

Design of Thermal Systems EML 5516 (August 25, 2025)
Class Numbers 25560, 25561, 25562, 25563, 25564
Sections 1FE2, 2FED, CAMP, WEBR, OVER
Class Periods: MWF, 5th period, 11:45am-12:35pm (Watch Lectures Online)
Location: NEB0102
Academic Term: Fall 2025

Instructor:

Dr. S.A. Sherif

sasherif@ufl.edu

Office Hours: will be scheduled via Zoom from 11:45am-12:35pm MW or in person at a time to be selected.

Teaching Assistant/Peer Mentor/Supervised Teaching Student: None

Course Description

Modeling of thermal equipment; system simulation; optimization, search methods, thermal system design and optimization using dynamic, geometric, and linear programming; simulation of large systems, vector and reduced gradient searches.

Course Pre-Requisites/Co-Requisites: Graduate standing or permission of instructor

Course Objectives

Students will be able to analyze and design optimize all types of thermal systems under a host of constraints that include economic, thermal, and size constraints. The optimization methods used include Lagrange Multipliers, search methods, geometric programming, linear programming, dynamic programming, and variational calculus. Students will also be able to carry out simulations of thermal systems and analyze them under dynamic or time-dependent conditions.

Materials and Supply Fees: None

Required Textbooks and Software: *Design of Thermal Systems*, Third Edition, by W.F. Stoecker, McGraw-Hill, 1989

Recommended Materials:

1. *ASHRAE 2021 Handbook of Fundamentals*, the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc., 1971 Tullie Circle, N.E., Atlanta, Georgia 30329
2. *Design Analysis of Thermal Systems*, by R.F. Boehm, John Wiley and Sons, New York, 1987.
3. *Design of Fluid Thermal Systems*, by W.S. Janna, PWS-Kent Publishing Company, Boston, MA, 1993.
4. *Thermal Design and Optimization*, by A. Bejan, M. Moran, and G. Tsatsaronis, John Wiley & Sons, Inc., New York.
5. *Elements of Thermal-Fluid System Design*, by L.C. Burmeister, Prentice Hall, New Jersey, 1998.

Required Computer

Recommended Computer Specifications: <https://it.ufl.edu/get-help/student-computer-recommendations/>

HWCOE Computer Requirements: <https://www.eng.ufl.edu/students/advising/fall-semester-checklist/computer-requirements/>

Course Schedule

Subjects

Lecture No.	Topic	Chapter No.
1	Designing a Workable System	Ch 2
1, 2, 3, 4	Engineering Economics	Ch 3
4, 5, 6, 7	Modeling Thermal Equipment	Ch 5
7, 8, 9, 10	System Simulation	Ch 6
10, 11	Optimization (General)	Ch 7
11, 12, 13	Optimization using Lagrange Multipliers	Ch 8

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13, 14, 15, 16, 17, 18	Optimization using Search Methods	Ch 9
18, 19, 20, 21	Optimization using Geometric Programming	Ch 11
22, 23, 24, 25, 26, 27	Thermodynamic Properties	Ch 13
28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41	Dynamic Behavior of Thermal Systems	Ch 15
Special Lectures 1, 2, 3, 4 (Variational Calculus)	Optimization using Calculus of Variations	Ch 18

Exam 1 released towards the end of October
Exam 2 released towards the end of November

Covering through Chapter 11
Comprehensive

Take Home
Take Home

Attendance Policy and Class Expectations

All lectures posted need to be viewed in a timely manner to remain current with HW assignments and exams. The course grade will be based on performance in two exams of equal weight and on submitting all HW assignments fully by the posted deadlines and on submitting all quizzes on time. Homework and quizzes will be collected but not graded. However, failure to submit a HW fully and by the posted deadline will result in having 3% of the course grade deducted per missed assignment. Quizzes will be both in-class and online (for the on-campus section) and online for the online sections. A missed quiz will result in deducting 2% of the course grade.

Evaluation of Grades

Exam 1	50%
Exam 2	50%
Misses Quizzes	2% of the course grade deducted/missed quiz
Missed HW Assignment	3% of the course grade deducted/missed HW

Grading Policy

Percent	Grade	Grade Points
92.0 - 100.0	A	4.00
88.0 - 92.00	A-	3.67
84.0 - 88.0	B+	3.33
80.0 - 84.0	B	3.00
76.0 - 80.0	B-	2.67
72.0 - 76.0	C+	2.33
68.0 - 72.0	C	2.00
64.0 - 68.0	C-	1.67
60.0 - 64.0	D+	1.33
56.0 - 60.0	D	1.00
50.0 - 56.0	D-	0.67
0 - 50.0	E	0.00

Academic Policies & Resources

To support consistent and accessible communication of university-wide student resources, check out this link to academic policies and campus resources: <https://go.ufl.edu/syllabuspolicies>.

Commitment to a Positive Learning Environment

The Herbert Wertheim College of Engineering values varied perspectives and experiences within our community and is committed to supporting the University's core values.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Coordinator
- HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
- Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@ufl.edu