The University of Jordan
School of Engineering

Department	Course Name	Course Number	Semester
Mechanical Engineering	Applications in Thermo-Fluid Systems Design	0914590	2023 Spring

2019 Course Catalog Description

A project-oriented course aimed at applying design principles of thermo-fluids' systems (TFS) and selection techniques covered in TFS courses into an integrated project using modern software packages. In lecture session the following should be discussed: soft skills like presentation, report writing, literature review, trading and scoring among different designs of thermos-fluid systems, selection, modelling, simulation and analysis of thermos-fluid components, simplified economic analysis. In laboratory sessions Students will work in teams on real-life mechanical design problems capped by project final report and presentation along with biweekly progress reports and presentations.

Instructors

Name	E-mail, Lecture Time	Join lectures on
Prof. Jamil AlAsfar	jasfar@ju.edu.jo	**Thu / 1:30 – 4:30**

Text Books

	Text book 1	Text book 2
Title	Design of Fluid Thermal Systems	Elements of Thermal-fluid System Design
Author(s)	William S. Janna	Louis C. Burmeister
Publisher, Year, Edition	CENGAGE Learning, 4th Edition, 2015	Prentice Hall, 1998

References

Books	1. "Introduction to Thermo-Fluids Systems Design", by Andrè Garcia McDonald, Hugh Magande, Publisher: Wiley, Year 2012. 2. Design and Optimization of Thermal Systems, Jaluria, Y., 2nd ed., McGraw-Hill, 2007. 3. Thermo-Fluids Systems Design, McDonald, A. G., and Magande, H. L., John Wiley, 2012. 4. Design and Simulation of Thermal Systems, Suryanarayana, N. V. and Arici, Ö., McGraw-Hill, 2003
Journals	1. Applied Thermal Engineering, Elsevier 2. International Journal Of Thermo-fluids, Elsevier
Internet important links	

Prerequisites

Prerequisites by topic	Thermodynamics, Heat Transfer, Fluid Mechanics, Turbomachinery
Prerequisites by course	0904302+0904441 + 0904342
Co-requisites by course	-
Prerequisite for	

Topics Covered

Week	Topics	Chapter in Text	Sections
1-3	Introduction to the design process and component selection of thermos-fluid systems		
2-4	Design problem selection, assignment, and definition		
5-6	Identification of the design approach and exploring alternatives of thermos-fluid systems		
7-8	Working on and presentation of design concepts and approach		
8-10	Defining the final design approach and procedure		
11-13	Working on the design in teams		
14-16	Presentations and evaluations		

Mapping of Course Outcomes to ABET Student Outcomes

SOs	Course Outcomes
1	1. To identify, formulate, and solve engineering problems.
2	2. Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
3	3. An ability to communicate effectively.
5	4. Ability to function positively in teams.

Evaluation

Assessment Tools	Expected Due Date	Weight
Course Work, the students should: **1. Submit one chapter of the report every week.** **2. Conduct a presentation of their achievement every other week. The students will be evaluated for the quality of their presentation, their achievement of the tasks assigned, Teamwork, Questions and Answers.**	Every week and every other week	**30%:** 1. 15% 2. 15%
Midterm: **1. Presentation skills and quality** **2. Question and Answer** **3. Report and achievement**	Eighth Week	**30%:** 1. 5% 2. 10% 3. 15%
Final Exam: **1. Design Final Report** **2. Final Presentation Skills and Quality** **3. Question and Answer** **4. Teamwork**	Week Fifteen	**40%:** 1. 20% 2. 5% 3. 10% 4. 5%

Contribution of Course to Meet the Professional Components

The course contributes to building the abilities and skills for designing a real-life mechanical system by choosing from alternatives and making proper selections of mechanical components.

Relationship to Student Outcomes

SOs	1	2	3	4	5	6	7
Availability	X	X	X		X		

ABET Student Outcomes (SOs)

1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3	An ability to communicate effectively with a range of audiences
4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Updated by Prof. Salih Akour, October 2022