ESOGÜ Mechanical Engineering Department

COURSE INFORMATION FORM

COURSE CODE	COURSE NAME	SEMESTER	CREDITS		
			T	U	ECTS*
151815346	FLUID MECHANICS	5	3	0	5

INSTRUCTOR NAME	LANGUAGE	COURSE TYPE**		
		CORE	ELECTIVE	
Prof. Dr. Necati MAHİR	English	X		
		Technical	Design	Other

COURSE EVALUATION				
	ACTIVITY		Number	Percentage (%)
MID-TERM	Written exam		1	40
	Quiz			
	Homework			
	Project			
	Laboratory			
	Other (…….)			
FINAL	Oral exam			
	Homework + Oral exam			
	Project + Oral exam			
	Written exam		1	60
	Other (…….)			
MAKE-UP EXAM**	Oral	Written	Oral and Written	Multiple Choice
		X		

COURSE CONTENT	Introductory concepts and definitions, The continuity equation, Euler equations of motion, Hydrostatics, Navier-Stokes equations, Some solutions of Navier-Stokes equations, The Bernoulli equation, Extended Bernoulli equation (Energy equation), Engineering applications of the Bernoulli equation, Momentum theorems, Dimensional analysis and similitude, Analysis of flow in pipes and over surfaces, Laminar and turbulent boundary layers, Potential flow.
COURSE OBJECTIVES	Derivations of continuity equation, Euler's equations of motion, Navier-Stokes equations, Bernoulli equation, energy equation, and momentum equations used in science of Fluid Mechanics, and their use and utilization in engineering applications. Hydraulic energy conversion, importance of hydropower in hydroelectric power plants.
COURSE AIMS	Physical properties of fluids, transport of fluids in pipes and ducts, hydraulic energy conversion, analysis of hydraulic systems, calculation of hydraulic losses, calculation of efficiencies of fluid machinery, and utilization of hydropower in hydroelectric power plants.
TEXTBOOK(S)	Young, Munson, Okiishi, and Huebch, "A Brief Introduction to Fluid Mechanics" John Wiley & Sons, Inc.
REFERENCES	P. Gerhart, A. L. Gerhart, J. Hochstein, "Fundamentals of Fluid Mechanics" Wiley. Frank M. White, " Fluid Mechanics ", McGraw-Hill Book Company.

* ECTS (European Credit Transfer System).
** Place (X) as appropriate.

COURSE OUTLINE	
WEEK	**SUBJECTS / TOPICS**
1	Introduction to Fluid Mechanics
2	Concepts and Definitions
3	Pressure and Fluid Statics
4	Fluid kinematics
5	Bernoulli and energy equations
6	Momentum analysis of flow systems
7	Momentum analysis of flow systems
8	Midterm
9	Dimensional analysis and modeling
10	Internal flow
11	Internal flow
12	Differentia analysis of fluid flow
13	Approximate solution of Navier-Stokes Equations
14	External flow: Drag
15	External flow: Lift
16	Final Exam

OUTCOMES

S/N	At the end of the course, students will be able to:	Never	Few	Many
1	apply knowledge of mathematics, science, and engineering			**X**
2	design and conduct experiments as well as to analyze and interpret data		**X**	
3	design a system, component, or process to meet desired needs		**X**	
4	Incorporate in a team work		**X**	
5	function on multi-disciplinary teams		**X**	
6	identify, formulate, and solve engineering problems			**X**
7	use techniques, skills, and modern engineering tools necessary for engineering practice		**X**	
8	get an understanding of professional and ethical responsibility		**X**	
9	communicate effectively		**X**	
10	understand the broad education necessary to understand the impact of engineering solutions in a global and societal context		**X**	
11	get a recognition of the need for, and an ability to engage in life-long learning		**X**	
12	gain a knowledge of contemporary issues	**X**		

Prepared by: Prof. Dr. Necati MAHİR **Date: 06.07.2021**

Signature(s):