ME 608: NUMERICAL METHODS IN HEAT, MASS, AND MOMENTUM TRANSFER
Spring 2020 (Schedule: MWF 10:30 – 11:20 am, Venue: WANG 2555)
Version 1.1 (01/08/2020)

INSTRUCTOR **Dr. Partha P. Mukherjee**

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OFFICE HOURS **Monday & Wednesday: 11:30 am - 1:00 PM** or by appointment.*
**Note that I try to be really prompt in responding via email. If you have a quick question, send me an email.*

TEACHING ASSISTANT **TBD**

GRADING POLICY

Homework/Quiz	40%
Final Examination	20%
Project	40%

Grade	Point
A+	96 – 100
A	91 – 95
A-	86 – 90
B+	81 – 85
B	76 – 80
B-	71 – 75
C+	66 – 70
C	61 – 65
C-	56 – 60
D	<= 55
F	<= 45

Your cumulative score will be calculated up to two decimal places. Scores falling in the "gray" areas will be assigned the grade corresponding to the score rounded off to one decimal.

RESOURCE Lectures will be developed based on multiple resources including research papers, and chapters from relevant textbooks. The following can be referred to additionally.

1. "Numerical Heat Transfer and Fluid Flow," Patankar (CRC Press)
2. "An Introduction to Computational Fluid Dynamics: The Finite Volume Method," Versteeg and Malalasekera (Pearson)

PREREQUISITES Strong analytical background; engineering mathematics (partial differential equations); programming skills; discussion with and approval from the instructor.

LEARNING OUTCOMES ***The focus of the course will be on learning the fundamental concepts of numerical solution of transport phenomena (heat, mass, momentum) problems with a goal to develop the ability for sound analysis*.** After finishing this course, the students should have the following ability.

1. Understand the mathematical description of advection-diffusion-reaction system;
2. Comprehensive grasp on the basics of finite volume method;
3. Gain knowledge on numerical solution of transport phenomena, involving species, charge, thermal, and fluid flow characteristics.

PROJECT The project, based on numerical analysis and simulation of multi-physics phenomena, is an integral part of this course. You can choose your own group members (group size limited to 4). Each course project will be designed based on discussion with the instructor. The formal written report and presentation will constitute a significant part of your grade.

Project Milestone (tentative schedule)

Milestone	Breakdown	Due Date
Team List (email to instructor)	-	2nd week
Topic Selection (title and brief description of the project objective)	5	3rd week
Progress Report (4-page report: problem statement, objective, task list, tentative schedule per task and preliminary results)	10	8th week
Draft Report	15	11th week
Final Report and Group Presentation	70	Last day of class
Total points	100	

SUBMITTED WORK	All submitted work should be presented in a clear, professional manner and must follow given format; should include a restatement of the problem, appropriate diagrams with all variables defined, a detailed, step-by-step solution, and all final answers clearly identified.
IMPORTANT DATES	FINAL EXAM: as per the final-exam schedule or TBA
ONLINE STUDENTS	The course project teaming arrangement will be discussed and appropriate adjustments may be made as needed.
COURSE WEBSITE	The materials, including homework, notes etc., will be posted on the Blackboard Learn course portal.
HONOR CODE & INTEGRITY	***Purdue Honor Pledge***: "As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue." https://www.purdue.edu/provost/teachinglearning/honor-pledge.html ***Academic integrity*** is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breeches of this value by either emailing integrity@purdue.edu or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern. ***Unethical Conduct.*** Communication between students in the solving of homework problems is encouraged. However, each student is expected to do his/her own work in satisfying the homework problem requirements, without using any materials that the instructors do not intend to have the students have (including, but not limited to, solutions from the textbook, past homeworks, old lab reports, or old exams). Failure to do so will result in a grade of zero for the homework assignment. Any student detected of cheating on an examination will receive a failing grade in the course, and documentation will be sent to the Dean of Students Office, recommending termination from the University for a period of no less than one year.
ATTENDANCE	Classroom attendance is expected except in cases of illness, emergencies, or other special circumstances. In case of an absence, an email notice should be sent to the instructor before the lecture or as soon as you are able. You will be held responsible for any material which is discussed in lecture, whether treated in the text or not. There will be no opportunity for make-up of missed assignments (homework and exercises) except in cases of long term illness or serious emergency. Students with excusable absence due to illness or serious emergency will be assigned a homework or class exercise grade equal to the average of the remaining assignments or exercises.
CAPS INFORMATION	Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at (765)494-6995 and http://www.purdue.edu/caps/ during and after hours, on weekends and holidays, or through its counselors physically located in the Purdue University Student Health Center (PUSH) during business hours.
EMERGENCY PROCEDURE	In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Information about changes will be available via E-mail inquiries to pmukherjee@purdue.edu.
COMMERICIAL NOTE TAKING	Among the materials that may be protected by copyright law are the lectures, notes, and other material presented in class or as part of the course. Always assume the materials presented by an instructor are protected by copyright unless the instructor has stated otherwise. Students enrolled in Purdue University courses are permitted to take notes, which they may use for individual/group study or for other non-commercial purposes. Notes taken in class are, however, generally considered to be "derivative works" of the instructor's presentations and materials, and

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