CIVIL ENGINEERING DEPARTMENT Civil Engineering Sciences PhD Content					
COURS ECODE	**COURSE NAME AND CONTENTS**	**T**	**A**	**C**	**ECTS**
INM801	**Steel Structures of Cold Formed Elements**	**3**	**0**	**0**	**8**
Purpos eand Content	Giving the necessary technical features and details for the light steel structure systems formed with cold-formed thin-walled steel elements, to examine the behavior of the curtain wall reinforced with cross and cladding elements under horizontal loads. Investigation of strength and stability of cold-formed thin-walled steel rods.				
INM802	**Arrangement of Steel Carrier Systems**	**3**	**0**	**0**	**8**
Purpos eand Content	1. Steel steel structures, aircraft hangars, sports halls and stadiums, bus garages, train stations and platforms, etc. formation of carrier systems and examination of system properties. 2. Selection of structural systems in multi-storey steel structures and examination of system properties. 3.Economic carrier selection." Steel industry buildings, aircraft hangars, sports halls and stadiums, bus garages, train stations and platforms, etc. To be able to create suitable bearing systems, To be able to create suitable bearing systems in multi-storey steel structures and to be able to analyze the static and dynamic loads affecting the bearing systems, To be able to choose economic bearing system				
INM803	**Geothermal Systems**	**3**	**0**	**0**	**8**
Purpos eand Content	The aim of the course are investigation of the formation mechanism, the major and trace element concentrations, the gas content, and isotope content of the geothermal waters and to teach the usage areas of this waters helping from property composition and physico-chemical properties and the environmental damage of this water. Introduction (formation and classification of the geothermal water, classification of the geothermal water), chemical, physical, gas and isotopic concentration of geothermal water, deposition and corrosive problems in geothermal water, geothermometry, geothermal areas of Turkey and their proporties, environmental pollution generated and evaluation in terms of civil engineering.				
INM804	**Karst Hydrology**	**3**	**0**	**0**	**8**
Purpos eand Content	Giving information about karstic systems and evaluating this system in terms of civil engineering Formation mechanism of karstic structures, factors affecting dissolution and kinetic behaviors, hydrology of karstic systems, analysis and management of karstic resources				

INM805	**Plastic Hinge Lines Theory in Reinforced Concrete Slabs**	**3**	**0**	**0**	**8**
Purpos eand Content	The course aims to provide students get the behavior of reinforced concrete slabs according to non-linear analaysis with yiled line theory Boundary condition and shapes of fracture in the plates, Fracture by the loss of bending resistance, Behavior of reinforced concrete plates, Methods of analysis, Principles of yield-line theory, Mechanisms of fracture, The use of virtual work method and equilibrium method, Special cases in the yield-line theory, Analysis of special plates.				
INM806	**Numerical Analysis in Structural Engineering**	**3**	**0**	**0**	**8**
Purpos eand Content	To teach one of the numerical methods used in the analysis of structural systems and the methods used for solving systems of equations. Introduction to matrix algebra. Solution of linear equations by direct and indirect methods. Finite difference method and its application to many civil engineering problems. Eigenvalue problem and solution methods.				
INM807	**Problematic Soils and Soil Improvement Methods**	**3**	**0**	**0**	**8**
Purpos eand Content	The aim of this course is to inform students about soil improvement which has an important place in Geotechnical Engineering. In this way, it is aimed to introduce the methods that can be applied to increase the carrying capacity of the soil and to choose the appropriate soil improvement method for the solution of the problems they may encounter. introduction, information about the course and general definitions, Problematic soils; weak soils, Problematic soils; swellable soils, Soil improvement and general definition, purpose and expected results, Compaction, Vibroflotation techniques, Ground stabilization by cement injection, Midterm exam, Theory of Jet Grout application, application areas, Bored Piles and Mini Piles, Stone-Sand columns, Injection, Deep Soil Mixing, Soil improvement with geosynthetics				
INM808	**Rock Mechanics**	**3**	**0**	**0**	**8**
Purpos eand Content	To understand and apply the basic principles and concepts of rock mechanics Define the physical properties of rock, to give stress and stress concepts and equations, failure criteria, standard rock mechanics, to give engineering properties of discontinuities, to introduce rock mass classifications, rock slopes and their properties,				
INM809	**Microstructure of Cement and Concrete**	**3**	**0**	**0**	**8**
Purpos eand Content	Understanding of microscobic and mineralogycal structures of cement, Understanding of matrix of concrete in terms of microscobic and mineralogycal, Understanding of cement-aggregate interface zone and its effects on concrete behaviour, Understanding to the effects of micro and mineralogical structures of cement and concrete on concrete behavior Evaluate of effects on behaviour of microscobic and mineralogycal structures of cement and concrete, and evaluate of effects on behaviour of cement-aggregate interface zone				

INM810	**Computed Tomography and Other Nondestructive Methods**	**3**	**0**	**0**	**8**
Purpos eand Content	Determining of cement, mortar and concrete porosity, determining of reinforcement in concrete, quality measurement on concrete, determining of mechanical properties of concrete, measurement of cohesion of mortar and adhesion forces. Method of Schmidt hammer, Method of ultrasonic test, Method of pull-out test, Computerized tomography method, reinforcement cover meter and mapping.				
INM811	**Advanced Structural Analysis**	**3**	**0**	**0**	**8**
Purpos eand Content	Obtaining up-to-date information and design philosophy about linear and nonlinear calculations of structural systems and gaining practical skills Constitutive equations of structural materials, philosophy of structural analysis and design, materially non-linear structures, distributed plasticity, linearization techniques, plastic hinge concepts, ultimate load, slope-deflection method, geometrically non-linear structures, second order theory, determination of buckling loads, influence lines.				
INM812	**Special Topics in Structural Analysis**	**3**	**0**	**0**	**8**
Purpos eand Content	To provide a detailed understanding of special topics related to structural statics Classification of structural systems, Mohr Method, Influence lines in hyperstatic systems, moving systems with nodes, Evaluation of second order theory methods				
INM813	**Highway Legislation**	**3**	**0**	**0**	**8**
Purpos eand Content	Understanding the content, differences and bindingness of national constituon and codes/regulations related to highway, Applying related highway laws and regulations to comment a judicial case National Constitiution, Related laws, Decree laws, by-laws, Codes/Regulations, binding prejudication precedent, expert reports				
INM814	**Preventive Maintenance of Road Superstructures**	**3**	**0**	**0**	**8**
Purpos eand Content	Grasping the importance of highway pavement design, Understanding the pavement distress, Grasping the importance of preventative maintenance, Learning the relationship between preventative maintenance and pavement distress Asphalt/Concrete Pavement Structure-Pavement Design Theories and Behaviour of Asphalt/concrete Pavement-Layers and Properties of Asphalt/concrete Pavement-Drainage Properties of Pavements-Asphalt/concrete Pavement Distress: Definition of Causes-Preventative Maintenance Concept-Tools and Technology for Implementation of the Preventative Maintenance- Main Preventative Maintenance Types-Sealing Cracks-Maintenanace at joints-Seal Coats: Sullry Seal, Fog Seal - Full Dept Repair- Thin hot Mixtures -International Examples of Preventative Maintenance Program-Conclusions and Future Perspective				
INM815	**Energy Propagation in Hydraulic Structures**	**3**	**0**	**0**	**8**

Purpos eand Content	The aim of this course is to provide information about the structures built for damping the high energy that the potential energy that is provided to the body of water in hydraulic structures and especially in dams. Thus, it is aimed that the students learn the differences between the measures to be taken against the damages that can be caused during the movement of water bodies with high energy potential and to be able to choose the optimal solution. Introduction, information about the course and general definitions, energy dissipators in hydarulic structures, spillway and problems encountered; types and hydraulics of spillways; labyrinth and shaft spillways; siphoned, tunnel and culvert spillways; stepped and jet spillways; energy dissipation at block ramps; energy dissipation with stepped spillways; hydraulic jumping and stilling basins; stilling basin types; ski jumps, jets and plunge pools; impact dissipators.				
INM816	**Integrated Water Resources Management and Floods**	**3**	**0**	**0**	**8**
Purpose and Content	The aim of this course is to make planning by addressing all factors related to water resources and to examine the subject with examples and researches, especially around floods, by acquiring the necessary information to make the principle of sustainability habitable. Thus, it is aimed to understand the breadth of water resources projects and the issues on which they are interactive, and to understand their impact on humans, especially with floods. Introduction, information about the course, sustainable development among water systems and decision makers, integrated approach for water resources, investigation on integrated water resources management sample, the damages of floods and impacts of floods on development, flood disasters in Turkey, examples of massive floods that have happened-I, factors causing floods, flood estimation methods, flood protection methods, non-structural flood prevention methods, examples of massive floods that have happened-II				
INM817	**Geopolymer Building Materials**	**3**	**0**	**0**	**8**
Purpos eand Content	Understanding the production of geopolymer and alkali-activated materials, understanding the chemical structure of the method, understanding the advantages and disadvantages of geopolymer and alkali-activated materials, designing geopolymer or alkali-activated materials Geopolymerization method in the production of building materials, physical, chemical, mechanical, microscopic and mineralogical properties in geopolymer concretes				
INM820	**Nonlinear Analysis of Reinforced Concrete Structures**	**3**	**0**	**0**	**8**
Purpos eand Content	It is aimed to teach the current information about linear and non-linear calculation of reinforced concrete structural systems, the provisions of the current earthquake regulations and to gain skills for practice in this direction. Nonlinear Analysis and Methods of Reinforced Concrete Structures, Material Behavior and Material Models, Confined Concrete and Concrete Material Models, Moment-Curvature Relationship, Plastic Hinge Hypothesis, Time History Analysis				

INM821	**Water Resources Management**	**3**	**0**	**0**	**8**
Purpos eand Content	Protection of water resources, drinking water treatment, water supply, water distribution systems, water loss and leakage prevention. Protection of water resources, drinking water treatment, water supply, water distribution systems, water loss and leakage prevention are the course objectives. Drinking water standards, regulations, Importance of local governments in water supply, Drinking water treatment methods and problems, detection and solution methods, Water loss and leakage detection and monitoring, Water loss and leakage prevention				
INM822	**Water Loss Reduction Techniques and Applications**	**3**	**0**	**0**	**8**
Purpos eand Content	The causes of water loss. Reduction of water loss, techniques and applications. Determination of the main causes of water loss, reduction of water loss by usefull techniques and applications are the course objectives. Types of water loss Reason of water loss for different situations, Evalation of reduction of water loss techniques, Choosing the right solutions for right cases, Applications of reduction of water loss, Economy of Water Losses, Efficiency and sustainability in the management of water losses				
INM823	**Geotechnical Engineering of Landfills**	**3**	**0**	**0**	**8**
Purpos eand Content	The objective of this course is to teach the Geotechnical engineering students (Master and P.h.D degrees) the Geotechnical aspects of lanfill design and construction. Based on this course, the studenrs will learn the geotechnical and geo-environmental issues associated with landfills and they will be abale to increase their knowledge and potential for solving issues related to geotechnical engineering of landfills. By and large, the main aims of this course, among others, are to evaluate the shear strength, compressibility, permeability, in situ stress and stiffness of the waste mass. Principles of Geotecnical Engineering of landfills; Properties and testing of clay liners; Issues related to mineral liners; The design and control of bentonite enriched soils; Geosynthetics in landfill design; The stability of geosynthetic landfill; Engineering properties and use of geosynthetic clay liners.				
INM824	**Analysis of Reinforced Concrete Structure Elements with Finite Element Method**	**3**	**0**	**0**	**8**
Purpos eand Content	The aim of this course is to analyze reinforced concrete structural elements by modeling with a widely used finite element program. In the finite element model of reinforced concrete structures; creation of parts, definition of material properties, assignment of section properties, assembly of parts, structuring of analysis, application of boundary conditions and loads to the model, creation of mesh structure of the model and analysis of analysis results				
INM897	**PhD Seminar**	**0**	**2**	**0**	**6**
Purpos eand Content	This course is offered to the students of Civil Engineering PhD Program; students will gain in-depth knowledge and skills to solve real-life problems. Information exchange for thesis study				

INM898	**PhD Field of Specialization**	**4**	**0**	**0**	**4**
Purpos eand Content	Transfer of scientific experience and scientific discipline to the students in the thesis stage by the academic advisor, and the ability of scientific ethics and work discipline to follow and evaluate the current literature. Demonstration of the student to follow scientific publications and developments about the subject				
INM899	**PhD Thesis Research**	**0**	**1**	**0**	**26**
Purpos eand Content	To complete an original study in the field of civil engineering All publications related to the thesis subject				
LUEE801	**Scientific Research Techniques and Scientific Ethics**	**3**	**0**	**0**	**8**
Purpos eand Content	To be able to know how a process in a scientific research proceeds and how a scientific report must be prepared. Course Content Fundamental concepts and information about the science, the structure of scientific research, scientific methods and different ideas on these methods, data acquisition methods (quantitative and qualitative), registration, analysis, interpretation and reporting of datas.				