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Office Hours:
1:15 - 3:15 MW
And by appointment

Textbook: There is no formal textbook for the course. All materials will be distributed in class or on the Web.

Description:

This course will be an introductory course in the use of software tools for modeling of applications from a variety of disciplines including engineering mechanics, physics and chemistry. Part of the course will be devoted to the solution of ordinary and partial differential equations. This portion will incorporate elements of numerical linear algebra and solution of linear systems of equations. In addition, some time will be devoted to methods for discretization of partial differential equations in the spatial and temporal domains. The main focus will be on the effective solution of the resulting discrete equations using direct and iterative (with and without preconditioning) solution techniques. High level packages such as MATLAB and COMSOL will also be utilized.

Prerequisites

1. Knowledge of basic calculus
2. Ability to program in C or Fortran
3. Knowledge of Linear Algebra
4. Knowledge of the UNIX operating system
5. Basic knowledge of MATLAB

Objectives: At the completion of this course you will be able to:

- Discretize steady and unsteady partial differential equations using basic finite difference techniques.
- Determine the level of difficulty that will be encountered in the numerical solution of partial differential equations
- Solve linear systems via efficient direct and iterative methods
- Apply principles of sparse linear algebra methods to the solution of discrete equations
- Use MATLAB and COMSOL for computations and visualization of results

Topics:

1. Dimensional Analysis
2. Basic concepts in numerical linear algebra

3. Direct and iterative solution techniques
4. Use of the COMSOL software package
5. Applications of these concepts to problems in the applied sciences.

Grading:

Your final grade will be determined from:

- 75% Homework assignments (10-30 points each)
- 25% 2 projects (100 points each).

Your final weighted average will be determined using the weights indicated and your grade will be determined according to the following scale:

Average	Grade	Average	Grade
100-95.0	A	74.0-76.9	C
94.9-90.0	A-		
87.0-89.9	B+		
84.0-86.9	B		
80.0-83.9	B-		
77.0-79.9	C+	< 76	E

The instructor may administer quizzes in class (announced or unannounced) at any time. These will be included with the take-home project scores. This will almost certainly be done if significant numbers of students fail to submit homework assignments on a timely basis or produce a very low quality of work.

Occasionally, the class will meet in one of the Dailey Hall computer labs. Students will be informed of such meetings at least one day in advance.

Assignments:

Homework assignments given in class will have varying due dates. Short assignments will usually be due at the next class meeting while longer assignments will be due in 1-2 weeks time. These assignments typically involve analytical investigation and computer programming. Late assignments will be penalized at a rate of 25% points per day. Homework is due at the beginning of class. No assignments of any type will be accepted after the final class meeting day. Students may meet together in small groups to discuss aspects of a given assignment, but all work presented must be your own.

As the semester proceeds, all assignments will need to be produced using document processing software as MS Word. When computer output is requested, provide printouts of the programs and other material as requested. Do not submit large volumes of printed data.

Policies

Students with documented disabilities may be entitled to specific accommodations. SUNY Brockport’s Office for Students with Disabilities makes this determination. Please contact the Office for Students with Disabilities at 395-5409 to inquire about obtaining an official letter to the course instructor detailing approved accommodations. The student is responsible for providing the course instructor with the official letter. Faculty and staff work as a team with the Office for Students with Disabilities to meet the needs of students with disabilities.

NO CELL PHONES OR PAGERS. Please turn off your cell phone or pager prior to entering the classroom. You will lose half credit on your next homework assignment if your cellphone or pager goes off.

Attendance:

You are expected to attend all classes. Significant amounts of material are not contained in the textbook. If you miss a class, it is your responsibility to get class notes and handouts and find out what you missed. The instructor reserves the right to fail any student who acquires more than 4 unexcused absences.

No incompletes or withdrawals will be given for this course except in cases of illness, personal tragedy, or extraordinary circumstances beyond the student's control, and then only if documented to the instructor's satisfaction.

Here is the official SUNY Brockport Attendance Policy:

The student is responsible for all assigned course work and cannot be absolved of this responsibility. When enrolled in a particular course, the student is obligated to do all of the work assigned. Punctual and regular attendance is vital to the discharge of this obligation. Absences, excused or not, do not alter this responsibility. Absences deemed excessive by the instructor may result in a lowered grade. Students whose unexcused absences exceed 15% of the scheduled classes and laboratories will be subject to failure at the instructor's discretion. Absences will be excused for (a) documented illness, (b) official representation of the college, (c) death of a close relative, (d) religious holiday, and (e) circumstances beyond the control of the student. Excuses for official representation of the college must be obtained from the official supervising that activity or event. Policies regarding absences from quizzes, exams, and laboratory sessions will be at the discretion of the instructor. Substantiation of excused absences is, in any case, the responsibility of the student. Regulations more restrictive than those stated above may be established by the instructor.

Authorship:

When you turn in an assignment, you are certifying it as your own work. Submitting material as your own work that is not entirely of your own authorship, or knowingly providing an answer to another person constitutes cheating. If I am convinced beyond a reasonable doubt that cheating has occurred, the person(s) submitting the illicitly obtained answer, and any person(s) knowingly providing same, will receive a grade of zero for that assignment. Further disciplinary procedures may also be considered.

Buckley Amendment:

The purpose of the Buckley Amendment is to protect the confidentiality of your grades. This law states that I cannot reveal any information regarding your performance in the course to anyone other than yourself and authorized college administrators without your written permission.

Disclaimer:

Announcements given in class are considered official addenda to this policy. All policies described are subject to change as the situation warrants. Should changes be necessary, all students will be notified in a timely fashion.