MM 406 Hydraulic Machinery				DEPARTMENT of MECHANICAL ENGINEERING					
Semester	**Methods of Education**							**Credits**	
	Lecture	**Recit.**	**Lab.**	**Project / Field Study**	**Homework**	**Other**	**Total**	**Credit**	**ECTS Credit**
8	42	0	-		23	10	75	3	3.0
Language	Turkish								
Compulsory / Elective	Elective								
Prerequisites	None								
Course Contents	Definition of power, tread, efficiency. Similitude, Specific speed. Hydroelectric power stations. Pumps; axial flow and centrifugal pumps. Design of centrifugal pumps, performance characteristic. Water turbines, pelton turbines, special type reaction turbines, Francis, Kaplan and propeller turbines. Recent developments in turbines. Thoma number, cavitation and its effect on reaction machinery.								
Course Objectives	To introduce basic properties and importance of pumps and turbines in engineering applications. To teach and apply basic methods employed for analysis of engineering problems involving fluids.								
Learning Outcomes and Competences	Understanding of basic properties of fluids. Learning the methods used for analysis of hydraulic machinery, and force and energy exchange between fluid and the surfaces in content with fluids, and application of these methods for design and development.								
Textbook and / or Reference	1. Turbomachinery Performance Analysis, R. I. Lewis. John Wiley & Sons, Inc. Arnold. 2. Water Machinery Lessons (in Turkish), C. Özgür, I. T. U. Press. 3. Complete Centrifugal Pumps (in Turkish), B. K. Baysal, I. T. U. Press.								
Assessment Criteria					**If any, mark as (x)**			**Percentage (%)**	
	Midterm Exams				X			50	
	Quizzes				X			5	
	Homeworks				X			5	
	Projects								
	Term Paper								
	Laboratory Work								
	Other								
	Final Exam				X			40	
Instructors	Assist.Prof. Ibrahim ATILGAN								
Week	**Subject**								
1	Introduction, definition of power, tread, efficiency.								
2	Similitude, specific speed, fundamental concepts.								
3	Pumps, axial flow and centrifugal pumps								
4	Design of centrifugal pumps, performance characteristics.								
5	Operations and applications of pumps.								
6	Water turbines, Pelton turbines, special type action and reaction turbines.								
7	Applications, Midterm Exam 1.								
8	Francis, Kaplan and propeller turbines.								
9	Recent developments in turbines.								
10	Turbines operations.								
11	Thoma number, cavitation and its effect on reaction machinery.								
12	Applications, Midterm Exam 2.								
13	The parallel and series connected centrifugal pumps.								
14	Applications of hydraulic machinery.								