FLUID MECHANICS

1	Course Title:	FLUID MECHANICS	
2	Course Code:	INS3051	
3	Type of Course:	Compulsory	
4	Level of Course:	First Cycle	
5	Year of Study:	3	
6	Semester:	5	
7	ECTS Credits Allocated:	6.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	1.00	
10	Laboratory (hour/week):	1	
11	Prerequisites:	None	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Doç.Dr. SERDAR KORKMAZ	
15	Course Lecturers:		
16	Contact information of the Course Coordinator:	skorkmaz@uludag.edu.tr 0224 24 09 04	
17	Website:	http://insaat.uludag.edu.tr/	
18	Objective of the Course:	To teach the student the theory and application of fluid mechanics, the fundamental of hydraulic engineering	
19	Contribution of the Course to Professional Development:		
20	Learning Outcomes:		
		1	To be able to identify the physical properties of fluids
		2	To be able to calculate the hydrostatic forces acting on plane and curved surfaces
		3	To be able to classifythetypes of fluid flow
		4	To be able to applythefundamental conservation principles to pressurized and open channel flow problems
		5	To be able tocalculatethe friction and minor losses in pressurized flows as well as pump and turbine powers
		6	Tobe able to analyze and design water distribution networks
		7	To be able to calculate the flow rate, depth and force of water and design channels
		8	Improvement in observation, measurement and report writing habitudeby means of laboratory experiments
		9	
		10	
21	Course Content:		

Course Content:

Week	Theoretical	Practice
1	The field of fluid mechanics, descriptions, dimensions and units	
2	Physical properties of fluids, body and surface forces	Reynolds experiment

3	Hydrostatics, governing equation, pressure distribution and measurement	Recitation
4	Hydrostatic forces on plane and curved surfaces	Hydrostatic pressure experiment
5	Kinematics, position, velocity, acceleration vectors, motion and deformation of a fluid element, flow types	Recitation
6	Concepts of system and control volume, Reynolds Transport Theorem	Recitation
7	Conservation of mass, momentum and energy, Bernoulli's equation	Water jet impact experiment
8	General characteristics of flow in pressurized pipes, friction losses, energy and hydraulic grade lines, Darcy-Weisbach and Hazen-Williams equations	Recitation
9	Darcy-Weisbach friction factor in laminar and turbulent flows, head loss in single pipe systems, velocity and diameter calculations	Experiment of friction losses in various pipes
10	Minor losses and flow measurement using venturimeter	Minor loss and venturimeter experiments
11	Pipes in series and in parallel, equivalent diameter, multi-reservoir systems, junctions	Recitation
12	Solution to water distribution networks using Hardy-Cross method, pumps and turbines	Experiment of water distribution networks
13	Open channel flow, properties, types and uniform flow equations	Recitation
14	Specific energy, critical flow, channel transitions, Rapidly varied flow, specific force and gradually varied flow	Experiments of Flow types, flow state and flow through obstacles in open channels , Experiment of gradually varied flow

22	Textbooks, References and/or Other Materials:	1. CE272 Fluid Mechanics Lecture Notes, METU, Civil Eng. Dept., 2009. 2. CE372 Hydromechanics Lecture Notes, METU, Civil Eng. Dept., 2009. 3. Fundamentals of Fluid Mechanics, B. R. Munson, D. F. Young, T. H. Okiishi, John Wiley, 2003. 4. Fluid Mechanics 6th Ed, F. M. White, McGraw Hill, 2008.
23	Assesment	

TERM LEARNING ACTIVITIES	**NUMBER**	**WEIGHT**
Midterm Exam	1	30.00
Quiz	0	0.00
Home work-project	12	10.00
Final Exam	1	60.00
Total	14	100.00
Contribution of Term (Year) Learning Activities to Success Grade		40.00
Contribution of Final Exam to Success Grade		60.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course		

24	**ECTS / WORK LOAD TABLE**

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	14	2.00	28.00
Self study and preperation	14	4.00	56.00
Homeworks	12	4.00	48.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	2.00	2.00
Others	0	0.00	0.00
Final Exams	1	2.00	2.00
Total Work Load			180.00
Total work load/ 30 hr			5.93
ECTS Credit of the Course			6.00

25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	**PQ2**	**PQ3**	**PQ4**	**PQ5**	**PQ6**	**PQ7**	**PQ8**	**PQ9**	**PQ10**	**PQ11**	**PQ12**	**PQ13**	**PQ14**	**PQ15**	**PQ16**
ÖK1	4	4	4	0	4	0	0	0	0	0	0	0	0	0	0	0
ÖK2	4	4	4	0	4	0	0	0	0	0	0	0	0	0	0	0
ÖK3	4	4	4	0	4	0	0	0	0	0	0	0	0	0	0	0
ÖK4	5	5	5	0	4	0	0	0	0	0	0	0	0	0	0	0
ÖK5	5	5	5	0	4	0	0	0	0	0	5	0	0	0	0	0
ÖK6	5	5	5	0	4	0	0	0	0	0	5	0	0	0	0	0
ÖK7	5	5	5	0	4	0	0	0	0	0	5	0	0	0	0	0
ÖK8	0	4	5	5	5	0	0	0	0	0	5	0	0	0	0	0

LO: Learning Objectives PQ: Program Qualifications

Contribution Level:	**1 very low**	**2 low**	**3 Medium**	**4 High**	**5 Very High**