First Course Handout

AE-341A - Aerospace Propulsion

Instructor

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TA

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Class Timings

MW – 8:00 a.m. - 9 a.m. (L6)

F – 11:00-12:00 p.m. (L11)

Course Outline

Topics	Lectures (50 Min)
1. Introduction: air-breathing and rocket propulsion, review of conservation equations: mass, momentum and energy, thermodynamics, compressible flow	**4**
Quiz 1	
2. Air-breathing jet engines: performance parameters, cycle analysis: ramjet, turbojet, turbofan, turboprop, turboshaft	**12**
Quiz 2	
3. Combustion: stoichiometry, thermochemistry, adiabatic flame temperature	**3**
Quiz 3	
Mid-Sem Exam	
4. Engine component analysis: gas turbine combustors, ramjet combustors, afterburners, subsonic and supersonic air intakes, exhaust nozzles	**9**
Quiz 4	
5. Thermal Turbomachinery: Axial Compressors, Centrifugal Compressors, Axial Turbines	**12**

End-Sem Exam	
Total Lectures	**40**

Text Book

1. Mechanics and Thermodynamics of Propulsion by Philip Hill and Carl Peterson, Second Edition, Dorling Kindersley India Pvt. Ltd., Noida, 2010

Reference Books

1. Gas Turbine Theory by HIH Sarvanamuttoo, GFC Rogers, H Cohen, Dorling Kindersley India Pvt. Ltd., New Delhi, 2009
2. Elements of Gas Turbine Propulsion by Jack D. Mattingly, McGraw Hill India Pvt. Ltd., New Delhi, 2015
3. Rocket Propulsion Elements by George P. Sutton and Oscar Biblarz, Seventh Edition, Wiley India Pvt. Ltd., New Delhi, 2014
4. An Introduction to Combustion: Concepts and Applications by Stephen R. Turns, Third Edition, Tata McGraw-Hill, New Delhi, 2012
5. Fluid Mechanics by Frank M. White, Fifth Edition, McGraw-Hill, New Delhi, 2003
6. Modern Compressible Flow: with Historical Perspective by John D. Anderson, Third Edition, McGraw-Hill, New Delhi, 2014

Grading Policies

Mid-Sem Exam	**30%**	**24th February**
End-Sem Exam	**40%**	**27th April**
Assignments (4)	**10%**	**To be submitted within 1 week**
Quizzes (4)	**20%**	**In-class**