

Thermal Science Design and Lab

EML4147C

Class Periods: Tuesday/Thursday, 4th period, 10:40 am – 11:30 pm

Lecture Location: FLI 0050

Lab Location: NEB 113

Academic Term Spring 2026

Instructor:

Kurt Schulze, Ph.D., P.E.

NEB 133

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(407) 375-8684 (cell)

Office Hours: See Canvas Site

Teaching Assistant/Peer Mentor/Supervised Teaching Student:

Please contact through the Canvas website

- See Canvas site

Course Description:

3 Credits; Thermodynamics, fluid mechanics, and heat transfer integrated with design and laboratory, including turbomachinery and heat exchanger design, phase-change heat transfer, thermodynamics of mixtures, psychometry, mass transfer, sensible heat recovery, pipe flow, turbomachinery, refrigeration, and combustion. Topics will vary from semester to semester.

Course Pre-Requisites / Co-Requisites:

EML 3100, EML 3301C and EML 4140

Course Objectives:

The objective of this course is to provide an intermediate level coverage of thermodynamic, fluid mechanic, and heat transfer topics integrated with design and laboratory experiences. This course stresses fundamental engineering science applied to thermal design and laboratory applications. Students will be exposed to open-ended thermal design topics and will be expected to communicate the design process through written and oral communication. Students are expected to gain a deeper understanding of fundamental thermal concepts via the laboratory experience. The collection procedure and analysis of experimental data will also be communicated through written reports

Materials and Supply Fees:

\$238.50

Relation to Program Outcomes (ABET):

The table below is an example. Please consult with your department's ABET coordinator when filling this out.

| Outcome | Coverage* |
|---|-----------|
| 1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics | High |
| 2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors | High |
| 3. An ability to communicate effectively with a range of audiences | High |

| | |
|---|------|
| 4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts | N/A |
| 5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives | High |
| 6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions | High |
| 7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies | High |

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

Required Textbooks and Software:

Textbooks as required for pre-requisite courses, listed below. The UF All-Access E-Book that is available comprises the relevant chapters from these books if you do not already own them or an equivalent.

Fundamentals of Heat and Mass Transfer, Incropera and DeWitt, a recent edition

Fundamentals of Thermodynamics, Sonntag, Borgnakke, and Van Wylen, a recent edition

Fundamentals of Fluid Mechanics, Munson, a recent edition

Course Schedule

See Canvas site

Attendance Policy, Class Expectations, and Make-Up Policy

Attendance and Expectations: It is the policy of the University of Florida that you attend all classes. Attendance will be recorded for **all laboratory periods** and design activities. You must complete pre-lab assessment and perform each lab to receive credit for the lab. You must perform the lab **during your regularly scheduled period**. Re-scheduling of labs will be in accordance with the policy shown on the course website.

14. Course Outline:

There will two lectures per week. On the Canvas website under “Modules”, “Labs” are the topics and activities that will be covered during the laboratory sections. There is a pre-lab video and pre-lab quiz associated with each lab session that must be completed prior to performing the lab. You will have 50 minutes to perform each experiment. Therefore, it is very important you work out your protocol prior to the lab so that you can expedite the actual experiment when that time comes. Attendance is expected for all classes.

This course also includes a design activity. The scope of the design will be assigned during the first part of the semester.

<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

Grading Policy

Pre-lab quizzes – 5%

Lab reports – 75%

Design project – 20%

Lab reports must be submitted on time to receive full credit. If a lab report is late, you will lose 10% of the total points available every 24 hours. It is OK to be late, but there is a cost associated with being late. The same policy is applied to design reports. One minute late is the same as one day late. For example, if a report is worth 100 points, you will lose 10 points per day.

17. Grading Scale :

| | | |
|----------------|---------------|---------------|
| 94 <= A <= 100 | 90 <= A- < 94 | (No A+) |
| 87 <= B+ < 90 | 83 <= B < 87 | 80 <= B- < 83 |
| 77 <= C+ < 80 | 73 <= C < 77 | 70 <= C- < 73 |
| 67 <= D+ < 70 | 63 <= D < 67 | 60 <= D- < 63 |
| E < 60 | | |

There is no rounding up or down.

More information on UF grading policy may be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Assignment submission

When uploading files to Canvas, it is your responsibility to ensure the file is uploaded properly. Anyone in a group can check to see if a file is uploaded properly. If a file is uploaded with an obvious error or corrupted, we will treat it as if the assignment was not submitted.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluer.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/process/student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. Typical disciplinary action would be a grade of E in the course for a first offense. A second offense (which includes other courses) would likely result in a two-semester suspension. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others. The use of a pirated textbook is unauthorized and constitutes an honor violation.

Important: In this course, all lab reports are group lab reports. That means that all the analysis and write-up is to be the groups own individual work. Information (including data) may not be shared among groups. You may discuss lab concepts and procedures with classmates, and you may get help on how to perform an analysis, but **whatever work you turn in, ultimately must be work performed only by members of the group.** You may **not** share tables, graphs, spreadsheets, etc., with other groups unless specifically authorized. ***You may not refer to or use old lab reports from previous semesters in any way even if you were the author. You may not refer to a lab report from the current semester unless it is your own. Any plagiarism on a group report will be the responsibility of the whole group, not just one individual. One person cannot assume responsibility for the group. If you as an individual plagiarize, you are putting your whole group at risk, and all members will share in the consequences.***

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University’s core values, including the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information, and veteran status.

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 Program Coordinator
- HWCoe Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <https://counseling.ufl.edu>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling; <https://career.ufl.edu>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>; <https://care.dso.ufl.edu>.

On-Line Students Complaints: <https://distance.ufl.edu/getting-help/>; <https://distance.ufl.edu/state-authorization-status/#student-complaint>.