

### SYLLABUS

<b>Code/Name</b>	MCE 303 / Fluid Mechanics II
<b>Type</b>	Required
<b>Credit/ECTS</b>	3/4
<b>Hour per Week</b>	3 (3+0+0)
<b>Level/Year</b>	Undergraduate/3
<b>Semester</b>	Fall
<b>Classroom</b>	D204
<b>Content</b>	Differential analysis of fluid flow. Navier-Stokes equation and its solutions. External flow, drag, lift, and airfoil theory. Compressible fluid flow, isentropic flow, supersonic nozzles, shock waves and expansion waves. Pumps, turbines, and scaling laws. Introduction to CFD.
<b>Prerequisites</b>	-
<b>Textbooks</b>	<b><u>Primary</u></b> Y Çengel, J Cimbala, <i>Fluid Mechanics: Fundamentals and Applications</i> , 4 <sup>th</sup> edition, McGraw-Hill Education, 2018. <b><u>Supplementary</u></b> FM White, <i>Fluid mechanics</i> , 8 <sup>th</sup> edition, McGraw-Hill Education, 2015.
<b>Objectives</b>	<ul style="list-style-type: none"><li>• To know, understand and apply the basic concepts of fluid mechanics</li><li>• To apply scientific method strategies to fluid mechanics</li><li>• To plan and carry out design and processes in the field of fluid mechanics</li></ul>
<b>Course Outcomes</b>	In this course you will be able to: C01 Analyze dynamic of fluid flow and derive Navier-Stokes equations C02 Understand the mechanics of viscous flow about immersed boundaries C03 Learn the mechanism of a flow in which there are significant changes in fluid density C04 Apply principles of fluid mechanics to design and selection of fluid machinery

#### Weekly Schedule of Topics

W	Topic
1	Differential analysis of fluid flow
2	Differential analysis of fluid flow
3	Differential analysis of fluid flow
4	Approximate solutions of the Navier-Stokes equation
5	Approximate solutions of the Navier-Stokes equation
6	Approximate solutions of the Navier-Stokes equation
7	External flow
8	External flow
9	External flow
10	Compressible flow
11	Compressible flow
12	Turbomachinery
13	Turbomachinery
14	Introduction to CFD

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<b>Professional Contribution</b>	Utilize both theoretical and practical knowledge in engineering solutions including fluid flow both internal and external
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**Contribution to Program Outcomes\***

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	5	4	4	5	0	3	1	0	0	3	0
CO2	5	5	4	4	0	3	1	0	0	3	0
CO3	5	5	4	4	0	3	1	0	0	3	0
CO4	4	4	4	4	1	3	1	0	0	2	0

\* Contribution Level | 0: None | 1: Very Low | 2: Low | 3: Medium | 4: High | 5: Very High

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<b>Special Conditions</b>	The consequence of violation of the attendance rule is to receive a grade of <b>NA</b> .
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**Requirements**

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<b>Evaluation</b>	Midterm Exam	40%
	Quiz, Assignment	10%
	Final Exam	50%
	Total	100%

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**Rubric**

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<b>Course Policy</b>	<ol style="list-style-type: none"><li>1. You must attend at least 70% of the sessions including add-drop period.</li><li>2. Be in the class on time.</li><li>3. English should always be used to communicate with one another.</li><li>4. Mobile phone should be switched off and put away during the class.</li><li>5. You cannot talk to your friends during class no matter what the subject is.</li></ol>
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<b>Cheating &amp; Plagiarism</b>	<ul style="list-style-type: none"><li>• Copying or letting someone to copy your work on exams, assignments, or reports is cheating.</li><li>• Cutting and pasting text, figures and tables from the web sources or any other electronic source is plagiarism.</li><li>• The consequence of academic dishonesty is to receive a grade of <b>F</b> for the course.</li></ul>
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**Instructor**

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Room	216	Office Hours	

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Prepared by Gökhan Canbolat