AERO 208 - HEAT TRANSFER

Course Code	Course Name	Semester	
AERO 208	Heat Transfer	Fall ☒ Spring ☐ Summer ☐	
Hours		**Credit**	**ECTS**
Theory	**Practice** / **Lab**	3	5
3	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 understand the fundamentals of heat transfer.
Course Content	Introduction; Overview of heat transfer, differences from thermodynamics. Three modes: conduction, convection, and radiation. Conduction; Fourier's law, steady-state conduction, thermal resistance. Transient conduction (lumped-capacitance). Convection; Forced and natural convection (Newton's law of cooling). Heat exchangers and their performance (NTU method). Radiation Stefan-Boltzmann law, emissivity, radiation between surfaces. Extended Surfaces (Fins) Fin efficiency and applications. Combined Modes; Cases involving multiple heat transfer modes (e.g., conduction + convection).
Course Method/ Techniques	Lecture ☒ Question & Answer ☒ Presentation ☐ Discussion ☒
Prerequisites/ Corequisites	
Work Placement(s)	

Textbook/References/Materials

- Fundamentals of Heat and Mass Transfer, F. Incropera, D. DeWitt, T. Bergman, A. Lavine).

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

Weekly Schedule		
No	**Topics**	**Materials/Notes**
1	Introduction	Introduction to heat transfer.
2	Conduction	Heat transfer by conduction
3	One-Dimensional Steady-State Conduction.	One-Dimensional Steady-State Conduction
4	One-Dimensional Steady-State Conduction.	One-Dimensional Steady-State Conduction (continued)
5	Two-Dimensional Steady-State Conduction	Two-Dimensional Steady-State Conduction
6	Transient Conduction	Transient Conduction
7	Transient Conduction (continued)	Transient Conduction (continued)
8	Midterm Exam	
9	Introduction to Convection	Introduction to Convection heat transfer
10	External flow convection heat transfer	External flow convection heat transfer.
11	External flow convection heat transfer (continued)	External flow convection heat transfer (continued)
12	Internal flow convection heat transfer	Internal flow convection heat transfer
13	Free Convection	Free Convection
14	Radiation	Processes and properties and radiation exchange between surfaces.
15	Final Exam	

Assessment Methods and Criteria		
In-term studies	**Quantity**	**Percentage**
Attendance	14	5%
Lab		
Practice		
Fieldwork		
Course-specific internship		
Quiz/Studio/Criticize	5	25%
Homework		
Presentation / Seminar		
Project		
Report		
Seminar		
Midterm Exam	1	30%
Final Exam	1	40%
	Total	**100%**
Contribution of Midterm Studies to Success Grade		60%
Contribution of End of Semester Studies to Success Grade		40%
	Total	**100%**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration (Hrs)**	**Total Workload**
Course Hours	14	3	42
Lab			
Practice			
Fieldwork			
Course-specific Work Placement			
Out-of-class study time	14	4	56
Quiz/Studio/Criticize	5	2	10
Homework			
Presentation / Seminar			
Project			
Report			
Midterm Exam and Preparation for Midterm	1	10	10
Final Exam and Preparation for Final Exam	1	15	15
Total Workload			**133**
Total Workload / 25			**5.32**
ECTS Credit			**5**

Course Learning Outcomes	
No	**Outcome**
L1	Comprehending and calculating conduction heat transfer.
L2	Applying conservation of energy in heat transfer problems.
L3	Comprehending and calculating forced and natural convection heat transfer.
L4	Comprehending and calculating radiation heat transfer.

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	4	5	5	5	1	5	3	3	2	1	1					35/55; 63.636%
L2	4	5	5	5	1	5	3	3	2	1	1					35/55; 63.636%
L3	4	5	5	5	1	5	3	3	2	1	1					35/55; 63.636%
L4	4	5	5	5	1	5	3	3	2	1	1					35/55; 63.636%
															Total	140/220; 63.636%