GAS TURBINES -- ME 5462

In this course, you apply math, fluid mechanics, thermodynamics, and some heat transfer experiences from your previous classes to the design and analysis of gas turbines.

Instructor: Terry Simon, 235ME, 612-625-5831 (O), 651-698-1205 (H), tsimon@me.umn.edu
Office Hours: Tuesday, 12:00-1:00 p.m.; Wednesday 11:00-12:00 noon.

Teaching Assistant: Matt Anderson, ME475, 612-626-2886 (O), matt@me.umn.edu
Assistant: Office Hours: Monday 3:00-4:00 p.m.; Thursday, 9:00-10:00 a.m.

Class Meets: Lecture M, Tu, W, and F 9:05-9:55 AM in ME321

Prerequisites: Thermodynamics (ME3331 or equivalent) and Fluid Mechanics (ME3332 or equivalent).


References: Familiar (to you) undergraduate thermodynamics and fluid mechanics texts. Additional materials will be handed out in class or made available on the class web site.

Requirements: Attendance at lectures is essential. You are responsible for lecture material regardless of whether it appears in the text, so take careful notes and ask questions if something is not clear. If you miss a lecture, obtain notes from a classmate.

Preparation Homework: Weekly problem sets will be assigned before Friday’s class. Solving these problems will be essential for obtaining a complete grasp of the course material. But, these problems will not be collected and will not be graded. As seniors and graduate students, you will need to take responsibility for solving these problems in a timely fashion to assist your learning. Solutions will be posted the following Wednesday.

Design and Analysis Problems: Several times during the semester you will receive problems that will be designed to enhance your understanding of the material through design and open-ended case studies. These problems will be collected and graded. We will be using the Engineering Equation Solver (EES) software to assist in solving these problems. EES is a powerful math package with built-in thermophysical property information. You can obtain your own personal copy of the software at no charge for either your PC or your Mac, details for obtaining the software and manual will be discussed in class.

Quizzes: Short quizzes will be given at the beginning of lectures on Friday. These will be of the open book/notes type. Expect approximately 12 quizzes during the semester. You will be allowed to drop your lowest two quiz scores. There will not be make-up quizzes given – if you miss one, it will be one of the dropped quizzes.

Course grade: Two, 50-minute, mid-quarter, in-class exams (15% each) 30%
Design and analysis homework problem assignments 20%
Quizzes (lowest two scores dropped) 25%
Final Exam 8:00 - 10:00 AM, Monday, December 20th 25%
Problem Assignments:
In order to gain some mastery of this topic, it is essential that you practice applying the basic concepts and analytical procedures to engineering problems. These problems are to be learning experiences rather than testing exercises. Therefore, working together is encouraged and difficult parts will be discussed freely in class. Begin on them early so that there will be time for ample, productive discussion. Initiation of discussions in class on these problems and on the course material in general is expected of you -- this is your contribution toward a successful class period. Note: the quizzes and exams are written to reward thoughtful, careful work on the homework problems and involvement (leading to a clear understanding) in the classroom discussions.

Some Suggestions on Problem Solving (apply whether the problems are handed in for grading or not):
It is important that you develop a systematic approach to problem solving. Haphazard approaches will make easy problems difficult and difficult problems impossible.
To assist:
• Present all work in a clear, neat manner.
• **Define the system** you are analyzing. Include a neat system sketch and a clear process diagram.
• List all assumptions in your analysis.
• Show all the steps in your analysis. If you make an error, this will facilitate your going back and locating the error.
• Check to see that the result is correct dimensionally. Dimensional errors indicate that there are errors in the analysis or in the math. **Carry units and cancel.**

Go through this list of suggestions before completing each assignment.
Free discussion on the homework is encouraged. The actual work presented must be your own, however, not a copy, of any form, from another study. Discussion during exams is not allowed. During all quizzes and exams, you are allowed free access to the textbook, notes, and other books and written resources.

Refer to the following web site to remind yourself of your responsibilities concerning academic integrity and honesty: [http://www1.umn.edu/regents/policies/academic/Student_Conduct_Code.html](http://www1.umn.edu/regents/policies/academic/Student_Conduct_Code.html)
Please read it all. But, of special note is the following paragraph:

**Scholastic Dishonesty.** Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis.

Incomplete:
The “I” grade is assigned only when a student has completed all but a small portion of the work of the course and has made **prior arrangements** with the instructor to make up the work.

Withdrawal:
It is extremely rare to be granted a withdrawal from a course. It requires approval by the Scholastic Committee of our College. Don’t let things slip. If you are having difficulties, please see me (and your other instructors, if necessary) to discuss your options for improvement. We are here to assist you, but you will need to seek out such assistance. It is our hope that you will have a successful semester.