

King Fahd University of Petroleum & Minerals  
 MECHANICAL ENGINEERING DEPARTMENT  
**ME 422 : PROPULSION SYSTEMS**  
**AE 422 : FLIGHT PROPULSION I**  
 Spring Semester 2000-2001 (002)

**Instructors:** Dr. B. S. Yilbas                      **Office:** 22-230                      **Phone:** 4481  
 Dr. S. Z. Shuja    22-120    4465

**Textbook:** **MECHANICS AND THERMODYNAMICS OF PROPULSION SYSTEMS.** by Hill, P. and Peterson, C., Addison-Wesley Pub. Ltd., 1992.

**References:** **1. An Introduction to Aerospace Propulsion** by Archer, R. D. and Saarlus, M., Prentice Hall Publisher, 1996.  
**2. Aerothermodynamics of Gas Turbine and Rocket Propulsion** by Oates, G. C.

**Course Description:**

Aerothermodynamics of aerospace vehicle engines, combustion, thrust and efficiency. Gas turbine engines: Turbojet, turbofan, turboprop ; Ramjet and scramjet , typical engine performance. Aerothermodynamics of inlets, combustors and nozzles. Introduction to propellers, turbocompressors and turbines. Introduction to rockets and performances of rocket vehicle engines. Chemical and electrical driven rocket engines.

**Prerequisites:** ME 204, ME 311

**Material to be covered:**

Week	Classes (50 min)	Chapters	Topics
1	3	2	Mechanics and Thermodynamics of Fluids.
2,3	6	5	Thermodynamics of Aircraft Jet Engines.
4	3	6	Aerothermodynamics of Inlets, Combustors and Nozzles.
5,6,7	9	7	Axial Compressors.
8,9	6	8	Axial Turbines.
10,11	6	9	Centrifugal Compressors.
12,13	6	10	Performance of Rocket Vehicles.
14,15	6	11,12	Chemical Rocket Thrust Chambers and Propellants.

**Evaluation:**

Quizzes	18%	
Major Exam 1	17%	<b>24<sup>th</sup> March 2001 (6:00-8:00pm)</b>
Major Exam 2	22%	<b>5<sup>th</sup> May 2001 (6:30-8:30pm)</b>
Assignments	8%	
Final Exam	35%	

**Attendance:**

University regulations on attendance will be strictly enforced.

**Homework:** Each student must submit his homework solution on time (no late homeworks will be accepted). All homeworks solutions should have the Department standard cover sheet in the front .

Homework	1	2	3	4	5	6	7
<b>Problem # (from textbook)</b>	5.2,5.7,5.9, 5.15,5.17, 5.20	6.1,6.2,6.7, 6.11,6.15	7.2,7.3,7.6, 7.11,7.13	8.2,8.5,8.8, 8.10,8.13, 8.17	9.2,9.5,9.7, 9.12,9.15	10.2, 10.4	11.1,11.3, 11.8,12.3, 12.7