

# **AE-341: Airbreathing Propulsion [L-T-P-D (C) – 3-0-0-0-(9)]**

## **Spring 2020**

**Instructor:** Dr. Ashoke De

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**Lectures:** M, W: 08:00 - 9:00, F: 11:00 - 12:00; Room: EEM117

### **Course Description:**

1. Introduction to Propulsion, Review of basic fluid mechanics and thermodynamics
2. Introduction to compressible flows: 1D steady, isentropic flows, Normal shocks
3. Introduction to gas turbine engines: Thrust, efficiencies and performance parameters
4. Performance/cycle analysis: Ramjets, Turbojet, Turbofan, Turboprop, Nozzle
5. Introduction to turbo-machinery: basic principles and equations
6. Centrifugal compressor: Principle, performance characteristics, efficiency, stall and surge
7. Axial compressor: Theory, single stage and multi-stage compressor, cascades and losses
8. Axial turbines: Theory of operation, stage and overall performances, turbine and compressor matching, turbine blade cooling
9. Combustors & after burners, intakes

### **Suggested Books:**

1. Mechanics and Thermodynamics of Propulsion- Hill & Peterson
2. Gas Turbine Theory – Cohen, Rogers, Saravanamuttoo
3. Modern compressible Flow – Anderson
4. Aircraft Propulsion- Saeed Farokhi
5. Thermodynamics – Cengel & Boles

### **Grading Policy:**

<b>Item</b>	<b>Points</b>	<b>Remarks</b>
Mid-semester Examination	30 points	Closed book/notes
Two announced quizzes	20 points (10 points each)	Closed book/notes
Final Examination	40 points	Closed book/notes
Class evaluation (surprise quizzes)	10 points (best 2 would be considered)	Closed book/notes
<b>Total</b>	<b>100 points</b>	<b>Minimum passing marks=30</b>

**Re-grading:** You can return the Examination/Quiz copies on the day the answer-scripts are distributed for re-grading, after writing your comments on the top of the answer-scripts. If you are absent (except official leaves, if granted) on that day, you lose the right to appeal.

**Make-up Exams:** Only one make-up examination will be given, only to the students with regular attendance in Lectures. Students missing mid-semester examination, or only one central quiz, can take this upon production of a valid medical/other relevant certificate/official reason. The entire material covered in the course will be included, irrespective of which test is missed. This make-up will be at the same time as the final make-up exam (date of which will be decided by the DOAA). Thus, there will be only ONE make-up test for the entire course, after the final examination. Use of unfair means of any kind during the course, exams, quizzes, etc., including use of proxy-attendance or taking help during examinations, copying, etc.) would result in severe punishment, as per institute rules.

**I-cards:** Carrying I-cards is mandatory in all examinations/quizzes.