CEE 375 – CEE Computer Applications – Syllabus

Catalog data: **20-CEE-375**. *Civil and Environmental Engineering Computer Applications*. 3 ug. cr. Introduction to college computing facilities, applications, basic concepts of computer programming and application of computer solutions in civil and environmental engineering. *(This still needs updating in catalogue! See "Goals")*

Textbook: *Applied Numerical Methods with MATLAB for Engineer and Scientists*, 1st ed., S.C. Chapra, McGraw-Hill Companies, Inc., 2005

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Goals: To introduce numerical methods for solving mathematically complex engineering problems (many real-world problems do not have an exact analytical solution) and to familiarize students with computer techniques and software (especially MATLAB, Excel Solver) for performing the numerical methods, using civil and environmental engineering applications as examples.

Lecture topics:	*Weeks 1-2*	Introduction to numerical methods, modeling, computer software, and types of error (Chapra, Chapters 1-4) *Homework #1*
	Weeks 3-4	*Exam I* (30 min, 12% total grade) Root solving techniques and introduction to optimization problems (Chapra, Chapters 5-6 + additional notes), *Homework #2*
	Weeks 5-6	*Exam II* (30 min, 12% total grade) Matrix algebra, Gauss elimination, LU decomposition, and solving systems of equations (Chapra, Chapters 7-11), *Homework #3*
	Weeks 7-8	*Exam III* (30 min, 12% total grade) Curve-fitting: regression analysis, polynomial, and spline techniques (Chapra, Chapters 12-15), *Homework #4*
	Weeks 9-10	*Exam IV* (30 min, 12% total grade) Integration techniques and solution of ordinary differential equations (ODEs) (Chapra, Chapters 16-20), *Homework #5*
	Final exam period	Wednesday, August 30th, 1:30-3:30pm *Exam V* (30 min, 12% total grade) *Group project presentations (5 groups, ~15-20 minutes each)*
Grading:	60 % 20 % 10% 10 %	Exams (five 30-min exams @ 12 % each) Homework* (five sets @ 4% total grade each) Group project/presentation Instructor evaluation based on participation during in-class exercises and labs, spot checks

***Homework policies**: Assignments will be posted to Blackboard at the beginning of the odd-numbered weeks in the quarter. They will be due by 5 pm on Thursday of the even-numbered weeks. *Late homework will not be accepted* because the solutions will be posted on the evening of the due date to allow time for the class to review them prior to exams. The final work handed in must represent the efforts of the individual student who submits it; direct sharing and/or copying of solutions constitutes cheating. Teamwork and learning from interaction with each other is okay to the extent that it is restricted to discussion of solutions and solution approaches.

Format: Begin each problem on a new page, write only on one side of the page, "box in" final answers, and staple the entire assignment in the upper left hand corner, ordering the problems as appropriate. Solutions must be legible and orderly, solutions that cannot be read will be returned ungraded.