IV GRADUATE COURSES OFFERED IN THE DEPARTMENT OF CIVIL ENGINEERING

GENERAL COURSES

CIVL500 MS Thesis
The MS thesis should present the results of scholarly investigation of a topic related with one of the fields of Civil Engineering.

CIVL502 Civil Systems Engineering

CIVL598 Graduate Seminar
To provide basic knowledge about the research and other activities related with MS Thesis. It includes a schedule of invited speakers on infrastructure-related to MS studies.

CIVL600 PhD Thesis
The PhD thesis should demonstrate the student's ability to address a significant research problem in the field of Civil Engineering, and arrive at a successful resolution of the problem. A PhD thesis must give evidence of at least one of the following qualities: (a) a new scientific approach or innovation, (b) the development of a new scientific method, (c) the application of a known method to a new field.

CIVL699 PhD Qualifying Examination
The qualifying examination is intended to test the student’s understanding of basic courses at the undergraduate and graduate levels, as well as his/her capability to perform research on a specified thesis topic. It consists of two parts: a two-session written examination (general and specialty), and an oral examination.

CIVIL ENGINEERING MATERIALS

CIVL582 Creep and Shrinkage of Concrete

CIVL583 Fiber Reinforced Concrete
Concept of FRC. Fiber types. Physical and chemical properties of fibers. Properties of freshly mixed and hardened fiber reinforced concrete. Mix proportioning of FRC. Mechanical properties of FRC and high strength FRC. Cost and economical benefits of FRC.

CIVL585 Concrete Construction

CIVL586 Chemical Admixtures for Concrete

CIVL587 Cement Replacement Materials

CIVL588 Durability of Building Materials

CIVL589 High Strength Concrete
Historical review and materials used. Concrete mix design calculations for HSC. Properties of fresh and hardened concrete. Mechanical properties of hardened concrete. Durability of HSC. Quality assurance and quality control. HSC structures and economical considerations.

CONSTRUCTION TECHNOLOGY & MANAGEMENT

CIVL591 Construction Management 1
This course aims to provide graduate students with the necessary information related to project management in the construction industry, which will help them in their professional careers. It covers the topics such as advanced construction planning and scheduling, resource management and construction progress control such as, cost and time, as well as quality management and quality control.

CIVL592 Construction Management 2
This course aims to provide graduate students with the information and practices in project appraisal, life cycle costing, value management and environmental management. This course covers a wide range of subjects that are required in the daily operations in the construction industry. Students will gain valuable experience through different types of projects which will require the application of life cycle costing methods, value management, environmental appraisal and management and an overall project appraisal.

CIVL593 Risk Management in Construction Projects
This course aims to provide an overview of what is meant by risk and way in which it influences decisions made in the construction industry. It should provide graduate students with the necessary systems and techniques used in management of risk on construction projects as well as the whole construction industry. This course also covers the theoretical aspects of risks as well as the application of risk to real life projects.

CIVL599 Occupational Health Safety and Management in Construction
This course aims to provide graduate students with the necessary information related to Safety and health management in the construction industry, which will help them in their professional careers. Safety and health management. Development of the safety and health function. Information systems. Process safety and disaster preparedness. Building and facilities. Personal protection. Fire protection. Materials handling and storage.
CIVL595 Contract Administration
This course aims to provide graduate students with the knowledge of contract administration and how contracts in the industry function. This course covers topics such as different contracting arrangements in the construction industry, fundamentals of contracts, significance of different forms of organization, different types of bonds, how contracts are awarded and how payment of contracts is performed.

CIVL596 Construction Technology 1
This course aims to provide graduate students with the necessary information related to Construction Technology in the construction industry, which will help them in their professional careers. Site work. Excavation equipments. Rock excavation. Protection of excavation. Lifting equipments. Transporting equipments. Soil compacting equipments. Masonry construction, and concrete construction.

CIVL597 Construction Technology 2
This course aims to provide graduate students with the necessary information related to Construction Technology in the construction industry, which will help them in their professional careers. Formworks technology, formwork design. Scaffolding system, scaffolding design, Foundation construction. Demolition & recycling. Compressed air system. Wood construction and dewatering technology.

GEOTECHNICAL ENGINEERING

CIVL550 Special Topics in Geotechnical Engineering
Advanced topics of special interest to graduate students on recent developments in geotechnical engineering. Specific topics and prerequisites identified for each section and varied from term to term.

CIVL551 Advanced Soil Mechanics

CIVL552 Geotechnical Earthquake Engineering

CIVL553 Soil Behaviour

CIVL554 Advanced Soil Stabilization
Introduction to engineering ground modification and some problematic soils. Site exploration and characterization. Field reconnaissance, surface and subsurface exploration. Classification

CIVL555 Expansive Soils

CIVL556 Measurement of Shear Strength of Soils

CIVL557 Mechanics of Unsaturated Soils

CIVL558 Applications of Geosynthetics in Civil Engineering
Physical, mechanical, chemical, biological, and endurance properties of geosynthetics including geotextiles, geogrids, geonets, geomembranes, geopipes and geocomposites. Standard testing methods for geosynthetics. Application and design procedures for the purposes of separation, reinforcement, stabilization, filtration, drainage and containment of solids and liquids.

CIVL559 Computational Methods in Geotechnical Engineering
Constitutive modeling for geomaterials. Finite element implementation of constitutive models, and coupled solid-fluid mechanical governing equations for inelastic porous media. Transient and steady state conditions. Geotechnical, geological, structural, and other related modern engineering problems. Analysis of engineering works using state of practice software to provide insight into geotechnical design and the performance of constructed facilities. Use of finite element software program for implementation and analysis.

CIVL651 Advanced Geotechnical Engineering I
Geotechnical site investigation methods and in situ tests used to estimate engineering parameters. In situ test methods: standard penetration test, cone penetration with and without pore pressure measurements (CPTU and CPT), self-boring and cone pressuremeters (SBPMT and CPMT), flat dilatometers (DMT) and field vane shear test. Correlations of strength and
stiffness properties, in situ state parameters, consolidation coefficients, stress history, and other parameters. Bearing capacity of shallow and deep foundations. Settlements of shallow and deep foundations leading to structural damage. Soil-structure interaction models using finite element based softwares. Design procedures and construction considerations for shallow and deep foundation systems.

HYDRAULICS ENGINEERING

CIVL530 Special Topics in Hydraulics
A hydraulic branch course offered to any graduate student related mainly to his/her thesis topic.

CIVL531 Groundwater Engineering
Occurrence of groundwater, techniques and methods in groundwater investigations, groundwater hydraulics, aquifer analysis, techniques and methods in groundwater extraction, groundwater contamination.

CIVL532 Applied Hydrology
System approach in hydrology, hydrologic modelling, probabilistic methods in hydrology, stochastic hydrology, synthetic flow generation, remote sensing techniques in hydrology, isotope techniques in hydrology.

CIVL533 Irrigation and Drainage Engineering
Soil and water types, reclamation of saline and alkali soils, land classification, types of drainage, drainage structures, design of drainage systems, irrigation practices, types of irrigation and their requirements, moisture in soil and crop water requirements, design of irrigation systems, economic evaluation, operation and maintenance of irrigation systems.

CIVL534 Hydropower Engineering
Fundamental of hydropower engineering; power in flowing water, hydropower potential, types of hydropower schemes, types of power stations, transmission of power by pipelines. Planning of hydropower schemes. Appurtenances for hydropower plants; intakes, canals and tunnels, head ponds, surge tanks, penstocks. Power house; classification, substructures, superstructures. Water turbines; historical background, velocity diagram, turbine constants, types of turbines, selection of turbines, cavitation and setting of turbines.

CIVL536 Coastal Hydraulics
The coast and coastal processes, short-period waves (wind waves), wave climate, waves in coastal region, long-period waves (tides and tsunamis), coastal currents and storm surges, the interaction between waves and structures, coastal sediments problems, coastal pollution and control.

CIVL537 Advanced Sediment Transport
Introduction; properties of sediment; incipient motion of a sediment particle; fall velocity; bedforms mechanics and resistance laws (ripples, dunes and anti-dunes); bed load, suspended load and total load theories and calculations; regime concept and stable channel design (the design of erodable channels); settling basin types and intake structures; scour criteria, isotope techniques in sediment transport studies. Sediment transport under wave action.
CIVL538 Design of Coastal and Harbour Structures
Types and functions of coastal and harbour structures, wave forces on coastal and harbor structures, principles of coastal sediment transport, coastal erosion and deposition, coastal pollution and pollutant transport processes in coastal waters, design of coastal defense structures and seawalls, design of breakwaters, design of quay walls, design of turning basin and approach channel, design procedures of marine outfalls.

STRUCTURAL ENGINEERING

CIVL512 Stability of Systems

CIVL543 Finite Element Method

CIVL544 Advanced Topics in Steel Structures
Introduction to Limit State Design of structural elements. Initial sizing, analysis and design of single-storey and multi-storey buildings. Structural behaviour and practical aspects of connections, including semi-rigid connections. Understanding the behaviour and design of members that are subject to combined bending and torsion.

CIVL547 Structural Reliability

CIVL548 Matrix Methods in Structural Analysis

CIVL573 Assessment, Repair and Strengthening of Structures
Introduction to assessment of structures. Destructive and non-destructive tests on RC, Steel and masonry constructions. Repair and strengthening techniques of RC structures.
Strengthening of beams, columns and walls. Repair and Strengthening of other types of constructions.

**CIVL574 Connections in Steel Structures**

**CIVL575 Sustainability of Building Construction**

**CIVL577 Seismic Performance Assessment of Buildings**

**TRANSPORTATION ENGINEERING**

**CIVL561 Pavement Design**

**CIVL562 Bituminous Materials and Mix Design**

**CIVL563 Special Topics in Traffic Engineering**

**CIVL564 Special Topics in Transportation Engineering-Road Safety**

CIVL565 Pavement Management Systems

CIVL567 Computer Applications in Transportation Engineering
Multi-layered elastic theory, stress, strain and deflection analysis in flexible and rigid pavements. Thickness design of various pavement types for highways, streets, parking lots, and industrial areas. Westergaard’s edge and interior loading models for airport pavements. Design of asphalt concrete and Portland cement concrete pavements for airports. Analysis of asphalt mixtures for pavement surface courses.

CIVL569 Airport Engineering

V. LIST OF ACADEMIC STAFF & THEIR RESEARCH INTERESTS

<table>
<thead>
<tr>
<th>Name Surname</th>
<th>Title</th>
<th>e-mail (@emu.edu.tr)</th>
<th>Field</th>
<th>Research Interests</th>
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<tbody>
<tr>
<td>BILSEL, Huriye</td>
<td>Assist. Prof.</td>
<td>huriye.bilsel</td>
<td>Geotechnical Engineering</td>
<td>Mechanics of unsaturated soils, geo-environmental engineering, geotechnical earthquake engineering</td>
</tr>
<tr>
<td>ÇELIK, Tahir</td>
<td>Prof.</td>
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<td>Construction Technology &amp; Management</td>
<td>Life cycle cost, data warehouse, expert systems.</td>
</tr>
<tr>
<td>ÇELİKAĞ, Mürüde</td>
<td>Assist. Prof.</td>
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<td>Structural Engineering</td>
<td>Behavior of steel reduced beam web (RBW) connections, Maintenance, Repair and Sustainability in building construction, optimization of trusses</td>
</tr>
<tr>
<td>ERGİL, Mustafa</td>
<td>Assoc. Prof.</td>
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<td>Hydraulics Engineering</td>
<td>Groundwater and contamination, sediment transport, basin hydrology.</td>
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<td>KUNT, Mehmet Metin</td>
<td>Assist. Prof.</td>
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<td>Transportation Engineering</td>
<td>Pavement design analysis and management, traffic accident research, geographic information systems and network analysis.</td>
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<td>OZAY, Giray</td>
<td>Assist. Prof.</td>
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<td>Structural Engineering</td>
<td>Structural dynamics, defects deterioration and strengthening in buildings, historical buildings and their analysis.</td>
</tr>
<tr>
<td>Name</td>
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<td>Department</td>
<td>Research Area</td>
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<tr>
<td>SEZAI, Zalihe</td>
<td>Assoc. Prof.</td>
<td>zalihe.nalbantoglu</td>
<td>Geotechnical</td>
<td>Problematic soils, ground modification techniques, contaminated soils.</td>
</tr>
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<td>SOYER, Erdinç</td>
<td>Assist. Prof.</td>
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<td>Structural</td>
<td>Finite element force method, structural dynamics, finite element analysis.</td>
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<tr>
<td>SENSOY, Serhan</td>
<td>Assist. Prof.</td>
<td>serhan.sensoy</td>
<td>Structural</td>
<td>Earthquake performance assessment of structures, stability of systems, nonlinear dynamics.</td>
</tr>
<tr>
<td>TURKER, Umut</td>
<td>Assist. Prof.</td>
<td>umut.turker</td>
<td>Hydraulics</td>
<td>Coastal erosion and beach profiles, Coastal vegetation hydraulics, GIS applications, Groundwater analysis and modeling</td>
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