CIVIL ENGINEERING DEPARTMENT
"FORMAL" VE "EVENING" EDUCATION 2020-2021 EDUCATION PROGRAM

1. SEMESTER COURSES (1. CLASS FALL SEMESTER)

Course Code and Name	C.H.	ECTS
IMZ101 Calculus for Engineers 1	3+0	6
IMZ103 Physics for Engineers	3+0	6
IMZ105 Introduction to Civil Engineering	3+0	4
IMZ107 Technical Drawing	3+0	5
IMZ109 Fundamentals of Informatics	3+0	3
ING111 English 1	2+0	2
AIIT101 Ataturk's Prin. and Revol. 1	2+0	2
TD101 Turkish Language 1	2+0	2
		30

2. SEMESTER COURSES (1. CLASS SPRING SEMESTER)

Course Code and Name	C.H.	ECTS
IMZ102 Calculus for Engineers 2	3+0	6
IMZ104 Linear Algebra	3+0	5
IMZ106 Statics	3+0	6
IMZ108 Computer Aided Drawing	3+0	4
IMZ110 Geology for Civil Engineers	3+0	3
ING112 English 2	2+0	2
AIIT102 Ataturk's Prin. and Revol. 2	2+0	2
TD102 Turkish Language 2	2+0	2
		30

3. SEMESTER COURSES (2. CLASS FALL SEMESTER)

Course Code and Name	C.H.	ECTS
IMZ205 Dynamics	3+0	4
IMZ207 Strength of Materials 1	3+0	5
IMZ213 Structural Elements	3+0	6
IMZ215 Occupational Health and Safety 1	2+0	6
IMZ217 Differential Equations	3+0	6
IMZ219 Statistical Methods in Engineering	3+0	3
		30

4. SEMESTER COURSES (2. CLASS SPRING SEMESTER)

Course Code and Name	C.H.	ECTS
IMZ202 Numerical Methods	3+0	3
IMZ204 Surveying	3+0	4
IMZ206 Materials of Construction	3+0	5
IMZ214 Strength of Materials 2	3+0	5
IMZ216 Hydrology	3+0	5
IMZ218 Occupational Health and Safety 2	2+0	5
IMZ220 Soil Mechanics 1	3+0	3
		30

Students who takes 1.~4. Semester Courses, have to do (20 work days) **IMZ200 Summer Practice-1**.

5. SEMESTER COURSES (3. CLASS FALL SEMESTER)

Course Code and Name	C.H.	ECTS
IMZ301 Structural Analysis 1	3+0	5
IMZ303 Reinforced Concrete 1	3+0	5
IMZ305 Fluid Mechanics 1	3+0	5
IMZ307 Steel Structures	3+0	5
IMZ311 Transportation	3+0	5
IMZ315 Soil Mechanics 2	3+0	5
	24	**30**

6. SEMESTER COURSES (3. CLASS SPRING SEMESTER)

Course Code and Name	C.H.	ECTS
IMZ302 Structural Analysis 2	3+0	5
IMZ304 Reinforced Concrete 2	3+0	5
IMZ306 Fluid Mechanics 2	3+0	5
IMZ308 Foundation Engineering 1	3+0	5
IMZ310 Project Management	3+0	5
IMZ312 Reinforced Concrete Design	3+0	5
	24	**30**

7. SEMESTER COURSES (4. CLASS FALL SEMESTER)

Course Code and Name	C.H.	ECTS
IMS401 Durability of Concrete	3+0	5
IMS405 Deep Excavation and Retaining Structures	3+0	5
IMS407 Water Supply Engineering	3+0	5
IMS409 Advanced Hydrology	3+0	5
IMS411 Civil Engineering Laboratory	1+2	5
IMS413 Coastal Engineering	3+0	5
IMS415 Bill of Quantities- Feasibility-Payments	3+0	5
IMS417 Engineering Economy	3+0	5
IMS419 Spread Sheets in Civil Engineering	3+0	5
IMS421 Applications of Surveying	3+0	5
IMS423 Introduction to Prestressed Concrete	3+0	5
IMS425 Project Planning	3+0	5
IMS427 Hydraulic Structures 1	3+0	5
IMS431 Foundation Engineering 2	3+0	5
IMS435 Structure Design 1	3+0	5
IMS437 Soil Mechanics 3	3+0	5

8. SEMESTER COURSES (4. CLASS SPRING SEMESTER)

Course Code and Name	C.H.	ECTS
IMS402 Applications of Fluid Mechanics	3+0	5
IMS404 Design of Dams	3+0	5
IMS406 Steel Structure Design	3+0	5
IMS408 Environmental Health Facilities	3+0	5
IMS412 Computational Geotechnic	3+0	5
IMS416 Highway Engineering	3+0	5
IMS418 Coastal and Harbour Structures	3+0	5
IMS420 Architectural Design	3+0	5
IMS422 Hydraulic Structures 2	3+0	5
IMS424 Irrigation and Drainage	3+0	5
IMS426 Construction Law	3+0	5
IMS430 Structure Design 2	3+0	5
IMS432 Repair and Strengthening of	3+0	5
IMS434 Groundwater Hydraulics	3+0	5
IMS436 Soil Dynamics	3+0	5
IMS438 Soil Improvement	3+0	5

CIVIL ENGINEERING DEPARTMENT 1. SEMESTER COURSES

IMZ-101 CALCULUS FOR ENGINEERS 1 (3+0)
Numbers. Functions. Limit, continuity, derivative. Minimum and maximum. Reverse functions. Trigonometric functions. Logarithmic and exponential functions. Hyperbolic functions. Polar and parametric functions. Characteristics of curves. MacLaurin and Taylor series. Definite and indefinite integrals.

IMZ-103 PHYSICS FOR ENGINEERS (3+0)
Units. Vectors. Force and Moment. Kinematics. Dynamics. Work, Kinetic Energy, Potential Energy and Conservation of Energy.Impulse,Linear Momentum and Conservation ofLinear Momentum.Center of Gravity. Moment of Inertia.

IMZ–105 INTRODUCTION TO CIVIL ENGINEERING (3+0)
Introduction to civil engineering. Definition of civil engineering profession. Phases of civil engineering works, drawings and specifications. The working of civil engineering department. Introduction to construction materials and building constructions. Developments in concrete technology. Introduction and applications of road and railway transportation, Introduction and applications of hydraulic and water structures, Introduction and applications of geotechnical engineering.

IMZ–107 TECHNICAL DRAWING (3+0)
Introduction to drawing instruments and their use. Applications of norm lettering and figures. Introduction to sketching and sectioning. Point, linear and planar projections of geometrical shapes. Concepts of perspectives and sections.

IMZ–109 FUNDAMENTALS OF INFORMATICS (3+0)
Introduction to informatics systems and hardware units of a personal computer. Learning and using of operating systems. Using internet and its applications. Basis and applications of word processors such as text, table, equation editor. Learning excel program; input data to worksheets, computations with various formula applications and create a graph. Learning presentation programs.

CIVIL ENGINEERING DEPARTMENT 2. SEMESTER COURSES

IMZ-102 CALCULUS FOR ENGINEERS 2 (3+0)
Indefinite integral. Definite integral. Length. Area. Volume. Center of gravity. Multivariate functions. Continuity. Partial derivates. Extremes. Total differential. Double and triple integrals.

IMZ-104 LINEAR ALGEBRA (3+0)
Fundamentals of Matrix Algebra. Determinants. Solution of Systems of Linear Equations. Eigenvalues and Eigenvectors. Vectors.Plane and Line. Coordinate Transformations. Circle and Sphere.

IMZ-106 STATICS (3+0)
Fundamentals of mechanics. Review of vector algebra. Important vectorial quantities. Equivalent force systems. Equilibrium and equilibrium equations. Introduction to mechanics of beams, trusses, frames, and machines. Frictional forces. Normal force, shear force and bending moment diagrams.

IMZ–108 COMPUTER AIDED DRAWING (3+0)
Beginning arrangements and running AUTOCAD. AUTOCAD file processing units. Preliminary and auxiliary commands. Basic drawing commands and their applications. Text writing commands and their applications. Modify and arrangement commands and their applications. Display control commands. Layers and objects properties commands and their applications. Dimension commands and their applications. Block definitions and specifies of a block to insert. An example of drawing a housing plan for application all commands.

IMZ-110 GEOLOGY FOR CIVIL ENGINEERS (3+0)
Structure of earth, minerals and rocks, classification of rocks, engineering properties of rocks, geological maps and sections, earthquakes, mass movements and land slides, dams, tunneling geology, hydrogeology and environmental geology, foundation engineering and geology, important of geology at city and regional planning.

CIVIL ENGINEERING DEPARTMENT 3. SEMESTER COURSES

IMZ-205 DYNAMICS (3+0)
Kinematics of particles. Dynamics of particles. Work and energy. Impulse and momentum. Kinematics of rigid bodies. Dynamics of rigid bodies. Planar motion of rigid bodies. Work, energy, impulse and momentum for rigid bodies.

IMZ-207 STRENGTH OF MATERIALS 1 (3+0)
Introduction, Classification of Mechanics. Internal Forces,Internal Moments and Diagrams. Axial Loading, Stress and Strain Analysis, Thermal Effects. Two Dimensional Stress and Strain Analysis,Principal Stresses and Strains,Mohr Circle,Generalized Hooke's Law for Elastic Materials. Fracture Hypoteses.Torsion of Bars with Circular Cross–Sections.

IMZ-213 STRUCTURAL ELEMENTS (3+0)
The application of building;The safety of excavation; Foundation types; Wall types; Slab types; Bond beam, lintel, beam and column types; Staircases; Chimney types; Concrete and reinforced concrete mold types; Scaffold types; Roof types; Joinery types.

IMZ-215 OCCUPATIONAL HEALTH AND SAFETY 1 (2+0)
Occupational health and safety procedures and practices in construction industry.

IMZ-217DIFFERENTIAL EQUATIONS (3+0)
Introduction. Ordinary and Partial Differential Equations. Linear and Nonlinear Differential Equations. General Solution, Particular Solution.Initial and Boundary Value Problems.Ordinary Differential Equations of First Order and First Degree, Equations with Separable Variables, Homogeneous Differential Equations, Differential Equations with Functions of Linear but Nonhomogeneous. Exact Differential Equations. Linear Differential Equations.

IMZ-219 STATISTICAL METHODS IN ENGINEERING (3+0)
Introduction, Frequency Analysis, Probability, Probability Distributions, Sampling Distribution, Hypothesis Tests, Correlation and Regression.

CIVIL ENGINEERING DEPARTMENT 4. SEMESTER COURSES

IMZ-202 NUMERICAL METHODS (3+0)
Systems of Linear Equations, Gaussian Elimination and LU Methods. Nonlinear Equations, Iteration, Convergence, Relative Error, Polynomials. Eigenvalue Problems, Force Method. Interpolation (Curve Fitting). NumericalDifferentiation and Numerical Integration. Numerical Solutions of DifferentialEquations.

IMZ-204 SURVEYING (3+0)
Definitions. Horizontal measurements by simple devices. Leveling. Measurement of angles. Horizontal and vertical measurements in field and evaluations. Stadia methods. Planimeter applications on map. Surveying methods. Triangulation. Polygonization computations and drawings. Traverses. Route surveys. Various field application.

IMZ-206 MATERIALS OF CONSTRUCTION (3+0)
Cementitious materials. Portland cements. Pozzolan-added cements. Aggregates. Standard laboratory test on aggregates. Properties of normal, heavy-weight, light-weight, and special concretes. Concrete mix design computations. Laboratory tests on fresh and hardened concrete.

IMZ-214 STRENGTH OF MATERIALS 2 (3+0)
Moments of Inertia, Transformation Rules. Purebending and Unsymmetric Bending, Moment–Curvature Relation. Combined Loading State: Shear Force and Bending Moment, Stress Analysis and Design. Axial Force and Bending Moment, Stress Analysis and Design. Torsional and Bending Moment, Stress Analysis and Design. Elastic Curve. Energy Methods: General principles.

IMZ-216 HYDROLOGY (3+0)
Hydrological cycle. Resources and distribution of water on the earth. Mechanism and measurement of precipitation, calculation of areal average precipitation depth. Evaporation, infiltration, groundwater. Stream flow measurements (stage, cross-section and velocity) and, determination of discharge. Characteristics of a river basin. Hydrograph analysis and unit hydrograph theory. Application of statistics in hydrology.

IMZ-218 OCCUPATIONAL HEALTH AND SAFETY 2 (2+0)
Occupational Health and Safety Legislation Related with Construction Works.

IMZ-220 SOIL MECHANICS 1 (3+0)
Introduction to soil mechanics, Basic characteristics of soils, Formation of soils / Physical and index properties of soils / Consistency limits of soils / Determination of grain size distribution / Weight-volume relationships / Soil classification / Flow of water in soil: capillarity and permeability (hydraulic conductivity) / Flow of water in soil: seepagenalysis and flownets / Stresses in a soil mass: total and effective stresses / Stress increases in soil masses due to surface loading / Compressibility of soils.

CIVIL ENGINEERING DEPARTMENT 5. SEMESTER COURSES

IMZ-301 STRUCTURAL ANALYSIS 1 (3+0)
Loads and load specifications. Statically determinate structures. Influence lines for statically determinate structures. Simple beams, three hinged arches, trusses, cables and frames. Displacements and deformations in statically determinate structures.

IMZ-303 REINFORCED CONCRETE 1 (3+0)
Introduction to concrete and reinforced concrete, basic behavior of reinforced concrete and fundamentals of design, structural safety, axially loaded members, ultimate strength of members subject to flexure, combined flexure and axial load, biaxial bending and axial load, slender columns.

IMZ–305 FLUID MECHANICS 1 (3+0)
Basic properties of fluids. Hydrostatic forces on plane and curved surfaces. Stability of immersed and floating bodies. Velocity and acceleration in fluid motion. Continuity equation. Rotation, vorticity and circulation concepts. Velocity potential and stream function. Euler and Bernoulli equations in ideal flow. Momentum and moment-of-momentum equations and some applications.

IMZ–307 STEEL STRUCTURES (3+0)
Mechanical properties of steel. Joining parts. Rivets. Bolts. Welding. Tension members. Compression members. Members under combined stresses. Composite beams.

IMZ-311 TRANSPORTATION (3+0)
The following issues are in the scope of this course: General definitions of road elements, planning of road, resistance on road, calculations of bends in road, drainage, traffic, road paving, road materials.

IMZ-315 SOIL MECHANICS 2 (3+0)
Consolidation theory / Settlement calculations / Rate of settlement / Stress-strain behavior of soils / Shear strength of soils / Experimental determination of shear strength parameters / Retaining walls / Slope Stability.

CIVIL ENGINEERING DEPARTMENT 6. SEMESTER COURSES

IMZ-302 STRUCTURAL ANALYSIS 2 (3+0)
Statically indeterminate structures: force method and slope deflection method. Influence lines for statically indeterminate structures: moment-distribution method. Approximate methods of structural analysis subject to lateral loads. Introduction to matrix methods of structural analysis.

IMZ-304 REINFORCED CONCRETE 2 (3+0)
Shear and diagonal tension in beams, bond, anchorage and development length, introduction of Turkish Earthquake Code for design of reinforced concrete buildings, analysis and design for torsion, reinforced concrete slabs, reinforced concrete foundations.

IMZ–306 FLUID MECHANICS 2 (3+0)
Laminar and turbulent flow. Boundary layer. Secondary flow. Laminar and turbulent flows in pipes. Hydraulic analysis of pipe networks. Unsteady flow in pipes. Open channel flow. Uniform flow, best hydraulic section, specific energy. Hydraulic jump. Gradually varied flow. Dimensional analysis. Hydraulic similarity.

IMZ-308 FOUNDATION ENGINEERING 1 (3+0)
The aim of this course is to use basic soil mechanics in foundation design and projects. Site and Soil Exploration / Bearing Capacity Analysis / Design of Shallow and Deep Foundation / Settlement Analysis / Deep Excavation and Support Systems.

IMZ-310 PROJECT MANAGEMENT (3+0)
Concepts related management, introduction of building regulations, feasibility, choosing building land and place, preparing the drawings and technical specifications, construction license, estimation of construction cost, resource analysis, unit price analysis, quantity analysis, contract, supervision of the construction process, site organization, project planning and scheduling, site organization, preparing of the payment requests.

IMZ-312 REINFORCED CONCRETE DESIGN (3+0)
Analysis and design of reinforced concrete buildings. Details of floors, beams, columns, stairways etc.

CIVIL ENGINEERING DEPARTMENT 7. SEMESTER COURSES

IMS-401 DURABILITY OF CONCRETE (3+0)
The definition of durability of concrete, alkali aggregate reaction, effect of sulfate, effect of acid, corrosion, sustainability, exposure classes related to environmental actions, high durability concrete.

IMS-405 DEEP EXCAVATION AND RETAINING STRUCTURES (3+0)
Lateral earth pressure theories (Rankine/Coulomb), loads on support systems, soil movement caused by deep excavations and the effect on neighboring structures, soil pressures and design of retaining structures, reinforced concrete design of retaining structures, overall stability checks of retaining structures, braced cuts and support systems, deep excavations, open and supported digs, shaft excavations, protection from over ground and underground water, instrumentation, in-situ measurement of deformations and stresses, case studies of deep excavation problems, design of anchored support systems (bored piles or reinforced concrete sheet wall).

IMS-407 WATER SUPPLY ENGINEERING (3+0)
Population estimation methods, Determination of drinking water need, surface and ground water supply, storage, pump, location of subway, network design methods, dead point method.

IMS-409 ADVANCED HYDROLOGY (3+0)
Engineering hydrology, system analysis. Hydro meteorological factors. River basin area, border and drainage characteristics. Reservoirs and its physical characteristics. Determination of reservoir capacity. Design of hydraulic structures.

IMS-411 CIVIL ENGINEERING LABORATORY (1+2)
Stress-strain relation of concrete, Tensile strength of concrete. Bending properties of beams. Behavior of reinforced concrete beams. Venturimeter, Orifis, Impulse-momentum experiments. Pycnometer test. Determination of consistence of soils, relative stiffness of soils, granulometry analysis, hydrometer experiment. Proctor tests. Density determination of soils with sand cone method. Unconfined compression test. Shearing box experiment. Oedometer test.

IMS–413 COASTAL ENGINEERING (3+0)
Introduction, Definition of Coastal Areas, Classification of Water Waves, Wave Characteristics, Wave theories, Linear wave theory, Wave Celerity, Wave Kinematics, Pressure Distribution, Wave Energy, Energy Flux, Wave Transformations , shoaling, refraction, reflection, Wave Transformations; Diffraction, Wave breaking, Wave Climate and Statistics; Wave generation, Wave forecasting.

IMS-415 BILL OF QUANTITIES- FEASIBILITY-PAYMENTS (3+0)
Quantity surveying practices in construction projects.

IMS-417 ENGINEERING ECONOMY (3+0)
Occupational health and safety procedures and practices in construction industry.

IMS-419 SPREAD SHEETS IN CIVIL ENGINEERING (3+0)
Spreadsheet Basics/ Excel functions / Math and trigonometry functions / Engineering drawing / Creating macro / Matrix program / Numerical method / Applications of Spread sheets in Civil engineering Problems / Beam on elastic foundation / One dimensional consolidation / Retaining walls.

IMS-421 APLICATIONS OF SURVEYING (3+0)
Leveling aplications, leveling and volume calculation for excavation, leveling and area calculation, teodolite usage, calculation of horizontal distances, map drawing.

IMS-423 INTRODUCTION TO PRESTRESSED CONCRETE (3+0)
The definition of prestressed concrete, basics of prestressed concrete, design of prestressed concrete beams, columns, shear, continuous beams.

IMS-425 PROJECT PLANNING (3+0)
CPM, bar chart and resource levelling techniques. Their practical applications. Applications with Ms Project.

IMS–427 HYDRAULIC STRUCTURES 1 (3+0)
River Morphology, Sediment Transport, River Improvement Structures, Flood Protection Structures, River Crossing Structure, Diversion Weirs, Energy Dissipators.

IMS-431 FOUNDATION ENGINEERING 2 (3+0)
Teaching under graduate students the basic design principles of shallow and deep foundations. Subsurface exploration and case studies / Design of Shallow Foundation and applications/ Types of Pile Foundations / Bearing Capacity of Piles under static vertical loads, Applications / Negative Skin Friction, Applications / Bearing Capacity and Settlement of Group Piles / Bearing Capacity of Piles Under Lateral Loads / Caissons / Sheet Pile Walls.

IMS-435 STRUCTURE DESIGN 1 (3+0)
Definition of structure, kinds of structure, choose of frames, choose of foundation system, modelling of frame, modelling of structural members on computers, solution of building, examination of results, calculation of reinforced concrete members, earthquake analysis, strengthening of buildings.

IMS-437 SOIL MECHANICS 3 (3+0)
Analysis methods in geotechnical engineering, numerical methods, geotechnical investigations, drained and undrained loading conditions, settlement calculations, soil improvement methods, problematic soils, slope stability analyses.

CIVIL ENGINEERING DEPARTMENT 8. SEMESTER COURSES

IMS–402 APPLICATIONS OF FLUID MECHANICS (3+0)
Design of dams, Calculation of steady and unsteady flow profile with Hec-RAS, Projects of Irrigation and Drainage Water supply and Waste Water Disposal Design, Coastal and horbour structures design, Royble mound breakwater design, Vertical Wall breakwater design, Flood modeling with Hec-RAS.

IMS-404 DESIGN OF DAMS (3+0)
Design of various types of dams. Determination of reservoir storage capacity; dead storage, active storage and flood control storage. Determination of dam height. Location of dam on the topographic map. Design of spillway and stilling basin.

IMS–406 STEEL STRUCTURE DESIGN (3+0)
General information about various types of steel constructions. Steel trusses. Computations and design works of a steel roof systems.

IMS-408 ENVIRONMENTAL HEALTH FACILITIES (3+0)
Steps for sewage construction.

IMS-412 COMPUTATIONAL GEOTECHNIC (3+0)
Numerical modeling and its application in geotechnical engineering, finite element method and constitutive equations and stress-strain behavior of soils in geo-mechanics, soil models and determination of soil parameters, numerical techniques, interfaces, simulation of construction steps, consolidation analysis, numerical analysis of geotechnical applications (shallow and pile foundations, embankments, deep excavation, retaining walls, slope stability).

IMS-416 HIGHWAY ENGINEERING (3+0)
Route researches, earth works, calculation of road paving.

IMS–418 COASTAL AND HARBOUR STRUCTURES (3+0)
Statistical properties of sea waves, estimation of the wind wave parameters, Currents by waves, Sediment transport in coastal region, Coastal protection structures, Breakwaters, Rouble-mound breakwaters, Vertical breakwaters, Horbour structures.

IMS-420 ARCHITECTURAL DESIGN (3+0)
Explanation of concepts related to architectural design, architectural design process, architectural projects, designing of houses.

IMS–422 HYDRAULIC STRUCTURES 2 (3+0)
Dams and Reservoirs, Reservoir Planning and Design, Dam Body Design, Elements of Dams, Spillway Design, Derivation Facilities, Water Power Plants, Water In take Structures, Economics of Hydraulic Structures.

IMS–424 IRRIGATION AND DRAINAGE (3+0)
Calculation of water requirement of plants. Design of irrigation canals. Art structures on irrigation network. Fundamentals of drainage engineering. Methods of design discharge determination in drainage. Design of drainage canals.

IMS-426 CONSTRUCTION LAW (3+0)
Legal procedures related with construction management, construction contracts, bidding process, contract management.

IMS-430 STRUCTURE DESIGN 2 (3+0)
Definition of structure, kinds of structure, choose of frames, choose of foundation system, modelling of frame, modelling of structural members on computers, solution of building, examination of results, calculation of reinforced concrete members, earthquake analysis, strengthening of buildings.

IMS-432 REPAIR AND STRENGTHENING OF STRUCTURES (3+0)
Techniques and reasons for repairing and strengthening of structures. Repairing and strengthening of reinforced concrete structures. Groups of repairing and strengthening. Necessary works to be made on the earthquake area, and urgent precautions. Materials and techniques used. Determination of level of repairing and strengthening and techniques. Some examples related to repairing and strengthening of reinforced concrete structures. Strengthening of

structures adding new structural elements.

IMS-434 GROUNDWATER HYDRAULICS (3+0)
Basic Concepts and Definition about Ground water Hydraulics, Geology and Aquifers, Geological and Geophysical surveys, Geology and Aquifers, Basic Properties of Aquifers, Aquifer Properties and Parameters, Ground water Flow Equations: Basic Assumptions, Ground water Flow Equations, Steady Flow, Unsteady Flow, Flownets, Wells, Discharge Measurement of Wells.

IMS-436 SOIL DYNAMICS (3+0)
Seismology and earthquakes, strong ground motion, dynamic soil properties, ground response analysis, site response parameters, stress-strain and shear strength characteristics of soils under dynamic loads, site response analysis, liquefaction, seismic slope stability, earthquake codes related to geotechnical design, seismic microzonation.

IMS-438 SOIL IMPROVEMENT (3+0)
Soil improvement techniques / Preloading and vertical drains / Stone columns / Jet grouting / Deep mixing method / Shallow and deep compactions / Soil improvement with add-mixtures/ Reinforced soils / Soil nailing and anchorage / Micro piles / Case studies.