Jordan University of Science and Technology

Faculty of Engineering

Aeronautical Engineering Department

AE523 Propulsion - JNQF Level: 7
First Semester 2023-2024

Course Catalog
3 Credit Hours. An integrated approach to the application of engineering principles to propulsion systems. Topics include air-breathing engines and their components, turboprop, turbojet, turbofan, turboshaft, and ramjet. Beside the engine components; inlets, compressors, combustors, turbines, and propelling nozzles. Engine components Matching, Matching of Engine and Aircraft.

Text Book	
Title	Fundamentals of Jet Propulsion with Applications .
Author(s)	Ronald D. Flack
Edition	1st Edition
Short Name	Ref. 1
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref. 2	Aircraft Propulsion	Saeed Farokhi	2nd Edition	
Ref. 3	Elements of Gas Turbine Propulsion	Mattingly, J.D, McGraw Hill, New York	1st Edition	
Ref. # 4	Gas Turbine Theory	Cohen, H., Rogers, G.F.C. and Saravanamutloo, H.I.H	1st Edition	--

Instructor	
Name	**Dr. Ahmad Al Shyyab**
Office Location	M5 L2

Office Hours	Sun : 09:30 - 10:30 Mon : 09:30 - 11:30 Tue : 09:30 - 10:30 Wed : 09:30 - 11:30
Email	asalshyyab@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Sun, Tue : 10:30 - 11:30 Room: C3018

Prerequisites		
Line Number	**Course Name**	**Prerequisite Type**
713440	AE344 Aerodynamics (1)	Prerequisite / Pass

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Week 1	Introduction	**Chapter 1** From **Ref. 1**
Weeks 2, 3, 4, 5, 6	Ideal and Non-Ideal Cycle Analysis	**Ch 2 & 3** From **Ref. 1**
Weeks 7, 8	Diffusers and Inlets	**Ch. 6** From **Ref. 2**
Weeks 8, 9	Nozzles	**Ch. 6** From **Ref. 2**
Weeks 10, 11, 12	Axial Flow Compressors, Fans and Turbines	**Ch. 6 & 8** From **Ref. 1**
Weeks 13, 14	Combusters, Afterburners	**Ch. 7** From **Ref. 1**
Weeks 14, 15, 16	Component Matching Analysis	**Chapter 11** From **Ref. 1**

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Classify propelling engines according to methods of propulsion and application, and recognize the components of each type and its function [1SO1] [1L7K1]	6%	
Analyze thermodynamics of an aircraft jet engine and calculate the engine performance measures, such as thrust and specific fuel consumption in terms of design and operating conditions. [1SO1] [1L7K1]	25%	
Compare the performance of each engine type as a function of operating condition and engine parameters, such as maximum engine temperature, pressure ratio, and flight Mach number. [1SO1] [1L7K1]	6%	
Analyze performance of standalone inlets (diffusers) , nozzles, Combustors and understand the factors that limit their performance. [1SO2] [1L7S2]	30%	

Analyze the operating characteristics of compressors and turbines in terms of given blade geometry, blade angles and deflections, and the shaft angular speed. [1SO2] [1L7S2]	25%	
Formulate component matching analysis and Engine aircraft matching analysis. [1SO7] [1L7C4]	8%	

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
37	55					8

Relationship to NQF Outcomes (Out of 100%)		
L7K1	L7S2	L7C4
37	55	8

Evaluation	
Assessment Tool	**Weight**
First Exam	30%
Second Exam	30%
Final Exam	40%

Policy	
Attendance	Teaching this course is blended; Students have to attend two one-hour face-to-face in-classroom lectures each week and one one-hour asynchronous online lecture each week as well. Your attendance at the in-classroom lectures is a must, you are allowed to miss 20% of this portion without any excuse. However, have you miss more than 20% of the in-classroom lectures you will be dismissed no matter what excuse you may have.

Date Printed: 2023-12-06