subject topics.
(Prerequisite: *Senior status or advisor's approval, CEE 310, CEE 490*)
5 ECTS:1-2-6

Restricted Elective CEE Courses

The course allocation per semester is only indicative. The Department reserves the right to offer these courses on different semesters as needed.

CEE 401 Software Development for Engineering Application
(Open elective course)

Introduction to computer-aided engineering. Object-oriented software design and development for engineering applications using C++, Java, or/and C#. Software implementation of common numerical methods and algorithms. Usage of data structures and databases in engineering modeling, visualization and internet computing. Modern methodologies for designing and developing engineering simulators. Term project: Implementation of a software solution that addresses a practical engineering problem.
(Prerequisites: *CS 033 or equivalent*)
5 ECTS:3-0-6

CEE 411 Construction Management II

Construction contracts. Conflict resolution and negotiations. Organization and administration. Planning, estimating, control and risk assessment. Quantity surveying. Labor and equipment estimates. Estimating excavation and concrete. Tender preparation. Software packages for project management. Accounting and control. Economic evaluation of construction projects. Construction Finance. Fully Integrated and Automated Project Processes (FIAPP). Term project: proposal preparation, where students use contract documents and software tools.
(Prerequisite: *CEE 310*)
5 ECTS:3-0-6

CEE 432 Masonry Building Materials

Building Stones: classification, selection, factors affecting durability and weathering, porosity, capillary absorption, measurement of physiomechanical properties, preventive and remedial measures, Cyprus building and decorative stones. Mortars and Renderings: plasters, limes, typical mix proportions, specification of plaster and render mixes for special applications, effect of w/b ratio and binder content, hydraulic and non-hydraulic binders and mortars. Concrete Blocks and Bricks: aggregate blocks, AAC blocks, manufacture, classification and use, strength, quality, thermal properties, drying shrinkage, durability. Ceramics: clay bricks, clay and shale consultants, brick forming and firing, properties of bricks, problems, moisture expansion, durability, designation. Adobe and Mud Bricks: pathology and deterioration problems.
5 ECTS:3-0-6

CEE 441 Advanced Topics on the Design of Steel Structures

Torsional, lateral, and lateral-torsional buckling of steel elements. Elastic and inelastic stability of steel frames. Design of steel members and structures against buckling. Composite members and their connections. Methods of construction and erection. Maintenance and fire protection. Integrated design of steel structures. Term project.
(Prerequisite: *CEE 342*)
5 ECTS:3-0-6

CEE 442 Prestressed Concrete

Basic concepts of prestressed concrete. Materials and systems for prestressing. Load balancing method. Prestress losses. Flexural analysis. Flexural, shear, and torsional design. Anchorage systems. Indeterminate prestressed concrete beams. Concordant tendons. Camber, deflection, and crack control. Precast concrete concepts.

(Prerequisite: *CEE 340*)
5 ECTS:3-0-6

CEE 450 Geomechanics

Site exploration and in-situ testing: standard penetration test (SPT), cone penetration test (CPT), pressuremeter test. Critical state theory – advanced topics in soil behavior. The finite element method

in geotechnical engineering. Ground improvement: preloading, drains, compaction, soil replacement, stone columns, grouting. Reinforced earth retaining walls. Slope stabilization – anchors. Selection of special topics in geotechnical engineering. Term project using finite element software.
(Prerequisite: *CEE 251*)
5 ECTS:3-0-6

CEE 451 Engineering Geology

Origin and composition of rocks. Geology of Cyprus. Geomorphology and geological structures. Engineering properties of rocks. Mechanical behavior of rocks discontinuities. Rock mass classification systems. Mechanical behavior of rocks mass. Hoek & Brown failure criterion. Rock slope stability – landslides. Rock mass permeability. Permeability field testing. The role of geology in the design and construction of dams and tunnels.
(Prerequisite: *CEE 251 or CEE 253*)
5 ECTS:3-0-6

CEE 470 Water Resource Management

Water demand and supply. Distribution systems. Collection, transportation and storage of water resources. Pipe networks and pumps. Reservoirs and dams. Control of water resources by natural system functions, user actions, and influence of social, economic, and political institutions. Water resource policies. Case studies (e.g., flood/drought management).
(Prerequisites: *CEE 370, CEE 371*)
5 ECTS:3-0-6

CEE 475 Design of Hydraulic Systems

Design of Water Supply and Sewage Systems: Drinking water quality. Design flow estimation. Population forecasting. Main water sources. Water intakes. Water conveying and containment systems. Pump systems – operating points, similarity. Pump cavitation. Reservoir balance. Design of water distribution networks. Appurtenances and special devices of networks. Waterhammer and other transient phenomena. Wastewater and stormwater collection systems – design flows, general layout, hydraulic computations. Pipe materials, quality issues.
Design of Irrigation and Drainage Systems: Origin and quality of irrigation water. Soil properties, soil moisture. Flow equation, infiltration. Plant water demands – evapotranspiration, photosynthesis. Rainfall, water balance in the root zone. Design flows. Distribution systems – surface irrigation, spraying, drip irrigation; general layout, hydraulic computations. Economic optimization. Drainage and flood control.
(Prerequisites: *CEE 370, CEE 371*)
5 ECTS:3-0-6

CEE 477 Coastal Engineering

Hydrodynamic processes in the coastal and nearshore regions. Waves, tides, and currents. Morphology and modification of shoreline. Protection, and restoration of coastal areas. Design of coastal and maritime structures. Coastal and maritime structures management.
5 ECTS:3-0-6

CEE 480 Wastewater Management

Constituents in wastewater, analysis and selection of wastewater flow rates and constituent loadings, process analysis, physical-chemical-biological unit operations, fundamentals of biological treatment, advanced treatment methods.
5 ECTS:3-0-6

CEE 483 Flow Transport Processes in Environmental Engineering

Fundamentals of pollutant transport mechanisms (advection, diffusion, dispersion) related to air, water and ground media. Gaussian plume dispersion models, Lagrangian diffusion, Taylor's dispersion. Air/Water Quality assessment; environmental design and mitigation strategies. Heat transfer and energy considerations for building design.
(Prerequisites: *CEE 270*)
5 ECTS:3-0-6

CEE 492 Independent Study
(Available in greek and english)

Individual study, research, or laboratory investigation under faculty supervision.
(Prerequisite: *Undergraduate advisor's approval, exchange program student status*)
5 ECTS:0-0-9

CEE 493 Independent Study
(Available in greek and english)

Individual study, research, or laboratory investigations under faculty supervision.
(Prerequisite: *Undergraduate Advisor's approval, exchange program student status*)
5 ECTS:0-0-9

CEE 494 Advanced Topics in Environmental Engineering

Advanced and contemporary topics of special interest in Environmental Engineering (Fall Term).
5 ECTS:3-0-6

CEE 495 Advanced Topics in Environmental Engineering

Advanced and contemporary topics of special interest in Environmental Engineering (Spring Term).
5 ECTS:3-0-6

CEE 496 Advanced Topics in Civil Engineering

Advanced and contemporary topics of special interest in Civil Engineering (Fall Term).
5 ECTS:3-0-6

CEE 497 Advanced Topics in Civil Engineering

Advanced and contemporary topics of special interest in Civil Engineering (Spring Term).
5 ECTS:3-0-6

Required Non-CEE Courses

These courses are offered by other Departments of the University of Cyprus and they are mandatory for fulfilling the requirements for the degree of Civil and Environmental Engineering.

First Academic Year

Fall Term

MAS 025 Mathematics for Engineers I

As shown in the undergraduate prospectus of the Department of Mathematics and Statistics.
5 ECTS

MAS 029 Elements of Linear Algebra

As shown in the undergraduate prospectus of the Department of Mathematics and Statistics.
5 ECTS

PHY 134 Physics for Engineers

As shown in the undergraduate prospectus of the Department of Physics.
5 ECTS

CS 033 Introduction to Programming Principles for Engineers

As shown in the undergraduate prospectus of the Department of Computer Science.
5 ECTS

ENG 100 General Advanced English

As shown in the undergraduate prospectus of the Department of Foreign Languages and Literatures.
5 ECTS

Spring Term

ARH 123 Technical Drawing

As shown in the undergraduate prospectus of the Department of Architecture.
5 ECTS

MAS 026 Mathematics for Engineers II

As shown in the undergraduate prospectus of the Department of Mathematics and Statistics.
5 ECTS

ENG 104 Academic English: Technical Writing

As shown in the undergraduate prospectus of the Department of Foreign Languages and Literatures.
5 ECTS

Second Academic Year

Fall Term

MAS 027 Mathematics for Engineers III

As shown in the undergraduate prospectus of the Department of Mathematics and Statistics.
5 ECTS

Third Academic Year

Spring Term

ARH 331 Building Technology

As shown in the undergraduate prospectus of the Department of Architecture.
5 ECTS

FACULTY

- Stavroula Pantazopoulou, Professor
- Panos Papanastasiou, Professor
- Michalis Petrou, Professor
- Dimos Charmpis, Associate Professor
- Symeon Christodoulou, Associate Professor
- Ioannis Ioannou, Associate Professor
- Despo Fatta-Kassinos, Associate Professor
- Petros Komodromos, Associate Professor
- Marina Neophytou, Associate Professor
- Dimitrios Loukidis, Assistant Professor
- Panayiotis Roussis, Assistant Professor
- Loukas Dimitriou, Lecturer

Curricula Vitae

Stavroula Pantazopoulou, Professor

Dr. Pantazopoulou obtained her undergraduate degree in Civil Engineering from the National Technical University of Athens and subsequently earned MSc (1982) και PhD (1987) degrees from the University of California - Berkeley. She is a member of committees of the American Concrete Institute (ACI) and of the Fédération Internationale du Béton (FIB). She has been awarded the Moisseiff Award of ASCE for significant contribution in the field of Civil Engineering. Her research interests include the mechanics of reinforced concrete, estimation of lifetime of structures, earthquake engineering, seismic assessment and retrofitting of buildings using novel materials and technologies, strengthening of reinforced concrete structures using FRPs.

Panos Papanastasiou, Professor

Undergraduate studies at the National Technical University of Athens (Diploma in Civil Engineering, 1984), graduate studies at the University of Minnesota (M.Sc, 1986 and Ph.D, 1990 in Civil Engineering). He is Professor and Head in the Department of Civil and Environmental Engineering at the University of Cyprus (associate professor from 2002 to 2006). He has worked as a Research Scientist (1991-1992), Senior Research Scientist (1992-1999) and Principal Research Scientist (1999-2002) in Schlumberger Cambridge Research in U.K. His research interests and contributions are in the area of Applied and Computational Mechanics with applications in constitutive modeling of cohesive-frictional materials, micro-mechanics, fracture mechanics, environmental geomechanics, petroleum engineering and finite element analysis. He is editorial advisor in the International Journal of Geomechanics.

Michalis Petrou, Professor

Dr. Michael F. Petrou has been an Associate Professor in the Department of Civil and Environmental Engineering at the University of Cyprus since 2004. Prior to this appointment, he worked as an assistant/associate professor at the University of South Carolina, U.S.A. and as an associate professor

at the University of Thessaly, Greece. He received a Diploma from the National Technical University of Athens, Greece in 1987 and a M.Sc. and Ph.D. from Case Western Reserve University, U.S.A. in 1991 and 1993 respectively. He has been the author/co-author of 72 research publications, including 32 refereed journal publications. He received more than $2.5 millions in research funding for a total of 25 projects. Funding sources include private, state, and federal agencies mainly from the U.S.A. such as the National Science Foundation, South Carolina Department of Transportation, Federal Highway Administration, U.S. Department of Transportation, Department of Energy, REA Construction Inc., Shaw Components Inc., Cox Wood Inc. and Westinghouse Savannah River Company. He received several awards including the A.S.E.E. Southeastern Section Outstanding Teaching Award, 2001 and the James M. Robins Excellence in Teaching Award, Chi Epsilon Southern District, 1999. He has been a member of several technical committees of the Prestressed Concrete Institute, American Concrete Institute, and Transportation Research Board. His research interests are in the general area of civil engineering materials and experimental methods, including behavior of reinforced and prestressed concrete, self-compacting concrete, high performance concrete, fiber reinforced polymer composites, high performance steel, laboratory and field testing of structures, structural modeling, and repair/strengthening of structures.

Dimos C. Charmpis, Associate Professor

He obtained a Diploma in Civil Engineering (5-year course) from National Technical University of Athens (NTUA) in Greece (1994). He also received a Master of Business Administration (MBA) from NTUA and Athens University of Economics and Business (1999). He then earned a Ph.D. degree from NTUA (2003) after completing a thesis on topics in the area of Computational Mechanics. As a postdoctoral researcher he worked together with research groups at NTUA, Technical University of Munich (Germany) and University of Innsbruck (Austria) during 2003-2005. Since August 2005 he is a Lecturer at the Department of Civil and Environmental Engineering of the University of Cyprus. His research interests cover various topics of Computational Mechanics and aim in the exploitation of innovative computing systems and numerical methods for the analysis and design of structures under static or seismic loading.

Symeon Christodoulou, Associate Professor

Undergraduate and graduate studies at Columbia University, New York City (B.Sc, 1991 on a Fulbright scholarship, M.Sc., 1993 and Ph.D., 1998). He has worked as a Civil Engineer/Project Manager for O'Brien Kreitzberg, the premier construction management firm in the U.S.A. (1995-1998), as an Assistant Professor at Polytechnic University, Brooklyn (1998 – 2003) and as an Industry Professor at Democritus University of Thrace, Xanthi (2003 – 2004). His extensive industry experience includes work on highways, buildings, airports and monorail systems in the USA. His principal research interests are in construction engineering and management, fully integrated and automated project processes, information technology, risk analysis and artificial intelligence for civil engineering and construction applications. He is the recipient of a number of research funds (including the National Science Foundation, NSF, USA), the author of several scientific publications, a recipient of an international research award (London, 1999), a reviewer of ASCE's Journal of Computing in Civil Engineering and editorial board member of the International Conference on Artificial Intelligence in Civil Engineering (Rome, 2005).

Ioannis Ioannou, Associate Professor

He received a B.Sc. (First Class) degree in Construction Management (1999) from the University of Manchester Institute of Science and Technology (UMIST) while on a Commonwealth Scholarship. He then went on to complete a Ph.D. in Building Engineering (2002) at the same university, while on a joint Overseas Research Student (ORS) and UMIST Graduate School scholarship. Prior to his appointment at the University of Cyprus he was a Research Associate at the University of Edinburgh. Dr Ioannou is an Incorporate Member of the Chartered Institute of Building (C.I.O.B.). His research

interests have a particular emphasis on studies of water movement in porous construction materials and the associated problems of material durability. His recent work included the use of synchrotron radiation energy dispersive diffraction tomography (EDD-T) in the study of salt crystallization in stones.

Despo Kassinos, Associate Professor

Undergraduate studies at the National Technical University of Athens (Diploma in Chemical Engineering, 1993), graduate studies at the University of Athens and JRC Ispra (European Association for Environmental Management and Education, MSc in Environmental Management, 1995) and at the National Technical University of Athens (PhD in Chemical Engineering, 1999). She has worked as a research scientist (1999-2003) at the School of Chemical Engineering of the National Technical University of Athens. Her principal research interests are in the field of environmental science, technology and management and in particular in the areas of environmental monitoring, water and wastewater treatment, wastewater management systems, xenobiotics in the environment and environmental risk assessment.

Petros Komodromos, Associate Professor

Undergraduate studies at the University of Patras (Civil Engineering Diploma, 1992), graduate studies at the Department of Civil and Environmental Engineering (CEE) at the University of California, Berkeley (1995-1996) and at the Massachusetts Institute of Technology (MIT) in the Department of CEE (M.S. in Structures, 1995 and Ph.D in Information Technology, 2001). Since September 2003 he joined the CEE Dept. of the University of Cyprus where he teaches structural analysis, computer-aided engineering, and software development courses. His research interests include modern earthquake resistant design, computer-aided engineering and utilization of information technology in engineering.

Marina Neophytou, Associate Professor

Undergraduate studies - BA (Honours) and MEng degrees - in Civil, Structural and Environmental Engineering at Cambridge University (UK) on a full-expense Cambridge Commonwealth Trust Scholarship (1993-97). During her undergraduate studies she has worked at the Schlumberger Cambridge Research Centre (Cambridge, UK) and Schlumberger-Dowell Research and Production Center (Paris, France) for which she has received the European Grant Award "Women in Technology". She obtained the MA and PhD degrees (2002) in the area of Environmental Fluid Mechanics from Cambridge University (UK) on academic and industrial scholarships. From 2002-2005, she has been a Post-doctoral Research Associate at Cambridge University (UK) and a Visiting Research Fellow (2002-2003) at the ICEHT/FORTH (Patras-Greece). Her principal research interests lie in the area of environmental fluid mechanics, in particular atmospheric pollution dispersion, environmental turbulence modelling, Computational Fluid Dynamics modelling at the local and urban scales, indoor air pollution, buoyancy-driven flows, building ventilation, sustainable building design.

Dimitrios Loukidis, Assistant Professor

Dimitrios Loukidis received his Diploma in Civil Engineering from the National Technical University of Athens (NTUA) in July 1999. Upon completion of his undergraduate degree, he pursued graduate studies at Purdue University in the area of geotechnical engineering, where he received his MSCE degree (December 2000) and PhD degree (May 2006). His PhD dissertation was about constitutive modeling of sands and its application to foundation engineering. After completion of his studies, he worked as a post-doctoral research associate at Purdue University (2006-2008). In January of 2009, he joined the faculty of Civil and Environmental Engineering Department of the University of Cyprus at the rank of Lecturer. His main research interests are in the areas of foundation engineering, computational geomechanics, and geotechnical earthquake engineering.

Panayiotis Roussis, Assistant Professor

Undergraduate studies at the National Technical University of Athens (Diploma in Civil Engineering, 1996) and graduate studies at Rice University, Texas (M.S., 1999) and the State University of New York at Buffalo (Ph.D., 2004). He held an appointment as a postdoctoral research associate (2004-2005) at the University at Buffalo and the Multidisciplinary Center for Earthquake Engineering Research (MCEER) in the United States. He is currently a Lecturer in the Department of Civil and Environmental Engineering at the University of Cyprus, where he teaches structural analysis, structural dynamics and earthquake engineering, and seismic-isolation and energy-dissipation systems. His research interests and contributions are in the area of earthquake engineering and structural dynamics, with a focus on seismic-isolation and energy-dissipation systems, performance-based earthquake engineering, earthquake-simulator testing and development of nonlinear dynamic analysis software.

Loukas Dimitriou, Lecturer

Dr. Loukas Dimitriou holds a Diploma in Civil Engineering from National Technical University of Athens (NTUA) and a Ph.D. from Dept. of Transportation Planning and Engineering, NTUA. For the period 2011-2013 he was appointed Assistant Professor at King Saud University, School of Civil Engineering, Prince Mohamed bin Naif Chair for Traffic Safety Research, Riyadh, Saudi Arabia. From 2014 he is appointed as Lecturer, in the Dept. of Civil and Environmental Engineering, University of Cyprus, Nicosia, Cyprus. His academic and professional activities relates to the design and analysis of civil and transportation infrastructure, the use of advanced methods and techniques for optimizing systems' design and performance and in developing frameworks for supporting decisions in his fields.