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 306			
Course Title in English	Hydraulics			
Course Title in Turkish	Hidrolik			
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
	-	80	20	-
Semester Offered				
Contact Hours per Week	Lecture: 3 hours	Recitation:-	Lab:-	Other:-
Estimated Student Workload	116 hours			
Number of Credits	5 ECTS			
Grading Mode	Standard Letter Grade			
Pre-requisites	FLM 301 Fluid Mechanics			
Expected Prior Knowledge	Prior knowledge of fundamental concepts of fluid mechanics is expected.			
Co-requisites	None			
Registration Restrictions	Only Undergraduate Students			
Overall Educational Objective	To learn to apply the fluid mechanics principles in Civil Engineering applications focusing on dimensional analysis in hydraulic problems, principles of model theory and open channel & closed conduit flows.			
Course Description	This course covers the hydraulic concepts in which students apply the fluid mechanics principles to solve hydraulic problems of Civil Engineering domain. The following major topics are covered in detail: Dimensional analysis, model similitude, closed conduit flow and open channel flow.			
Course Description in Turkish	Bu derste; temel hidrolik kavramları, akışkanlar mekaniği prensiplerinin İnşaat mühendisliği hidrolik problemlerine uygulanmasına yönelik işlenmektedir. Hidrolik kavramları, şu konu başlıklar altında kapsamlı bir şekilde incelenmektedir: Boyut analizi, Model benzeşimi, Basınçlı akımlar, Serbest yüzeyli akımlar.			
Course Learning Outcomes and Competencies	Upon successful completion of the course, the learner is expected to: 1. derive mathematical relations corresponding to physical phenomena; 2. explain, compare and relate prototypes and models; 3. apply the design principles of closed conduits, relate to its applications; 4. apply the design principles of open channel flows, relate to its applications.			

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	Quiz, Midterm
(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	S	3,4	Quiz, Midterm
(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			
(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			

Prepared by and Date	Prof. Dr. E. Beyhan Yeğen / December 2019	
Semester	Spring 2019-2020	
Name of Instructor	Prof. Dr. E. Beyhan Yeğen	
Course Contents	Week	Topic
	1.	Introduction
	2.	Pipe flow
	3.	Continuous energy losses
	4.	Local energy losses
	5.	Pump-Reservoir-Pipe networks
	6.	Model Theory s
	7.	Open channel flow
	8.	Uniform flow
	9.	Specific energy
	10.	Subcritical and supercritical flows
	11.	Rapidly varied flows
	12.	Hydraulic jump
	13.	Gradually varied flows
	14.	Dimensional analysis
	15.	Final Exam/Project/Presentation period
	16.	Final Exam/Project/Presentation period
Required/Recommended Readings	Required Textbooks: • Featherstone R. E., Nalluri C. (2009). Civil Engineering Hydraulics, Wiley – Blackwell, 5th edition. Recommended Textbooks: • Houghtalen, R.J., Akan, A.O.H., Hwang, N.H.C. (2017). Fundamentals of Hydraulic Engineering Systems (5th Edition), 4th Edition, Pearson, ISBN-13: 9780134292380. • Graf W. H., Altınakar M. S., (2002). Fluvial Hydraulics, Wiley Press. • Chow V. T., (1986). Open Channel Hydraulics, McGraw Hill Press.	

Teaching Methods	Lectures/contact hours using "flipped classroom" as an active learning technique
Homework and Projects	1 Term Project
Laboratory Work	-
Computer Use	MS Office or Equivalent Programs are required, , students are encouraged to use computer programs while preparing their term project.
Other Activities	-
Assessment Methods	Types of assessment — Number — Ratio (%) Midterm Exams — 2 — 70 Quiz - HW — weekly — 30 Total — 100
Course Administration	**Instructor's office and phone number:** **office hours:** **e-mail address:** **Rules for attendance:** Minimum of 70% attendance required. In class quizzes and homeworks contribute to 30% of the final grade. **Missing a midterm**: Provided that proper documents of excuse are presented, each missed midterm by the student will be given the grade of the final exam. No make-up will be given. **Missing the final project**: Faculty regulations. **A reminder of proper classroom behavior, code of student conduct**: YÖK Regulations **Statement on plagiarism**: YÖK Regulations http://3fcampus.mef.edu.tr/uploads/cms/webadmin.mef.edu.tr/4833_2.pdf

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		3		42	A*(B+C+D)
Quizzes	12	1	1		24	A*(B+C+D)
Midterm(s)	2	23	2		50	A*(B+C+D)
Term Project					0	A*(B+C+D)
Final Examination					0	A*(B+C+D)
Total Workload					116	
Total Workload/25					4,64	
ECTS					**5**	