Elementary Transport Phenomena
ECH 3264
Class Periods: MWF, Period 4, 10:40-11:30 am EST
Location: CSE E220 and via Zoom
Academic Term: Fall 2021

Instructor:
Dr. Whitney Stoppel (she/her), please call me Prof. Stoppel or Dr. Stoppel
Whitney.stoppel@ufl.edu
Office Phone Number: 352.392.6205
Office Hours: Wednesday, 3-4:15 via zoom

Zoom links are provided on canvas and require you to **log into your zoom via UF SSO
https://elearning.ufl.edu/zoom/

Best way to contact Dr. Stoppel:
a. Message/Email via Canvas platform
b. Normal email (whitney.stoppel@ufl.edu) with **ECH3264** in the subject line (helps my outlook filter so I don't miss your emails)
    a. Do not send emails from a non-UF email address please

Teaching Assistant/Peer Mentor/Supervised Teaching Student:
Blake Trusty will serve as our PhD Student Teacher during this class. He will offer office hours to help you understand the methods of problem solving via the assigned homework problems. Please contact your ST via email- same email rules apply for emails to Blake as well. Blake's office hours will be scheduled after the first day of class.
blake.trusty@ufl.edu

Neeharicka Measala will run the classroom zoom meetings so we can operate in hyflex. If you are not able to ask your questions live, you can type them in the chat and Neeharicka will make sure I get them during lecture.

Course Description
Flux law and conservation equations of mass, energy and momentum; steady and unsteady states as applied to physical and chemical processing; macroscopic and microscopic analysis.

Course Pre-Requisites / Co-Requisites
Prerequisite: ECH 3023 and MAP 2302 and MAC 2313.

Course Objectives
1. Derive differential equations from basic conservation principles describing heat, mass, and momentum transport
2. Define and utilize Fourier's Law and Fick's Law
3. Define the characteristics of Newtonian and Non-Newtonian Fluids
4. Define and explain the origins of the quantities (such as heat transfer coefficient, viscosity, and diffusivity) used to describe heat, momentum, and mass transport
5. Use the equations of change to formulate differential equations with proper boundary conditions to describe transport phenomena
6. Solve one dimensional steady problems of mass, momentum, and heat transport with and without source terms
7. Solve selected multidimensional problems of mass, momentum, and heat transport with and without source terms

Materials and Supply Fees

No additional fees for this course

Relation to Program Outcomes (ABET):

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	
3. An ability to communicate effectively with a range of audiences	
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	
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	Low
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	Medium

*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
The textbook we will use for this class:
https://www.wiley.com/en-us/Introductory+Transport+Phenomena-p-9781118953723

Introductory Transport Phenomena
R. Byron Bird, Warren E. Stewart, Edwin N. Lightfoot, Daniel J. Klingenberg
ISBN: 978-1-118-95372-3

Final Exam
12/17/2021 (Friday)
7:30 AM - 9:30 AM

COVID-19 Policies and Procedures

- You are expected to wear approved face coverings at all times during class and within buildings, even if you are vaccinated.
- If you are sick, stay home and self-quarantine. Please visit the UF Health Screen, Test & Protect website about next steps, retake the questionnaire and schedule your test for no sooner than 24 hours after your symptoms began. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 (or email covid@shcc.ufl.edu) to be evaluated for testing and to receive further instructions about returning to campus.

- If you are withheld from campus by the Department of Health through Screen, Test & Protect, you are not permitted to use any on campus facilities. Students attempting to attend campus activities when withheld from campus will be referred to the Dean of Students Office.
- UF Health Screen, Test & Protect offers guidance when you are sick, have been exposed to someone who has tested positive or have tested positive yourself. Visit the UF Health Screen, Test & Protect website for more information.
- Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators.

Course Schedule

**note that dates are given as MM/DD/Year*
**Homework (HW) due dates are suggested dates of completion to stay on track*

Module Name	**Topics**	**Dates**	**Assessment**
Math Reminders-1	Integrals, derivatives, and using them to solve problems- tables and how to use them	08/23/2021 to 08/27/2021	HW 1: 08/30/2021 **Quiz 1: 09/01/2021**
Section 1: Heat/Energy Transport	Thermal conductivity and Fourier's law, deriving equations for the heat flux from shell balances, Solving for steady temperature distributions, Steady conduction in cylindrical and spherical geometries, Heat transfer coefficients, Time-dependent conduction, Multi-dimensional heat flow, Dimensionless numbers and variables	8/26/2019 to 9/17/2019	HW 2: 09/08/2021 **Quiz 2: 09/10/2021** HW 3: 09/15/2021 **Exam 1: 09/21/2021 (Tuesday)**
Math Reminders-2	Vectors and tensors- need to refresh on these topics to make sure that we can solve more problems and define our systems appropriately	09/20/2021-09/27/2021	HW 4: 09/27/2021 **Quiz 3: 09/29/2021**
Section 2: Momentum Transport or "Fluid Mechanics"	Viscosity and Newton's Law, Convective momentum transport, velocity distributions via shell balances, multi-dimensional momentum transport, Newtonian and Non-Newtonian fluids, general mass and momentum balances	9/29/2021-10/20/2021	HW 5: 10/06/2021 **Quiz 4: 10/11/2021** HW 6: 10/13/2021 **Exam 2: 10/21/2021 (Thursday)**
Section 3: Mass Transport	Diffusivity and Fick's first law, transport by convection, concentration distributions via shell balances, Fick's second law	10/22/2021-11/17/2021	HW 7: 10/27/2021 **Quiz 5- 10/29/2021** HW 8: 11/05/2021 **Quiz 6- 11/8/2021** HW 9: 11/19/2021 ***Exam 3: 12/06/2021 (Monday) (Covers Mass)***
Math Reminders 3: Solving more complex equations	Review again of crazy integration rules to make sure you remember how to solve	11/19/2021-11/22/2021	HW 10: 11/29/2021 **Quiz 7: 12/1/2021**
Section 4: Putting them all together!	Unsteady states, viscous heat sources, crafting your own problems and justifying why you can solve them (assumptions and boundary conditions)	11/29/2021-12/08/2021	HW 11: 12/03/2021 HW 12: 12/08/2021 *Make up Quiz: 12/08/2021* **Final Exam: 12/17/2021**
Section 5: Transport in Real Life	Out of class time to work on a group project, project due 11/19/2021	November 2021	**Project: 11/19/2021**

Attendance Policy, Class Expectations, and Make-Up Policy

I will not keep or take attendance, but I really encourage you to show up as I am here to teach you transport but also serve as a mentor and advisor to you in your education in the ChE program at UF. It is very hard for me to get to know you as a student if you don't come to class and engage in the conversations we have or ask questions. I do my best to help students navigate their time at UF, but its hard for me to do this if I don't know you. Office hours are also a great place for me to get to know you. If you are unable to attend regularly scheduled office hours but want to have a get to know you meeting via zoom or something, please just ask. I will make time!

If you will be out of town for a UF sanctioned activity or you are sick and unable to make an exam for an excused reason, please communicate this to me as early as possible. If you know you will be out of town for an excused reason, I will arrange for you to take the exam before leaving town and ensure that the review session is before you leave/take the exam.

If you miss a quiz (sickness, excused reason), I will offer 1 make up quiz at the end of the semester on a different topic that can replace the grade for the missed quiz. I also drop your lowest quiz grade.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies:
https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

Evaluation of Grades

Assignment	*Total Points*	*Percentage of Final Grade*
Quizzes (7, drop 1)	40 pts each	3% each quiz, 17% total
Exams (3)	240 pts each	17% each, 51% total
Group Project	200 pts	14%
Final Exam (Dec. 17th)	250 pts	18%
	1410 total	

Please note that I usually input grades into Canvas on Sundays and Mondays. I try to be as quick as possible, but you should expect grades to be posted 1-2 weeks following the activity. Obviously grading quizzes is so much faster than grading exams. I will try to be as transparent as possible.

Grading Policy

We will follow standard grading procedures. If you do your homework and attend class, there is no reason to think you won't be able to get an A or B in the course. Bonus questions are often added to quizzes and exams to help offset point totals. I do not curve or do any sort of adjustments to the grades and there are no special assignments or anything. Points are points and you just need to get them via your quizzes, exams, and group project. I will provide grades on canvas. I will not return exams, but I will return quizzes (if we take them in person). I make up my own exams and quizzes, but homework problems come from the textbook. I try to write exam questions that mimic the questions I give in your homework and also very closely resemble the problems I work in class/over zoom.

Percent	**Grade**	**Grade Points**
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00

60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

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.

Other Important Things
Being an engineering student can be tough. Please make sure to take advantage of all of the opportunities provided by the College of Engineering as well as the services offered across campus. Please note that Dr. Stoppel is a mandatory reporter, meaning that if you want to discuss a sensitive topic, she is more than willing- but may have to have conversations on your behalf with the Engineering Dean of Students, Dr. Curtis Taylor, depending on the nature of the conversation and level of detail provided. Dr. Stoppel will always work to have your best interest in mind. If you find yourself in a tricky situation and you do not wish to discuss it but need help- please seek out assistance on campus via http://www.umatter.ufl.edu/ . This could be anything from struggling in class, dealing with a family illness or family-related situation, to dealing with a stressful roommate. Find things to help you relax, whether it is participating in sports, yoga, mindfulness, meditation, or simply enjoying a cup of tea. Please do not hesitate to reach out if you are struggling. Cynthia Sain and Shaura Thomas, our department undergraduate advisors, have a wealth of knowledge and experience. They have seen students struggle over many years- you aren't alone and you aren't the first person to struggle. Find support!! You deserve to be here even if you hit a few bumps along the way.

Find your people! Academics and learning can be way more fun if you find activities that keep you engaged. Check out the UF American Institute of Chemical Engineers Chapter, find a research opportunity, or an outreach activity.

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.bluera.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. *Dr. Stoppel does not give consent for publishing recorded lectures or any other class material.*

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 Conduct 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. If you have any questions or concerns, please consult with the instructor or STs in this class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

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 program coordinator:

Ms. Cynthia Sain	Dr./Prof. Spryos Svoronos (UGs)	Dr./Prof. Kirk Ziegler (grads)
352 294-2891	352-392-9101	352-392-3412
csain@ufl.edu	svoronos@ufl.edu	kziegler@che.ufl.edu

- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@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 suppor*t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Resource 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: http://www.distance.ufl.edu/student-complaint-process.