MEC 422 Thermal System Design

Instructor: Dr. Juldeh Sesay
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Office Hours: Wednesdays 10 – 12 pm or by appointment
General Information: check blackboard

Course Description
Thermal system design. Credit 3: Device design and system design. Quantitative data for system design including operating characteristics of compressors, turbines, heat exchangers, piping systems, internal combustion engines, and other component equipment. Component matching and system simulation. Optimization including thermo-economic evaluation and energy analysis. Case studies: refrigeration and air conditioning systems; combined cycles; steam-injected gas turbines.

Course Prerequisites: Mass and Heat Transfer
                        Fluid Mechanics
                        Thermodynamics

Textbook
"Design of Fluid Thermal System", Fourth Ed., William S. Janna, PWS Publishing Company, 1998

References
1. Heat Transfer: A Practical Approach by Yunus A. Cengel, 3rd Ed., McGraw-Hill
2. Analysis and design of Energy Systems, Hodge, B.K. and R.P. Taylor, 3rd Edition, Prentice   Hall, 1999
3. Design of Thermal Systems, Stoecker, W., McGraw-Hill
4. Elements of Thermal-Fluid System Design, Burmeister, L. C., Prentice Hall, 1998
5. Design Optimisation of Thermal Systems, Jaluria, Y., McGraw-Hill, 1998

Class schedule
Lectures: Tuesdays and Thursdays at 08:30 am – 09:50 am; Harriman Hall 137. There will be one design project in the semester and each group should have at most four students. There is no lab project this semester.
Recitation: There is no recitation in this course. The recitation period is to be utilized for your design projects.

Teaching Assistants and Grader: Gaurav Guleria

Course Topics

1. Introduction to design and analysis and project initiation

2. Fluid properties and basic equations

3. Piping systems I

4. Piping systems II

5. Selected topics in Fluid mechanics

6. Pumps and piping systems

7. Some heat transfer fundamentals

8. Double pipe heat exchangers

9. Shell and tube heat exchangers

10. Plate and frame and cross flow heat exchangers

11. Project presentation and evaluation

Grading and Class Policies
Final grade is determined based on your performance on the following areas:
Homework: 12%
Design Project: 18%
Midterm 1: 30%
Midterm 2: 30%
Quizzes (5): 10%

Course Policies
1. Lecture notes will not be posted on the blackboard.
2. Lectures are held on Tuesdats and Thursdays from 8:30AM to 9:50AM
3. No late homework (HW), project is accepted and zero grade will be assigned. Each homework will consist of five problems. Homework, and project must be submitted in class immediately after lectures on the due dates. All procedures must be shown in homework's, projects, and tests.
4. The first homework page has to have heading; your name, identification number, course & HW number (MEC 422, HW-2, for example)
5. The design project report has to be typed.
6. Submitted homework for grading has to be your own work. You have to **show all work or give related references**. No makeup tests will be given. If you do homework with someone else, you have to understand and stand behind the submitted work on your own. If it is determined that you are not familiar with the homework you may be responsible for plagiarism and cheating, and therefore loose all credits for that homework and all other homeworks to follow.

Student Accessibility Support Center Statement

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Student Accessibility Support Center, ECC (Educational Communications Center) Building, Room 128, (631)632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Student Accessibility Support Center. For procedures and information go to the following website: http://www.stonybrook.edu/ehs/fire/disabilities.

Academic Integrity Statement

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html

Critical Incident Management

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

Calculator Policy

"Effective Spring, 2008 only the following calculators will be permitted to be used on all midterm and final exams in the department of Mechanical Engineering. There will be no exceptions! This list of calculators is identical to that allowed for the National Council for Examiners for Engineering and Surveying (NCEES) Fundamentals of Engineering (FE) Exam that many of you will take in your senior year, as well as the professional Engineering (PE) exam that you may take several years now. The sooner you become comfortable on one of these calculators, the better.

NCEES Allowed calculators as of spring, 2008:
► Casio: All **fx-115** models. Any Casio calculator must contain fx-115 in its model name

► Hewlett Packard: The **HP 33s** and **HP 35s** models, but no others.

► Texas Instruments: All **TI-30X** and **TI-36X** models. Any Texas Instruments calculator must contain either TI-30X or TI-36X in its model name.

The NCEES policy on calculators can be found here:
http://www.ncees.org/exams/calculators/."