AERO 206 – FLUID MECHANICS

Course Code	Course Name	Semester	
AERO 206	Fluid Mechanics	Fall ☐ Spring ☒ Summer ☐	
Hours		**Credit**	**ECTS**
Theory	**Practice** / **Lab**	4	5
4	0 / 0		

Course Details	
Department	Aerospace Engineering
Course Language	English
Course Level	Undergraduate ☒ Graduate ☐
Mode of Delivery	Face to Face ☒ Online ☐ Hybrid ☐
Course Type	Compulsory ☒ Elective ☐
Course Objectives	To give the ability of developing fluid mechanics equations in integral and differential forms to students and to build the understanding of basic fluid-solid interactions.
Course Content	• 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 flow equations in integral and differential forms. Laminar and turbulent flows in pipes. • Stream Function. • Potential flows and Potential function. • Conformal mapping. • Flow over airfoils.
Course Method/ Techniques	Lecture ☒ Question & Answer ☒ Presentation ☐ Discussion ☒
Prerequisites/ Corequisites	
Work Placement(s)	

Textbook/References/Materials

- B.R. Munson, D.F. Young and T. H. Okiishi, 2006, Fundamentals of Fluid Mechanics, 5th Edition, J. Wiley and Sons.
- F. M. White, 2005, Fluid Mechanics, 5th Edition, McGraw Hill.

Course Category				
Mathematics and Basic Sciences	☐		Education	☐
Engineering	☒		Science	☒
Engineering Design	☐		Health	☐
Social Sciences	☐		Profession	☐

Weekly Schedule		
No	**Topics**	**Materials/Notes**
1	Fundamental Concepts	
2	Fluid Statics	
3	Integral Equations of Fluid Mechanics	
4	Integral Equations of Fluid Mechanics	
5	Differential Equations of Fluid Mechanics	
6	Differential Equations of Fluid Mechanics	
7	Differential Equations of Fluid Mechanics	
8	Midterm Exam	
9	Incompressible Inviscid Flow	
10	Incompressible Inviscid Flow	
11	Internal and External Incompressible Viscous Flow	
12	Internal and External Incompressible Viscous Flow	
13	Internal and External Incompressible Viscous Flow	
14	Conformal mapping	
15	Flow over buff bodies and airfoils	
16	Final Exam	

Assessment Methods and Criteria		
In-term studies	**Quantity**	**Percentage**
Attendance		
Lab		
Practice		
Fieldwork		
Course-specific internship		
Quiz/Studio/Criticize		
Homework	4	20%
Presentation / Seminar		
Project		

Report		
Seminar		
Midterm Exam	1	30%
Final Exam	1	50%
	Total	**100%**
Contribution of Midterm Studies to Success Grade		50%
Contribution of End of Semester Studies to Success Grade		50%
	Total	**100%**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration (Hrs)**	**Total Workload**
Course Hours	14	4	56
Lab			
Practice			
Fieldwork			
Course-specific Work Placement			
Out-of-class study time	14	2	28
Quiz/Studio/Criticize			
Homework	4	4	16
Presentation / Seminar			
Project			
Report			
Midterm Exam and Preparation for Midterm	1	13	13
Final Exam and Preparation for Final Exam	1	13	13
Total Workload			**126**
Total Workload / 25			**126/25**
ECTS Credit			**5**

Course Learning Outcomes	
No	**Outcome**
L1	Has knowledge about the basic fluid properties and the fundamental concepts of fluid mechanics.
L2	Can derive and apply the fundamental equation of fluid statics and determine the hydrostatic force acting on immersed surfaces.
L3	Can derive and apply the conservation equations of mass, momentum, energy and angular momentum in integral form.
L4	Can analyze incompressible flow in pipes and closed conduits, over bluff bodies and airfoils.

Contribution of Course Learning Outcomes to Program Competencies/Outcomes

Contribution Level: 1: Very Slight, 2: Slight, 3: Moderate, 4: Significant, 5: Very Significant

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	Total
L1	5	4	3	4	3	2	2	3	2	1	2	31/55 = 56.36%
L2	5	5	4	4	3	2	2	3	2	1	2	33/55 = 60%
L3	5	5	4	5	4	3	3	4	2	1	3	39/55 = 70.9%
L4	5	5	4	5	4	3	3	4	2	1	3	39/55 =70.9 %
											Total	64.54%