AE 433 – AEROSPACE PROPULSION :: FALL 2013

Instructor Dr. Thomas L Jackson

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Credit Three hours
Time 2:00-2:50pm MWF
Location 103 Transportation Bldg.

Teaching Assistant Kevin Heritier

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Description (From course catalog) Fundamentals of rocket and airbreathing jet propulsion devices; prediction of thrust, combustion reactions, specific fuel consumption, and operating performance; ramjets; turbojets; turbofans; turboprops; of inlets, combustors, and nozzles; compressors, turbines; component matching. 3 undergraduate hours. Prerequisite: AE 312 (Compressible Flow) and CS 101.

Necessary Background Vector calculus, differential equations through partial differential equations, incompressible flow theory, compressible flow theory, thermodynamics.

Textbook *Aircraft Propulsion*, Saeed Farokhi, John Wiley & Sons, 2009.
Recommended: *Fundamentals of Jet Propulsion*, Ronald Flack, Cambridge, 2010 (paperback edition)
Recommended: *Aerothermodynamics of Gas Turbine and Rocket Propulsion, Third Edition*, Gordon Oates, AIAA Education Series, 1997

Grading		
	Homework (assigned regularly)	40%
	Exam I	20%
	Exam II	20%
	Final Exam	20%

Honor Code It is assumed that the UIUC Student Code will be followed at all times, including during completion of homework and during exams.

Graduate Students Only: must complete a project, TBD.

All exams will be open notes and open book.

Homework policy and format

Policy Homework will be assigned regularly. Late work will be accepted with a loss of 20% per day. Valid excuses are not penalized, but must be discussed *in advance* with instructor. (Having multiple items due on a given day is *not* a valid excuse.) Problems must be submitted in neat, professional form. You are encouraged to discuss problem sets with your classmates, but *you must submit your own work.*

Problems are due at the beginning of class.

Format The solutions to problems are to be presented in a neat and readable format. Use only clean 8.5''x11'' paper. **Identify the top sheet with your name and number each page**. **Staple pages**. **Hand in flat: *do not fold***. If the solutions turned in are not readable, they will be returned. In such a case you may re-submit the problem, or problems, to the instructor in a legible form subject to a 20% penalty.

It is strongly suggested that each problem be written in the following manner. In addition to the points listed below, a discussion may be called for on occasion. Be concise.

1. State briefly (in your own words) the information given.
2. State the information to be found.
3. When appropriate, draw a schematic of the system or control volume to be used in the analysis. Be sure to label the boundaries of the system or control volume, and label appropriate coordinate directions. Show forces, flows, and label states.
4. Give the appropriate mathematical formulation of the basic laws that you consider necessary to solve the problem.
5. List the simplifying assumptions that you feel are appropriate in the problem.
6. Carry the analysis to completion algebraically before substituting numerical values.
7. Substitute numerical values, using a consistent set of units, to obtain a numerical answer. The number of significant figures should be consistent with the given data.
8. Check the answer and review the assumptions made in the solution to make sure they are reasonable.
9. Label the answer.