ECTS COURSE INFORMATION FORM

Faculty	**Faculty of Engineering**	
Program	**B.Sc. in Civil Engineering**	**Required**
	B.Sc. in Computer Engineering	**Elective**
	B.Sc. in Electrical-Electronics Engineering	**Elective**
	B.Sc. in Industrial Engineering	**Elective**
	B.Sc. in Mechanical Engineering	**Elective**

Course Code	CE 302			
Course Title in English	Foundation Engineering			
Course Title in Turkish	Temel Mühendisliği			
Language of Instruction	English			
Type of Course	Flipped Classroom/ Lecture/ Project			
Level of Course	Undergraduate			
Course Category (by % of Content)	Basic Science	Basic Engineering	Engineering Design	General Education
		50	50	
Semester Offered	Spring			
Contact Hours per Week	Lecture: 4 hours	Recitation: -	Lab:-	Other:-
Estimated Student Workload	132 hours			
Number of Credits	5 ECTS			
Grading Mode	Standard Letter Grade			
Pre-requisites	CE 301 Soil Mechanics			
Expected Prior Knowledge	Prior knowledge of soil mechanics is expected.			
Co-requisites	None			
Registration Restrictions	Only Undergraduate Students			
Overall Educational Objective	To learn about types and purposes of different foundation systems and structures, to evaluate the feasibility of foundation solutions to different types of soil conditions, to build the necessary theoretical background for design and construction of foundation and retaining systems, to develop the ability to analyze stability of slopes.			
Course Description	This course uses the basic principles of soil mechanics to develop the student's ability to design various foundation systems. The principles of statics and mechanics are used to form the necessary tools to solve geotechnical engineering problems concerning design. The following topics are covered: Types of shallow foundations, bearing capacity, selection of soil strength parameters; settlement analysis methods, differential settlement; Design of shallow foundations; Types of deep foundations; axial load capacity, group effects, settlement of deep foundations, lateral earth pressures, retaining walls, and slope stability analysis.			
Course Description in Turkish	Bu derste zemin mekaniğinin temel kavramları kullanılarak farklı temel sistemlerinin tasarımı şu konu başlıkları altında kapsamlı bir şekilde incelenmektedir: Sığ temeller, zeminlerin taşıma kapasitesi, oturma analizleri, sığ temellerin tasarımı, derin temeller, derin temellerde eksenel yük kapasitesi, grup etkisi, derin temellerde oturma hesabı, yanal zemin basıncı, dayanım yapıları, şev kayma analizleri.			
Course Learning Outcomes and Competencies	Upon successful completion of the course, the learner is expected to: 1. understand the importance and methodologies of subsoil investigations, analyze and explain soil investigation data for foundation design; 2. formulate and solve settlement problem due to loading and calculate the bearing capacity of a foundation base soil; 3. design shallow foundations by detailing the defined set of requirements and constraints need to be met, and addressing the uncertainties in the design process;			

	4. design deep foundations by detailing the defined set of requirements and constraints need to be met, and addressing the uncertainties in the design process; 5. design retaining structures by selecting and applying appropriate techniques and tools; 6. analyze the stability of slopes; 7. demonstrate skills of self-directed learning; 8. explain contemporary issues on the identification, formulation, and solution of foundation engineering problems and the impact of engineering solutions.

Relationship of the Course with the Student Outcomes	Level	Learning Outcome(s)	Assessed by
Student Outcomes	N=None S=Supportive H=High		Exam, Project, HW, Experiment, Presentation, etc.
(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	H	1, 2, 6	Flipped Classroom Exercises, Exams, Projects
(2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	H	3, 4, 5	Flipped Classroom Exercises, Exams, Projects
(3) an ability to communicate effectively with a range of audiences			
(4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	S	8	Essay, Projects
(5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives			
(6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions			
(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies	S	7	Projects

Prepared by and Date	Asst. Prof. Gökçe Tönük / January 2020	
Semester	Spring 2019-2020	
Name of Instructors	Asst. Prof. Gökçe Tönük	
Course Contents	Week	Topic
	1.	Introduction to foundation engineering, geotechnical properties of soil
	2.	Subsoil exploration, laboratory and in-situ testing, synthesis of laboratory and field data
	3.	Bearing capacity analysis
	4.	Stresses in soil due to loading and settlement analysis of shallow foundations
	5.	Design of shallow foundations and mat foundations, rigid methods, nonrigid methods
	6.	Types of deep foundations and definitions, load transfer
	7.	Axial load capacity and elastic settlement of piles
	8.	Pile group efficiency, settlement of pile groups, drilled shaft foundations
	9.	Externally and internally stabilized systems, lateral earth pressures
	10.	Retaining wall systems
	11.	Sheet pile walls, Braced Cuts
	12.	Slope stability analysis
	13.	Slope stability analysis
	14.	Soil Improvement and Ground Modification
	15.	Final Exam/Project/Presentation period
	16.	Final Exam/Project/Presentation period

Required/Recommended Readings	Required Textbooks: • Principles for Foundation Engineering, Braja M. Das; Nagaratnam Sivakugan, Cengage, 9th Edition, 2019. Recommended Textbooks: • Foundation Design, Principles and Practices, Prentice Hall, Donald P. Coduto, William A. Kitch, Man-chu Ronald Yeung, 3rd Edition. • Bowles, J. E., Foundation Analysis and Design, McGraw Hill. • Salgado R., The Engineering of Foundations, McGraw Hill. • Soil Mechanics, Spon Press R.F.Craig, 2004, 7th Edition.
Teaching Methods	Contact hours using "flipped classroom" as an active learning technique
Homework and Projects	4 project assignments
Laboratory Work	-
Computer Use	Several softwares and/or numerical methods for the solution of foundation design / retaining wall design / slope stability problems will be introduced.
Other Activities	-
Assessment Methods	Types of assessment — Number — Ratio (%) Midterm Exams — 3 — 50 (18+16+16) Projects — 4 — 28 (each contributing 7%) Classroom Exercises — 5 Essay — 1 — 2 Final Exam — 1 — 15 Total — 100
Course Administration	**Instructor's office and phone number**: A Block, 5th Floor Room: 535 **email address:** tonukg@mef.edu.tr **Rules for attendance:** Minimum of 70% attendance required. Classroom practice (in class and pre-class) contributes to 5% of the final grade. **Missing a project report/essay:** No make-up will be given. Students with more than one project report missing will fail. **Missing a midterm**: Provided that proper documents of excuse are presented, make-up MAY be given. **Missing a final**: University regulations will be enforced. **A reminder of proper classroom behavior, code of student conduct**: YÖK Regulations **Statement on plagiarism**: YÖK Regulations

ECTS Student Workload Estimation

Activity	No/Weeks	Hours			Calculation	Explanation
	No/Weeks per Semester (A)	Preparing for the Activity (B)	Spent in the Activity Itself (C)	Completing the Activity Requirements (D)		
Lecture/Flipped Classroo	14		4		56	A*(B+C+D)
Projects	4	8			32	A*(B+C+D)
Midterm	3	10	2		36	A*(B+C+D)
Essay	1	2			2	A*(B+C+D)
Final Examination	1	5	1		6	A*(B+C+D)
Total Workload					132	
Total Workload/25					5,28	
ECTS					**5**	