

Contents

SEMESTER 1:

ATA 111 - History of Turkish Revolution I

CE 101 – Introduction to Civil Engineering

CHM 103 – Chemistry

MATH 113 – Mathematics I

PHYS 113 - Physics I

TRD 111 - Turkish I

Foreign Language Elective

SEMESTER 2:

ATA 112 - History of Turkish Revolution II

CE 102 – Statics

CLP 001 – Career and Life Planning

MATH 114 - Mathematics II

PHYS 114 - Physics II

TRD 112 - Turkish II

Foreign Language Elective

SEMESTER 3

CE 201 - Strength of Materials I

CE 205 – Materials Science

CE 217 – Dynamics

CE 221 – Introduction to Programming

MATH 215 – Mathematics III

ME 201 – Computer Aided Technical Drawing

SEMESTER 4

CE 204 - Fluid Mechanics CE

206 – Building Materials

CE 210- Strength of Materials II

CE 228 – Surveying

MATH 216 – Mathematics IV

MATH 265 - Probability and Statistics I

Departmental Elective

SEMESTER 5

CE 303 – Soil Mechanics I
CE 311 - Hydraulics
CE 315 – Earthwork and Railway Construction
319 - Theory of Structures I
CE 405 – Steel Structures
MATH 220 – Numerical Methods
Departmental Elective

SEMESTER 6

CE 302 - Hydrology
CE 304 – Soil Mechanics II
CE 306 - Highway Engineering
CE 320 - Theory of Structures II
CE 340 - Reinforced Concrete I
MATH 266 – Probability and Statistics II

SEMESTER 7

BBA 222 – Entrepreneurship Applications
CE 435 – Design of Reinforced Concrete Structures
CE 443 – Foundation Engineering
CE 447 – Reinforced Concrete II
CE 497 – Civil Engineering Design
IE 367 – Occupational Health and Safety
Departmental Elective

SEMESTER 8

CE 498 – Civil Engineering Graduation Project
Faculty Elective
University Elective
University Elective
Departmental Electives

CE 203 – Engineering Geology
CE 307 – Construction Engineering and Management
CE 312 - Computer Aided Structural Modelling and Analysis
CE 316 – Fundamentals of Traffic Engineering
CE 321 – Advanced Materials Technology

- CE 323 – Composite Materials
- CE 403 - Water Supply and Sewage Systems
- CE 407 - Water Resources Engineering
- CE 417 – Soil Mechanics III
- CE 419 – Groundwater Hydraulics
- CE 420 - Environmental Sanitation
- CE 421 – Rock Blasting Technology
- CE 425 – Special Concretes
- CE 433 – Concrete Technology
- CE 434 – Earthquake Resistant Design and Performance Evaluation
- CE 451 – Coastal and Harbour Structures
- CE 454 – Water Power
- CE 456 – Risk Management in Construction
- CE 458 – Construction Project Management
- CE 460 – Irrigation and Drainage
- CE 462 – Prestressed Concrete
- CE 466 – Open Channel Flow
- CE 468 – Reinforced Concrete Project Design
- CE 470 – Energy Efficiency Applications in Buildings
- CE 472 – Durability of Concrete
- CE 474 – Admixtures for Concrete
- CE 481 – Hazardous Waste Management
- CE 492 – Civil Engineering O’COOP 1
- CE 494 – Civil Engineering O’COOP 2
- CE 496 – Civil Engineering O’COOP 3

SEMESTER 1:

ATA 111 - History of Turkish Revolution I (2+0):

This course covers the analysis of the causes and the consequences of the First World War; the searches for independence of the Turkish nation in Anatolia and salvation of the Turkish lands that were occupied after the Armistice of Montrose; the development and activities of Nationalist militias and the societies against them; the evaluation of the congress administrations that were formed after 19 May, 1919 in terms of their form and content; the structure of the Grand National Assembly and the process through which it gained legitimacy; the leadership of Turkish War of Independence; Treaty of Lausanne, and the Establishment of the Republic.

CE 101 – Introduction to Civil Engineering (3+0):

Introduction to Civil Engineering and its areas, Structural Engineering, Geotechnical Engineering, Earthquake Engineering, Transportation Engineering, Hydraulic Engineering, Introduction to structures and Structures materials, Project Management and construction project participants, Workplace Etiquette, Ethics in Engineering business, The Use of Computers in Civil Engineering, Learning the Basics of Microsoft Word, Writing Techniques, Learning the Basics of Microsoft Excel, Learning the Basics of Microsoft Powerpoint, Creating an Effective Powerpoint Presentation, Team presentations.

CHM 103 – Chemistry (3+0):

Properties of Matter, Fundamental Laws Of Chemistry, The Atomic Theory, Electron configuration, The concept of the mole, The Periodic Table, Chemical Compounds, Thermochemistry-enthalpy-entropy, internal energy, Solutions and their physical properties, Chemical Kinetics-Determination of the rate of reaction, Chemical equilibrium, Acids and Bases, Electrochemistry, Batteries and Electrolysis, Redox reactions

MATH 113 – Mathematics I (3+2):

Functions and Their Graphs, Combining Functions; Shifting and Scaling Graphs, Trigonometric Functions. Rates of Change and Tangents to Curves, Limit of a Function and Limit Laws, The Precise Definition of a Limit, One-Sided Limits, Continuity, Limits Involving Infinity; Asymptotes of Graphs. Tangents and the Derivative at a Point, The Derivative as a Function, Differentiation Rules, The Derivative as a Rate of Change, Derivatives of Trigonometric Functions, The Chain Rule, Implicit Differentiation, Related Rates, Linearization and Differentials. Extreme Values of Functions, The Mean Value Theorem, Monotonic Functions and the First Derivative Test, Concavity and Curve Sketching, Applied Optimization, Antiderivatives. Area and Estimating with Finite Sums, Sigma Notation and Limits of Finite Sums, The Definite Integral, The Fundamental Theorem of Calculus, Indefinite Integrals and the Substitution Method, Substitution and Area Between Curves, Volumes Using Cross-Sections, Volumes Using Cylindrical Shells, Arc Length, Areas of Surfaces of Revolution. Inverse Functions and Their Derivatives, Natural Logarithms, Exponential Functions, Indeterminate Forms and L'Hopital's Rule, Inverse Trigonometric Functions, Hyperbolic Functions.

PHYS 113 - Physics I (2+2):

Vectors. Kinematics. Newton's Law of Motion. Work and energy. Conservation of energy. Linear momentum and its conservation. Rotation of rigid bodies about a fixed axis. Rotational kinetic energy.

TRD 111 - Turkish I (2+0):

What is language? Importance of language and its place in a nation's life, language-culture relationship. Definition of grammar, function of grammar and departments of grammar. Phonetics: sounds and audio features of Turkish. Morphology; formal properties of Turkish (roots-adds). Words and word phrases. General information about composition, subject, perspective, ideas, main and ancillary ideas, paragraphs, intellectual order. Written expression, paragraph, the content and types (entrance, development and conclusion paragraphs). Expression forms, explanatory, descriptive, argumentative, narrative expression. Written expression; petition writing, quoting, footnotes and bibliography writing. Oral expression; speech and speech types (prepared speeches, panel, and discussion policies). Literary types; artistic (poetry, short stories, novels, theater and intellectual (articles, paragraphs, essays, criticism, interviews...)). Reading and studying the works that about literature and idea world. Analyzing an editing text (story, novel, theater).

Foreign Language Elective (2+2)

Every semester various foreign language classes (i.e. German, Russian, Chinese, Arabic, and advance English) offered at the university. Students can select the language of interest.

SEMESTER 2:

ATA 112 - History of Turkish Revolution II (2+0):

Lausanne Peace Treaty resulting success that is being converted to a modern state via announcement of Republic, and being gained to this state a modern, convenient to development identity, and placing Atatürk's Thought System to the memories precisely by the following revolutions of this process, so that our young people are made conscious and durable against to the threats to their personalities and to their countries.

CE 102 – Statics (3+0):

Definition and classification of mechanics. Principles of statics. System of planar forces, constraints of planar bodies and computation of constraint. Gerber beams. Systems of three hinges. Plane trusses. Cables. Space system of forces. Central axis. Parallel forces in space. A static equilibrium. Center of gravity. Constraints in space. Spatial trusses. Principle of virtual work. Friction.

CLP 001 – Career and Life Planning (0+2):

Professional and personal development, seminars, workshops, specialized certification programs, industry and business-field demonstrations, meetings with professionals, on-site training sessions,

social-sporting events.

MATH 114 - Mathematics II (3+2):

Integration by Parts, Trigonometric Integrals, Trigonometric Substitutions, Integration of Rational Functions by Partial Fractions, Improper Integrals. Sequences, Infinite Series, The Integral Test, Comparison Tests, The Ratio and Root Tests, Alternating Series, Absolute and Conditional Convergence, Power Series, Taylor and Maclaurin Series, Convergence of Taylor Series. Three-Dimensional Coordinate Systems, Vectors, The Dot Product, The Cross Product, Lines and Planes in Space, Cylinders and Quadric Surfaces. Functions of Several Variables, Limits and Continuity in Higher Dimensions, Partial Derivatives, The Chain Rule, Directional Derivatives and Gradient Vectors, Tangent Planes and Differentials, Extreme Values and Saddle Points, Lagrange Multipliers. Double and Iterated Integrals over Rectangles, Double Integrals over General Regions, Area by Double Integration, Double Integrals in Polar Form, Triple Integrals in Rectangular Coordinates, Triple Integrals in Cylindrical and Spherical Coordinates, Substitutions in Multiple Integrals.

PHYS 114 - Physics II (2+2):

Charge and matter. The electric field. Gauss' Law. Electrostatic potential. Capacitance. Current and resistance. Electromotive force and circuits. RC circuits. The magnetic field. Ampère's law. Faraday's Law of Inductance.

TRD 112 - Turkish II (2+0):

The place of Turkish language among the world languages, alphabets that Turks are used. The historical development of Turkish language, dialects of Turkish language. Turkish's syntax features, sentence analysis studies. Etymology, Semantics I (basic meanings, connotations) and Sense Events (meaning contraction, meaning expansion, meaning shift), Words' meaning relationship. Semantics II, metaphors, transfers (name transfer, phrase transfer) words, idioms, proverbs, slogans and terms. Expression (language) mistakes and applications. Oral expression, speech and speech types (panel, discussion principles). Written expression; business letters, minutes, report and news writing techniques. Ways to improve thinking in the paragraph, identification, sampling, comparison, utilization of numerical data, producing a witness. Literary types; artistic(poetry, short stories, novels, theater) and intellectual (articles, paragraphs, anecdotes, essays, criticism, travel, biography, memoirs, letter...) Reading and studying the selected sample texts from the literature and idea world. Reviewing a scientific text.

Foreign Language Elective (2+2)

Every semester various foreign language classes (i.e. German, Russian, Chinese, Arabic, and advance English) offered at the university. Students can select the language of interest.

SEMESTER 3

CE 201 - Strength of Materials I (3+0):

Definition and principles of statics, planar forces, supports on the plane, trusses, cables, friction, forces in the space. Definition of the strength of materials and its principles, stress, deformation and strains, stress - strain relations, strength hypotheses, internal forces in the bars and diagrams, normal force, simple shear, torsion of the circular sections, moments of inertia, simple and nonsymmetric bendings, bending with shear, elastic curve, combined loadings.

CE 205 – Materials Science (3+0):

Introduction to materials science and engineering, classification of materials. Atomic structure and interatomic bonding: ionic bonding, covalent bonding, metallic bonding, Van der Waals bond. The structure of crystalline solids: crystal structures, crystallographic points, directions and planes, crystalline and noncrystalline materials. Imperfections in solids: point defects, miscellaneous imperfection. Diffusion. Mechanical properties of metals: tensile test, stress-strain relations, brittle behavior, ductile behavior, shear effect, hardness. Dislocations and strengthening mechanisms: recovery, re-crystallization and grain growth. Failure: ductile fracture, brittle fracture, fatigue, creep. Phase diagrams.

CE217 – Dynamics (3+0):

Introduce the principles of engineering mechanics and their applications in the design and analysis of mechanical systems. Determine the kinematic parameters, position, velocity, and acceleration of a moving object. Understand the difference between velocity, acceleration, angular velocity and angular acceleration. Represent a mechanical system using free body diagrams. Understand how unbalanced forces lead to the movement of objects that can be treated as particles, and analyze the basic aspects of this process. Determine unbalanced forces and kinematic parameters of mechanical systems by using the principles of mechanics. Analyze basic aspects of motion of rigid bodies consisting of connected links, rollers, pins and sliders. Understand how unbalanced forces lead to the movement of the center of mass of rigid bodies, and analyze the basic aspects of this process. Analyze the basic aspects of how this leads to the spinning, rotation of rigid bodies.

CE221 – Introduction to Programming (2+2):

Introduction to Python Programming, Introduction to Program Computing Environment, Variables, Operations and Simple Plot, Arithmetic and Logic Operators, Introduction to Algorithms, Flow Control, Functions, Arrays, Solving of Simple Equations, Midterm exam, Examples of Polynomials, Errors and Source of Errors, Basic Plots, Advanced I/O, File Operations, SciPy/NumPy Libraries, Basic Linear Algebra

MATH 215 – Mathematics III (2+2):

Systems of linear equations; Solution sets of linear equations; Linear dependence and independence; Matrix Algebra; Inverse of a matrix and its characterization; Partitioned matrices; Determinants and their properties: Calculation of determinants; Column and row expansions; Minor and cofactors and inverse matrix; Cramer's rule; Vector spaces: Subspaces, null spaces and column spaces (Image); Basis and coordinate transformations; Linear transformations and their representations; Representation of coordinate transformation; Eigenvalues and eigenvectors : Characteristic polynomial and Cayley-

Hamilton Theorem; Diagonalization of linear transformations and matrices; Matrix polynomials; Diagonalization of symmetric matrices and projections; Generalized eigenvectors and eigenspaces; Inner product spaces : Orthonormal sets, Gram-Schmidt process; Singular value decomposition; Pseudo inverse; Least squares

ME 201 – Computer Aided Technical Drawing (2+2):

Introduction to computer aided technical drawing. Geometrical constructions. Principles of orthographic projection; projection of principal views from three dimensional models. Drawing techniques for basic manufacturing processes and standard features. Projection of third principal view from two given principal views; free hand drawing techniques. Three dimensional drawing techniques; simple shapes, inclined surfaces, skew surfaces. Principles of dimensioning. Principles of sectioning; full and half sections. Further work on sectioning, conventional practices. Solid Drawing

SEMESTER 4

CE 204 - Fluid Mechanics (3+0):

Introduction: Liquids and gases, the continuum assumption, dimensions and units. Fluid Properties: Compressibility, viscosity, surface tension, vapor pressure. Fluid Statics: Pressure variation with elevation, forces on plane surfaces, forces on curved surfaces, buoyancy, stability of immersed and floating bodies. Kinematics of Fluids: Euler's and Bernoulli's equation, rotation and vorticity. Control Volume Approach: The continuity equation, cavitation. Momentum Equation: Common applications, Navier-Stokes equation. Flow in Conduits: Laminar and turbulent flow. Flow Measurements: Measuring velocity, pressure, and flow rate. Drag and Lift: Terminal velocity. Dimensional Analysis and Similitude.

CE 206 – Building Materials (3+0):

Steel; advantages and disadvantages, classifications with respect to phases and carbon content, quenching, annealing, tempering, structural steels, corrosion, Aluminum, Aggregates; aggregate types, physical and mechanical properties, granulometry, deleterious substances, Portland Cement; hydration, physical and mechanical properties of cement, cement types, Mixing Water, Admixtures; chemical and mineral admixtures, Concrete; properties of fresh and hardened concrete, concrete production, durability, compressive strength formulas, mix design, special concretes, Masonry, Asphalt Binders and Mixtures, Wood, Composites.

CE 210- Strength of Materials II (3+0):

Bending with shear. The shear center. The shear center of thin walled sections. Elastic curve for symmetrical cross-sections. Study of elastic curve by various methods. Effect of shear on the elastic curve. Axial force with bending. Materials not resistant to tension. Bending with torsion. Energy methods. Theorem of virtual work. Theorems of Betti and Castigliano. Minimum principles. Elastic stability. Euler cases. Buckling beyond the elastic limit, method of omega multiplier, approximate methods, Rayleigh ratio.

CE 228 - Surveying (2+2):

Introduction, the shape of the earth and model surfaces for earth, units of measurements. Errors and error propagation. Weight concept. Maps and applications. Horizontal control surveys: Distance and horizontal angle measurements. Point positioning, triangulation, trilateration, traversing. Vertical control surveys: Differential leveling and trigonometric leveling. Area, volume and slope computation.

MATH 216 – Mathematics IV (2+2):

Introduction and Classification of Differential Equations; First Order Differential Equations: Solution of Separable and Linear Differential Equations; Substitution Methods and Exact Differential Equations; Order reduction; Higher Order Differential. Equations: Linear, homogeneous Equations with Constant Coefficients; Nonhomogeneous Equations and Method of Undetermined Coefficients; Method of Variation of Parameters; Laplace Transform: Solution of initial value problems; Linear Systems of Differential Equations; Homogeneous Differential equations in R^2 ; Solution via eigenvalues and eigenvectors; Homogeneous Differential equations in R^3 ; Matrix exponential and Fundamental matrix solution; Solution of Nonhomogeneous Equations; Laplace transform methods; Power Series Method: Series Solution Near Ordinary Points; Regular Singular Points; Method of Frobenius

MATH 265 - Probability and Statistics I (3+0):

Set Theory, Random Variable, Sample Space, Important Theorems on Probability, Conditional Probability, Bayes' Theorem, Tree Diagrams, Permutations, Combinations, Binomial Coefficients, Stirlings Approximation, Discrete and Continuous Probability Distributions, Mathematical Expectation, Variance and Standard Deviation, Joint Distributions, Normal, Binomial, Poisson, Multinomial, Hypergeometric etc. Distributions

SEMESTER 5

CE 303 – Soil Mechanics I (3+0):

Introduction to Geotechnical Engineering, Rock Cycle and the Origin of Soil, Soil-Particle Size, Clay Minerals, Specific Gravity, Weight-Volume relationships, phase diagrams, Plasticity and Structure of Soil, Classification of Soil, General principles of soil compaction, field compaction, Permeability, Bernoulli's Equation, Darcy's Law, Laplace's Equation of Continuity, flow nets, Seepage calculation from a flow net, In-Situ Stresses, Stresses in a Soil Mass, stress increase due to loading, fundamentals of consolidation, one-dimensional laboratory consolidation test. Laboratory sections of the class includes grain size distribution (Sieve and Hydrometer Analyses), moisture content, specific gravity, Atterberg Limits (Liquid Limit and Plastic Limit), standard proctor, sand cone, constant and falling head permeability, and incremental loading Consolidation tests.

CE 311 - Hydraulics (3+0):

Water Flow in Pipes: Forces in pipe flow, energy in pipe flow, friction head loss-discharge relationships, types of local head losses. Pipelines and Pipe Networks: Pipelines connecting two reservoirs, Hardy-Cross method, water hammer phenomenon in pipelines. Water Pumps: Centrifugal, propeller, jet type of pumps, pumps in parallel or in series. Water Flow in Open Channels: Flow classifications, uniform flow in open channels, energy principles, hydraulic jumps, gradually varied flow, hydraulic design of open channels.

CE 315 – Earthwork and Railway Construction (3+0):

Introduction to earthworks. Volumes of fills and cuts. Mass diagram. Optimization of earth moving. Excavation methods and machines. Excavators and dampers. Introduction to railroad engineering. Train dynamics. Geometric standards of track. Gradients, curves, transition curves, location of track, superstructure elements and materials. Layout of track.

CE 319 - Theory of Structures I (3+0):

General concepts. Analysis of statically determinate structures. Determination of internal forces, internal force diagrams. Analysis for moving loads: influence lines. Analysis of basic statically determinate systems: multi-span compound systems, three-hinged frames and arches, trusses. Principle of Virtual Work. Computation of deformations and displacements for statically determinate structures.

CE 405 - Steel Structures I (3+0):

Historical development of steel structure, advantage and disadvantage of steel usage in structural design, application areas of steel products. Properties of structural steel and general information about steel design procedures. Reliability, loads and load combinations. Connections, connecting members, riveted, bolted, welded connections and related design principals. Tension member design, its splice and employment principles in structural system. Design principles for compression members including built-up compression members and batten plates, lacing members design. Design procedures for beam-columns. Design principals of roof truss, purlins and stability bracing systems. Design procedure for beams having rolled and built-up rolled cross sections, design rules for their splice, bi-axial bending, procedures for lateral buckling control.

MATH 220 – Numerical Methods (2+2):

Introduction to basic concepts in numerical analysis, A brief review of numerical methods and application areas, Mathematical preliminaries, error analysis, Numerical errors, Taylor's theorem, Root Finding Methods, Solutions of the systems of linear equations, Curve Fitting Methods, Numerical Differentiation and Integration, Numerical Solutions of the Ordinary Differential Equations, Numerical Solutions of the Ordinary Differential Equations

SEMESTER 6

CE 302 - Hydrology (3+0):

Introduction. Precipitation. Evaporation. Infiltration. Groundwater. Stream flow measurement and analysis of data. Surface flow. Hydrograph analysis. Application of probability theory and statistics in hydrology.

CE 304 – Soil Mechanics II (3+0):

Shear strength of soil, laboratory determination of shear strength (direct shear and triaxial strength tests), in-situ determination of shear strength (borehole shear and vane shear tests), CD, CU, UU tests, lateral earth pressure: at-rest, active and passive pressures, Rankine's and Coulomb's Theories, lateral earth pressure: curved failure surface, bracing systems, slope stability, factor of safety, finite and infinite slopes, stability analysis by method of slices, steady state and rapid drawdown stability analysis, Introduction to soil bearing capacity, landfill liners and geosynthetics: geotextiles, geomembranes, geogrids and geonets, Planning subsurface soil explorations, boring and sampling methods, soil exploration report.

CE 306 - Highway Engineering (3+0):

Basic concept in highway engineering. Characteristics of driver-pedestrian-vehicles. General properties of highway traffic. Geometric standards and design traffic of highways. Highway capacity. Highway location and horizontal alignment. Vertical alignment and curves. Horizontal curves. Urban roads. Intersection control and design. Soil engineering for highway design. Drainage.

CE 320 - Theory of Structures II (3+0):

Analysis of statically indeterminate structures by force (energy) method under dead and live loads, temperature changes and support settlements. Computation of displacements by virtual work principle. Reduction theorem. Systems with elastic supports and connections. Analysis for moving loads, influence lines. Analysis of structures for most unfavourable loading conditions. Analysis of systems by displacement methods: slope-deflection and moment distribution method for the systems without joint translations. Slope-deflection equations for the frames with joint translations.

CE 340 - Reinforced Concrete I (3+0):

Reinforced concrete members. Concrete, reinforcing steel. Mechanical properties of concrete and steel. Mechanism of bond transfer. Development of anchorage and splicing of reinforcement. Loads and load effects. Structural failure providing safety in reinforced concrete. Material factors. The load factors. Load groups. Mechanics of reinforced concrete beam. Under-over reinforced beam. Balanced beam. Ultimate strength design. Analysis of reinforced concrete beams. Analysis of flanged beams. Column capacity. Eccentrically loaded columns. Column interaction diagram. Bi-axially loaded columns. Tied

and spiral columns. Diagonal tension failure of beam without stirrup. Load transfer in a cracked beam. Shear reinforcement. Shear design procedures. Behavior of reinforced concrete members subjected to torsion. Design for torsion. Shear and moment. Analysis and design of slender columns. Determination of moment magnification factor. Elastic design assumptions. Elastic analysis of beams with rectangular cross-sections. Frames, beam-column joints. Redistribution. General construction knowledge.

MATH 266 – Probability and Statistics II (3+0):

Normal and Uniform Distribution, Extreme Value Distributions, Sampling Distributions, Exact Sampling Distributions, Statistical Hypothesis Testing, Hypothesis Tests for Parameters, Hypothesis Tests for Probability Distributions, Hypothesis Test for Independence, Regression Analysis, Simple Linear Regression Analysis, Multivariate Regression Analysis, Other Correlation Coefficients

SEMESTER 7

BBA 222 – Entrepreneurship (2+0):

Principals of entrepreneurship, Strategic management for entrepreneurship, creativity, human resources management and communication for entrepreneurs, Business Planning, Entrepreneurship in Turkey / Success stories.

CE 435 – Design of Reinforced Concrete Structures (1+2):

Giving project data, Formwork plan drawing, Slab preliminary dimension calculation, Loads, Slab static and reinforced concrete calculation, drawing, Column and beam preliminary dimension calculation, Frame static calculation according to vertical loads, Frame static calculation according to vertical loads, Calculation according to earthquake load, Calculation according to earthquake load, Period calculation, Project controls, Column reinforced concrete account, Foundation calculation, Drawings, Drawing evaluations

CE 443 - Foundation Engineering (3+0):

Site exploration, types of shallow foundations and construction techniques, shallow foundation limit bearing capacity and settlement, shallow foundation design, types of piles and their installation, analysis and design of single piles, pile driving analysis and quality control of piling operations, pile groups and pile rafts, retaining structures.

CE 447 - Reinforced Concrete II (3+0):

Design of reinforced-concrete slabs supported by beams, girdered slabs, slabs without beams subjected to vertical loads. Information about Turkish Earthquake Code of 1998. Determination of lateral EQ forces affecting reinforced-concrete structures according to the code and distribution of internal forces in structural elements. Calculation of the internal forces at foundations (wall foundations, singular foundations, continuous foundations on elastic soil, plate foundations) of masonry and reinforced-concrete structures subject to vertical and lateral loading. Introduction to staircase systems and determination of internal forces at inclined and landing plates and design. Introduction to resisting walls, design of resisting wall sections under the affecting soil forces and live loads.

CE 497 – Civil Engineering Design (0+2):

Engineering Design, Team Behavior and Tools, Gathering Information, Sustainability and Environmental Design, Risk, Reliability, And Safety, Economic Decision Making, Cost Evaluation, Legal And Ethical Issues in Engineering Design, Interdisciplinary teamwork I, Interdisciplinary teamwork II, Preliminary studies of graduation project

IE 367 – Occupational Health and Safety (3+0):

Basic information, history, statistical data, legal regulations, national and international organizations, unsafe situations, unsafe behaviors, business lines, risk factors, work accidents, occupational diseases, precautions, occupational health and safety management systems, case studies

SEMESTER 8

CE 498 – Civil Engineering Graduation Project (0+4):

Design of an engineering structure and presentation.

Departmental Elective

CE 203 – Engineering Geology (3+0):

Rock characteristics. Discontinued structures. Engineering geology maps. Mass Movements. Dam, tunnel and foundation geologies. Excavation and excavations safety. Industrial minerals and rocks. Effects of groundwater on engineering applications. Importance geological knowledge in rural and urban planning

CE 307 – Construction Engineering and Management (3+0):

Construction industry overview and profile. Types of contracts and project delivery methods. Planning, scheduling, CPM and cost estimating. Construction risks and construction project management. Equipments and materials.

CE 312 - Computer Aided Structural Modelling and Analysis (3+0):

Introduction to computer aided structural modeling and an overall view for the analysis background. Definition of loads, load groups, and load combinations. Definition frame, area and volume elements and their fields of use. Modeling of frame structures and analysis under vertical, seismic, temperature, creep and shrinkage loads. The effects will be discussed thoroughly. Modeling of buildings with shear walls and shear wall buildings such as tunnel form buildings. Modeling of foundation settlement and foundation rotation. Modeling of mat foundations. Modeling of slabs, and vibration control. Modeling under seismic forces, Equivalent Elastic Force Modeling under seismic forces, Natural Frequency of a building and the Spectral Analysis

CE316 – Fundamentals of Traffic Engineering (3+0)

Basic parameters of traffic flow. Basic relationship of traffic flow. Data collection methods. Traffic flow models. Microscopic flow models. Capacity and the level of service. Traffic signs. Road markings. Parkings. Intersections. Roundabouts. Traffic signal design.

CE 321 – Advanced Materials Technology (3+0):

Phase transformations; microstructural and property changes in iron-carbon alloys. Applications and processing of metal alloys; types, fabrication and thermal processing of metals. Structures and properties of ceramics; imperfections, mechanical properties. Application and processing of ceramics, Polymer structures, thermoplastic and thermosetting polymers, Characteristics, applications and processing of polymers, Composites, fiber reinforced composites, structural composites, Corrosion and degradation of materials.

CE 323 – Composite Materials (3+0):

Composite material structure and processing, fibre reinforced composite, particulate reinforced composite, mechanical models of internal structure, mechanical properties, durability and degradation of materials, fibre orientation, mix optimization for fibre reinforced composites, failure modes, biaxial strength theories

CE 403 - Water Supply and Sewage Systems (3+0):

Importance of water supply and sewerage systems. Water resources. Stages of water from the source to the disposal of the waste water. Water demand. Methods of water diversion. Storage of water. Intake types. Typical problems encountered in supply lines. Computation of rainwater drainage systems. Computation of wastewater (sewerage) systems. Treatment and disposal of wastewater.

CE 407 - Water Resources Engineering (3+0):

Introduction to water resources and equilibrium of river channels. Sediment transport. Dams. Reservoir. Diversion weirs and gates. Intake structures. Energy dissipators. Hydroelectric power. Irrigation. Drainage. Flood control. River regulation. Economic analysis in water resources.

CE 417 – Soil Mechanics III (3+0):

Advanced issues on Soil Mechanics.

CE 419 – Groundwater Hydraulics (3+0):

Hydrological water cycle, geological formations, Aquifer types, Determination of hydraulic conductivity with porosity and other solution parameters in laboratory environment, grain distribution analysis.

CE 420 - Environmental Sanitation (3+0):

The common microorganisms in environmental sanitation, waste management, pollution, indicator microbes, classification of water sanitation, air sanitation, soil sanitation, solid wastes sanitation,

chemical and physical wastes of industrial pollution.

CE 421 – Rock Blasting Technology (3+0):

Theory and application of explosives in the mining and construction industry; explosives, initiating systems, characteristics of explosive reactions and rock breakage, fundamentals of blast design, drilling and blasting, regulatory and safety considerations, environmental problems produced from ,blasting-vibration, air blast

CE 425 – Special Concretes (3+0):

Introduction-Advanced Concrete Technology, Self-Compacting Concrete, Fiber-Reinforced, Alkali Activated Concrete, Shotcrete Concrete, High Density Concrete, High Performance Concrete, Underwater Concrete Casting, UHPC, RPC, SIFCON / Cement Based Composites, Polymer Modified Concrete, Roller Compacted Concrete, Vacuum Concrete

CE 433 – Concrete Technology (3+0):

Advanced Issues on Concrete Technologies

CE 434 – Earthquake Resistant Design and Performance Evaluation (3+0):

Introduction to earthquake resistant design of building structures. Introduction to the current Earthquake Code of Turkey (Deprem Bölgelerinde Yapılacak Binalar Hakkında Yönetmelik – 2007). Definition of loads, and load combinations both for cast in place and precast structures. Spectral analysis and equivalent load analysis for a seismic design. Steps in design and analysis towards a seismic reinforced concrete design. Definition of ductility and its way of existence in reinforced concrete structures. Control points for a ductile design. Definition of irregularities in plan and elevation, and investigation of the analysis outputs to highlight the possible irregularities. Structures with mixed ductility levels in two orthogonal directions. Ductile design of beams, columns and shear walls according to high and medium ductility levels.

CE 451 – Coastal and Harbour Structures (3+0):

Introduction, Main Concepts, Harbour Types and Properties, Cargo, Vessel Types and Handling Equipments, Port Basin Planning, Berthing and Mooring Structures, Open Berth Structures, Solid Berth Structure, Design Basis of Berth Structure, Breakwaters, Waterfront Structure Defect Types and Causes, Repair & Rehabilitation of Piled Waterfront Structures, Shipyard Marine Structures

CE 454 – Water Power (3+0):

Physical properties of hydraulic fluids, Energy and global warming, Renewable energy, Energy and power in hydraulic systems, Hydroelectric power plants and components, Water power for the future.

CE 456 – Risk Management in Construction (3+0):

Concept of risk and introduction to risk management. Identification, analysis and management of risk.

Qualitative and quantitative methods of risk analysis. Monte Carlo simulation. Utilization of methods and tools in construction risk management.

CE 458 – Construction Project Management (3+0):

Project concept. Project management knowledge areas. Project life cycle and organization. Project management in construction context.

CE 460 – Irrigation and Drainage (3+0):

Water and the environment, physical properties of soils and water, water resources in irrigation, flow of water in saturated and unsaturated soils, irrigation system components, design and evaluation of surface irrigation systems, steady and non-steady flow to drains, design of surface and subsurface drainage systems.

CE 462 – Prestressed Concrete (3+0):

Introduction to prestressed concrete-prestressing concepts; pre-tensioning and post-tensioning; full and partial prestress; the need for prestress; advantages and disadvantages; methods of prestressing. Forces imposed by prestressing (straight, draped and kinked tendon profiles). Load balancing. Introductory examples. Design requirements: strength and serviceability. Material properties. Design for serviceability: stress limits; serviceability criteria; determination of prestress and eccentricity; cable profiles; cracked section analysis; decompression and cracking moment; effect of cracking at service loads; short-term deflection calculations; crack control; design for strength: limit state design. Rectangular stress block. Ultimate moment capacity. Effect of non-prestressed steel; ductility; transfer strength; design for shear-effect of prestress on shear; stirrup design.

CE 466 – Open Channel Flow (3+0):

General equation of gradually varied flows (GVF). Types of channel slopes. Characteristics and classification of GVF profiles. Solution of GVF equations. Characteristics of rapidly varied flow. Flow over spillways. Crest shape and discharge of the overflow spillways. Basic characteristics of the jump. Stilling basins. Flow measurement in open channel. types of flow measurement structures. Sharp-, short-, and broad-crested weirs.

CE 468 – Reinforced Concrete Project Design (3+0):

Giving project data, Formwork plan drawing, Slab preliminary dimension calculation, Loads, Slab static and reinforced concrete calculation, drawing, Column and beam preliminary dimension calculation, Frame static calculation according to vertical loads, Frame static calculation according to vertical loads, Calculation according to earthquake load, Calculation according to earthquake load, Period calculation, Project controls, Column reinforced concrete account, Foundation calculation, Drawings, Drawing

evaluations

CE 470 – Energy Efficiency Applications in Buildings (3+0):

Introduction to energy efficiency applications in buildings. Energy efficiency, energy saving, definition of energy consumption. Information on energy efficiency regulations and targets of Turkey and other countries. Construction site applications, material selection, recycling, reuse, avoidance concepts. Energy efficiency applications in wall systems. Energy efficiency applications in thermal insulation systems. Energy efficiency applications in curtain wall systems. Energy efficiency applications in PVC/wooden door and window systems. Energy efficiency applications and green roofs in roof systems. Energy efficiency applications in construction chemicals. Energy efficiency applications and heat pumps in HVAC systems. Energy efficiency applications and automation in lighting systems. Information about green buildings and their certification.

CE 472 – Durability of Concrete (3+0):

The nature of concrete, Transition zone in concrete, Water as an agent of deterioration, Permeability, Classification of the causes of concrete deterioration, Freezing and thawing effect, Deterioration by fire, Hydrolysis of cement paste components, Sulfate attack, Alkali-silicate Reaction, Reactions involving formation of expansive products, Concrete in seawater & corrosion of embedded rebar

CE 474 – Admixtures for Concrete (3+0):

All kinds of material additives added other than basic concrete components

CE 481 – Hazardous Waste Management (3+0):

Introduction to hazardous waste management, Introduction to hazardous waste and cleanup, Hazardous waste characterization and listing, Pathways, fates, and disposition of hazardous waste, Toxicology and hazardous waste risk assessment control, Hazardous waste sources/ generators of hazardous wastes, Treatment and disposal methods and processes, Waste minimization, reuse and recycle, Assessment for site remediation, Medical/biomedical/infectious waste management, Radioactive waste management, Hazardous waste worker health and safety

CE 492 – Civil Engineering O’COOP 1 (3+0):

Professional Experience

CE 494 – Civil Engineering O’COOP 2 (3+0):

Professional Experience

CE 496 – Civil Engineering O’COOP 3 (3+0):

Professional Experience