ENGS 303: Heat and Mass Transfer
Spring 2024

Meeting Space: Lucas 107 / Trexler 272	Time: TuTh 10:10-11:40
Instructor: Cobb	Office: TREX 266A
Email: cobb@roanoke.edu	Office hours: M 1:00 – 2:00 PM, Tu 12:30-1:30, W 2:00-3:00, or by appt.
Course Site: Roanoke College	Laboratory hours: THU, 2:50 – 5:50 PM

Pre-requisites: ENGS 192, PHYS 202

Required Materials:
- Laptop with Microsoft Office products, Adobe Publisher, GNU Octave
- Texts: A Heat Transfer Textbook, 5th ed (available at ahtt.mit.edu) and Introduction to Engineering Thermodynamics (available at https://pressbooks.bccampus.ca/thermo1/)
- Engineering Paper

Instructional aspirations:
An introduction to the fundamentals of heat and mass transfer with continuing relevance due to the industries of nano-engineering, bio-engineering, and alternative energy methods. Thermodynamic principles and properties will be explored from an engineering perspective.

Expected learning outcomes: Successful students will be able to –
1. Articulate the definition of the various classes of heat and mass transfer – conduction, diffusion, convection, and radiation – and cite examples of their natural and technological importance
2. Appreciate the relevance of the laboratories and their relationship to the fundamental classes of heat and mass transfer, while contributing effectively as a member of a team.
3. Model an engineering system – an engine incorporating all classes of heat transfer -- using software tools to display graphing and data modeling to represent the engineered system
4. Create a useful approximate analysis of this engineering system, and communicate the analysis to the class clearly and succinctly.

Attendance: Students are required to attend every class. Your attendance will be recorded each lecture period. If you show up 10 minutes late, you will be marked absent. Any student who has four consecutive absences will be dropped from the course. A warning e-mail/letter will be sent when the third consecutive absence occurs. Also any student who misses a total of five classes will be dropped from the class. This includes both excused and unexcused absences. A warning letter/email will be sent when the fourth absence occurs. Any unexpected absence due to health reasons/emergency situation/participation in a conference or sporting events representing the College should be supported by proper documentation such as doctor's note, court order, and schedule of conference/sports events. You will need to inform me prior to the absence or within 48 hours of such an absence to be considered as excused. It is best to inform me about your absence in person. Emails and phone voice messages are not very reliable. It is your responsibility to make up for the work that you missed. I will not extend the deadline for turning in homework or other work assigned in the class unless you have my prior approval.

Expectation: Students are expected to put in a minimum of 12 hours/ week of work in order to successfully complete this course.

Grading: Grades for this course will be based on homework assignments, tests, integrative project, laboratories, in-class assignments and student participation.

Points	Grade	Points	Grade
<60	F	77-79	C+
60-62	D-	80-82	B-
63-66	D	83-86	B
67-69	D+	87-89	B+
70-72	C-	90-92	A-
73-76	C	≥93	A

Homework	10%
Quizzes	10%
In-class work, participation	5%
Exam 1	10%
Exam 2	10%
Exam 3 (Final)	15%
Lab Project	15%
Lab	25%

Homework: There will be at least one homework set each week, consisting of problems from the lectures given during the week. The homework sets will be posted on Inquire. Occasionally, I will assign homework problems in class. Assigned homework must be submitted by the indicated due date. See the late work policy below for more details.

Quizzes: These will be about 10 minutes and will be held during the lecture time. The quiz date will be announced during one lecture period prior to the quiz date. They will consist of questions from the homework and lecture material. If you are absent, you will not be allowed to make up with quiz unless you have a valid excuse. I will drop at least one quiz grade.

Lab Project: You will work in a small group to design and construct a lab experiment on an assigned topic related to thermal and fluid sciences. We will devote several lab sessions toward the end of the semester to the project. Your final submission must include a lab procedure that your classmates will use to test your experiment and learn about your topic.

Exams: There will be three exams during the semester. Each exam will cover the material listed on the syllabus and/or as informed by me in class. All exams will be cumulative. See the class schedule at the end of this handout.

Final Exam: The final exam (exam 3) will be in-person and is scheduled for 8:30 to 11:30 am on Monday April 29th.

In-Class Problems and Participation: You will also be required to complete problems assigned in class. Participation in class discussions is also an important aspect of learning the material.

MCSP Colloquium Series: You are required to attend at least 2 of the several talks as a part of the MCSP colloquia this semester. You have to write up a paper on your reflections of the talk to get full credit (2 points)

The reflection papers are due within one week of the talk. MCSP credits will be factored in while determining the final grade. This particularly helps students who are on the cusp of a letter grade.

Lab: Please note that a significant portion of the course work is dedicated to lab. This is an opportunity to put into practice many of the techniques and principles that are introduced within the classroom. Regular attendance in lab is essential.

Late Work: Please note that for all assignments a total of 50% will be deducted after one week past the due date (10% for each school day the assignment is late). After two weeks past the originally-assigned due date, no credit will be awarded for the assignment.

Make-up Exams: Make-up exams will only be allowed as a result of a discussion with me beforehand or a note related to the emergency (death, hospitalization, misdemeanor, etc.) signed by a governing official (medical doctor, parent, law enforcer, etc.).

Collaboration/Group Work: One key feature of 21st century science and engineering is the degree of collaboration within the community. As a part of this class, time will be spent in group collaboration in class and in laboratory. We will reinforce previous discussions of the difference between "collaboration" and "plagiarism." Plagiarism exists when someone takes personal credit for another's creative (usually written) work, which includes your classmates. Collaboration relies on the individual strengths and contributions of each group member to produce a deeper level of understanding. Two practical indicators where you may be flirting with plagiarism: 1) you are not thinking for yourself while completing assigned work; 2) you are not properly recognizing others for their contribution (including your own classmates). Please consult your instructor if this is unclear and/or you have questions.

Participation: What it means to "participate" in ENGS 303 includes the following: attentive attendance in lab and lecture, engagement in question and answer, working on in-class problems, reflective write-up for one extracurricular lecture or presentations, and responsibility for your own learning (office hours, etc.). Students are expected to put in a minimum of 12 hours/ week of work in order to successfully complete this course.

Office Hours: Please take advantage of the office hours prescribed above, or make an appointment with me. Drop-ins are at the total mercy of my daily schedule.

Inquire: Inquire will be used routinely to facilitate your learning. I will post announcements, notes, assignments and other communication. You are expected to check the course site once every day, so that you are aware of schedule, assignments, help tips, etc.

Academic Integrity: Maintaining academic integrity is a mutual responsibility for all of us. I will be respectful of your time and make sure I am available during my office hours and will communicate with you in a timely manner. I expect the same in terms of your timeliness, honesty and sustained effort. Plagiarism and cheating are unacceptable and also violate RC policies. Refer to the "Academic Integrity" page on the RC website–
https://www.roanoke.edu/inside/a-z_index/academic_integrity
Included here is an explanation of how violations of the College's academic integrity policy are handled.

Subject Tutoring: Subject Tutoring, located on the lower level of Fintel Library (Room 5), is open 4 pm – 9 pm, Sunday – Thursday. We are a Level II Internationally Certified Training Center through the College Reading and Learning Association (CRLA). Subject Tutors are highly trained Roanoke College students who offer one-on-one tutorials in a variety of general education and major courses such as: Business, Economics, Mathematics, INQ 240, Modern Languages, Lab Sciences, INQ 250, and Social Sciences (see all available subjects at www.roanoke.edu/tutoring). Tutoring sessions are available in 15, 30, or 45-minute appointments. Feel free to drop by for a quick question or make an appointment at www.roanoke.edu/tutoring for a longer one-on-one appointment. For questions or concerns, please contact us at 540-375-2590 or subject_tutoring@roanoke.edu.

Accessible Education Services: Accessible Education Services (AES) is located in the Goode-Pasfield Center for Learning and Teaching in Fintel Library. AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. Please contact Laura Leonard, Assistant Director of Academic Services for Accessible Education, at 540-375-2247 or by e-mail at aes@roanoke.edu to schedule an appointment. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact Laura Leonard at your earliest convenience to schedule an appointment.

Diversity: I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

Name/Pronoun: I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records.