Course Description Form	
Course Code and Name	ME302 Fluid Mechanics II
Course Semester	6
Catalog Content	Teach derivation and application of basic equations in differential form governing the fluid motion, solution of differential equations to find velocity distribution, calculation of forces exerted by flows on bodies, introduce the dimensional analysis, similitude and the boundary layer concept.
Textbook	1) Introduction to Fluid Mechanics, R. W. Fox, P. J. Pritchard and A. T. McDonald, John Wiley & Sons, Inc. 2) Introduction to Fluid Mechanics, D. F. Young, B. R. Munson, T. H. Okiishi and W.W. Huebsch, John Wiley & Sons, Inc.
Supplementary Textbooks	1) Mechanics of Fluids, M. C. Potter and D. C. Wiggert, Prentice Hall.
Credit	5
Prerequisites of the Course (Attendance Requirements)	ME301 Fluid Mechanics I
Type of the Course	Compulsory
Instruction Language	English
Course Objectives	Teach derivation and application of basic equations in differential form governing the fluid motion, solution of differential equations to find velocity distribution, calculation of forces exerted by flows on bodies, introduce the dimensional analysis, similitude and the boundary layer concept.
Course Learning Outcomes	1. The fundamental equations of flow motion can be derived in differential form. 2. Analytically can solve simple flow problems. 3. Can analyze potential flow problems. 4. Can derive boundary layer equations and apply them to some problems. 5. Can analyze flow and forces acting on the immersed bodies.
Instruction Methods	The mode of delivery of this course is in class instruction and problem solution, homework assingment and limitted experimental application.
Weekly Schedule	1. Week DIFFERANSIYEL ANALYSIS OF FLUID MOTION: Derivation of continuity equation. Stream function for two-dimensional incompressible flows. 2. Week DIFFERANSIYEL ANALYSIS OF FLUID MOTION: Motion of fluid elements (kinematics), derivation of momentum equation. 3. Week DIFFERANSIYEL ANALYSIS OF FLUID MOTION: Motion of fluid elements (kinematics), derivation of momentum equation. 4. Week INCOMPRESSIBLE INVISCID FLOW: Irrotational flow. Bernoulli equation for irrotational flow. Velocity potential and stream function. 5. Week INCOMPRESSIBLE INVISCID FLOW: Elementary plane flows. Superposition of plane flows. 6. Week DIMENSIONAL ANALYSIS AND SIMILITUDE: Introduction. Buckingham Pi theorem. Determination of Pi groups. 7. Week DIMENSIONAL ANALYSIS AND SIMILITUDE: Dimensionless groups of significance in fluid mechanics. Flow similarity and model studies. 8. Week I. Midterm. DIMENSIONAL ANALYSIS AND SIMILITUDE: Dimensionless groups of significance

	in fluid mechanics. Flow similarity and model studies. EXPERIMENT I 9. Week BOUNDARY LAYER: The boundary layer concept, boundary layer thicknesses. 10. Week BOUNDARY LAYER: Laminar flat-plate boundary layer: Exact solution. Momentum integral equations. 11. Week FLOW ABOUT IMMERSED BODIES: Drag and lift on surfaces parallel and normal to flow. EXPERIMENT II 12. Week FLOW ABOUT IMMERSED BODIES: Flow over cylinder and sphere: Drag and lift forces. Flow over different geometrical shapes. 13. Week II. Midterm. COMPRESSIBLE FLOW: Introduction. Analysis of steady one-dimensional compressible flow. Fanno line and Rayleigh line. 14. Week COMPRESSIBLE FLOW: Introduction. Analysis of steady one-dimensional compressible flow. Fanno line and Rayleigh line. 15. Week FINAL EXAM
Teaching and Learning Methods *(These are examples. Please fill which activities you use in the course)*	Weekly theoretical course hours: 3 Weekly applied course hours: 0 Reading Activities: 2 Internet browsing, library work: 2 Designing and implementing materials: 0 Report preparing: 5 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 12 Final Exam and Preparation for Final Exam: 12
Assessment Criteria	

	Numbers	**Total Weighting (%)**
Midterm Exams	2	45
Assignment	4	0
Application	2	5
Projects	0	0
Practice	0	0
Quiz	2	10
Percent of In-term Studies (%)		60
Percentage of Final Exam to Total Score (%)		40
Attendance		0

Workload

Activity	**Total Number of Weeks**	**Duration (weekly hour)**	**Total Period Work Load**
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			0
Reading Tasks	10	2	20
Studies	10	2	20
Material Design and Implementation			0
Report Preparing	2	5	10
Preparing a Presentation			0
Presentations			0
Midterm Exam and Preperation for Midterm Exam	2	12	24

Final Exam and Preperation for Final Exam	1	12	12
Other (should be emphasized)			0
Total Workload			128
Total Workload / 25			5,12
Course Credit (ECTS)			5

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Adequate knowledge of subjects specific to mathematics, natural sciences and related engineering disciplines; ability to use theoretical and applied knowledge related to these areas in complex engineering problems.					X
2	Ability to identify, define, formulate, and solve complex engineering problems; ability to select and apply appropriate analysis and modeling methods to this end.					X
3	Ability to design a complex system, process, device or product under realistic constraints and conditions to meet specific requirements; ability to apply modern design methods for this purpose.	X				
4	Ability to develop, select and use modern techniques and tools required for the analysis and solution of complex problems encountered in engineering practice; ability to use information technologies effectively.			X		
5	Ability to design and conduct experiments, collect data, analyze and interpret results to investigate complex engineering problems or discipline-specific research topics.					
6	Ability to work effectively in disciplinary and multi-disciplinary teams; ability to work individually.					
7	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of at least one foreign language; the ability to write effective reports and understand written reports, to prepare design and production reports, to deliver effective presentations, to give and receive clear and understandable instructions.					
8	Awareness of the necessity of lifelong learning; the ability to access information, to follow developments in science and technology, and to renew oneself constantly.					
9	Acting in accordance with ethical principles, professional and ethical responsibility;					

		information about standards used in engineering applications.						
	10	Information about business life practices such as project management, risk management and change management; awareness of entrepreneurship, innovation; information about sustainable development.						
	11	Knowledge about the universal and social effects of engineering applications on health, environment and safety and the problems of the age reflected in the engineering field; awareness of the legal consequences of engineering solutions.						
The Course's Lecturer(s) and Contact Informations	1. Prof. Dr. Nuri YÜCEL nuyucel@gazi.edu.tr 2. Assist. Prof. Dr. Nureddin DİNLER ndinler@gazi.edu.tr							