Course Syllabus — ENPM672 (Fall 2023)
Fundamentals for Thermal Systems

Course Organization/Management:
This course will be managed through Canvas (https://myelms.umd.edu)

Textbook:
Moran, Shapiro, Munson and Dewitt: "Introduction to Thermal System Engineering: Thermodynamics, Fluid Mechanics and Heat Transfer", John Wiley and Son, 2003. ISBN: 9780471204909
The publisher's website contains many useful resources as well as the CD included with the text.
http://www.wiley.com/WileyCDA/WileyTitle/productCd-0471204900.html

Instructor:
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Class Meets:
IN-PERSON AND ONLINE

Lecture Day and Time:
Tuesday, 4pm to 6:40 pm

Location of the Lecture (For in-person lectures):
JMP 2120

Online Participation
There is an online section for this course; students will also participate online.

Office Hours:
By appointment (communicated over email)

Course Communication:
Course-wide messages such as announced assignments will be posted on ELMS. E-mail will be used for individual communications.

Lecture Materials
Recordings of the lectures will be available on ELMS within a few hours of the in-person lectures. The pdf of the lecture materials will be uploaded on ELMS within a few days of the lecture.

Assignment (a total of 5):
Homework will be assigned on WileyPlus.

Midterm Exams:
There will be two midterm exams of 50 minutes each during regular lecture time in-class on October 3 and November 7.

Final Exam:
A 2-hour final exam on the last day of the lecture (December 5)

Grade Distribution:
Final grade will be determined as follows:

Midterm 1	20%
Midterm 2	20%
Final	40%
Assignments	20%

Philosophy:
The goal of this course is to provide an environment for the students to become proficient in the introductory concepts of thermodynamics, fluid mechanics, and heat transfer. Emphasis will be in gaining physical concepts in these topics by solving numerical problems, after a basic theoretical introduction on the topics.

Learning Outcomes:
After successfully completing this course, you will be able to:

- Understand the roles of thermodynamics, fluid mechanics, and heat transfer in several engineering applications involving storage, transfer, and conversion of energy.
- Understand the working principles of different types of thermal cycles, refrigerators, manufacturing facilities, cooling equipment, batteries, etc.
- Become capable of employing first-principle ideas in analyzing engineering problems involving thermo-fluid concepts.

Lecture Schedule:

Lecture Date and Week	Tentative Lecture Topics	Textbook Chapter
08/29/2023 (Week #1)	Introduction to Thermodynamics	1, 2, and 3
09/05/2023 (Week #2)	Introduction to Thermodynamics + Thermophysical Properties	3 and 4
09/12/2023 (Week #3)	Control Volume Analysis, Carnot Cycle	5
09/19/2023 (Week #4)	2nd Law, Entropy	6 and 7
09/26/2023 (Week #5)	Vapor Cycles: Rankine and Refrigeration	8
10/03/2023 (Week #6)	**Midterm 1 (from 4 pm to 5 pm) (based on contents taught up to week 5)** Gas Cycles: Otto, Diesel, Brayton (5 pm to 6:40 pm)	9
10/10/2023 (Week #7)	Gas Cycles: Otto, Diesel, Brayton Fluid Basics & Statics	9 11
10/17/2023 (Week #8)	Fluid Basics & Statics Mechanical Energy & Dynamics	11 12
10/24/2023 (Week #9)	Similitude Analysis	13
10/31/2023 (Week #10)	Internal and External Flows	14
11/07/2023 (Week #11)	**Midterm 2 (from 4 pm to 5 pm) (based on contents taught in Weeks 6-10)** Conductive Heat Transfer	16
11/14/2023 (Week #12)	Conductive Heat Transfer Convective Heat Transfer	16 17
11/21/2023	**No Classes (Thanksgiving Break)**	
11/28/2023 (Week #13)	Convective Heat Transfer Radiative Heat Transfer	17 18
12/05/2023 (Week #14)	**Final Exam (from 4 pm to 6 pm) (based on contents of the entire course)**	

Assignment Schedule:

Assignment Number	Chapters Covered	Assignment Posting Date	Assignment Submission Deadline
1	1, 2, 3, and 4	09/05/2023	09/19/2023 (11:59 pm)
2	5, 6, and 7	09/19/2023	10/03/2023 (11:59 pm)
3	8 and 9	10/10/2023	10/24/2023 (11:59 pm)
4	11, 12, and 13	10/24/2023	11/07/2023 (11:59 pm)
5	14, 16, 17, and 18	11/14/2023	11/28/2023 (11:59 pm)