

MM 301E Fluid Mechanics I				DEPARTMENT of MECHANICAL ENGINEERING					
Semester	Methods of Education							Credits	
	Lecture	Recit.	Lab.	Project/Field Study	Homework	Other	Total	Credit	ECTS Credit
5	42	-	15	-	30	38	125	3	5.0
Language	English								
Compulsory / Elective	Compulsory								
Prerequisites	None								
Course Contents	Introduction Fundamental concepts and fluid properties. Description and classification of fluid motion. Fluid statics. Buoyancy and stability. Concepts of system and control volume. Derivation and application of basic equations in integral form for a control volume. Laminar and turbulent flows in pipes and ducts, major and minor losses.								
Course Objectives	To introduce basic properties and importance of fluids 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 fluid motion, and force and energy exchange between fluid and the surfaces in contact with fluids, and application of these methods for design and development.								
Textbook and /or Reference	1. Introduction to Fluid Mechanics, R. W. Fox, P. J. Pritchard and A. T. MacDonald, John Wiley & Sons, Inc., Seventh Edition. 2. Mechanics of Fluids, M. C. Potter and D. C. Wiggert, Prentice Hall, Second Edition. 3. Fundamentals of Fluid Mechanics, B. R. Munson, D. F. Young and T. H. Okiishi, John Wiley & Sons, Inc., Third Edition.								
Assessment Criteria						If any, mark as (x)		Percentage (%)	
	Midterm Exams					X		45	
	Quizzes					X		5	
	Homework					X		5	
	Projects								
	Term Paper								
	Laboratory Work					X		5	
	Other								
	Final Exam					X		40	
Instructors	Prof. Nuri YUCEL, Prof. Hasmet TURKOGLU, Asst. Prof. Dr. Nureddin DINLER								
Week	Subject								
1	INTRODUCTION: Definition of fluid, fluid mechanics in engineering, scope of fluid mechanics, methods of analysis, dimensions and units.								
2	FUNDAMENTAL CONCEPTS: Definition of continuum, fluid as a continuum, velocity field, timeline, pathline, streakline and streamline. Stress field. EXPERIMENT I.								
3	FUNDAMENTAL CONCEPTS: Viscosity, Newtonian and non-Newtonian fluids, vapor pressure and surface tension, description and classification of fluid motion.								
4	FLUID STATICS: The basic equation of fluid statics, analysis of hydrostatic force on plane submerged surfaces.								
5	FLUID STATICS: Analysis of hydrostatic force on curved submerged surfaces. Buoyancy and stability.								
6	FLUID STATICS: Analysis of fluids in rigid-body motion.								
7	BASIC EQUATIONS FOR A SYSTEM: Conservation of mass, momentum, moment of momentum and energy equations.								
8	MIDTERM EXAM I, EXPERIMENT II.								
9	BASIC EQUATIONS IN INTEGRAL FORM: Derivation of Reynolds transport equation. Derivation and application of conservation of mass and momentum equations for a control volume.								
10	BASIC EQUATIONS IN INTEGRAL FORM: Derivation and application of moment of momentum and conservation of energy equations for a control volume.								
11	ANALYSIS OF INTERNAL INCOMPRESSIBLE FLOW: Derivation of extended Bernoulli equation. Calculation of major and minor head losses and usage of tables and graphs.								
12	ANALYSIS OF INTERNAL INCOMPRESSIBLE FLOW: Flow analysis in serial system of pipes, flow analysis in parallel system of pipes,								
13	MIDTERM EXAM II and solutions of exam problems.								
14	ANALYSIS OF INTERNAL INCOMPRESSIBLE FLOW: Analysis of pipe networks, analysis of interconnected reservoir systems								