University of Nevada, Reno

COMPUTER SCIENCE & ENGINEERING DEPARTMENT
CS 241 - INTRODUCTION TO COMPUTER METHODS FOR ENGINEERS
Spring 2012

Catalog: Introduction to algorithm development and software for analysis of engineering problems and design. Computer skills development, file and data management, graphics and numerical methods, spreadsheets. Prerequisite: PHYS 180 - (previously MATH 181)

Textbooks: Introduction to Matlab 7 for Engineers, William J Palm III, McGraw Hill, 2005.
MathCad: A Tool for Engineering Problem Solving, Philip J. Pritchard, 2nd Ed, McGraw Hill, 2008.
Excel and VBA tutorials from the Web, TBA

Instructor: Dwight Egbert, Professor of Computer Science & Engineering, egbert@cse.unr.edu
11:30AM-1:00PM - Monday & Wednesday (or by appointment), Room 322 SEM, Tel: (775) 784-6952

Lab Instructor: Ben Brown – brownb@cse.unr.edu
(TBA) Room SEM 255A

Academic Success Services:
Your student fees cover usage of the Math Center (784-4433 or www.unr.edu/mathcenter/), Tutoring Center (784-6801 or www.unr.edu/tutoring/), and University Writing Center (784-6030 or www.unr.edu/writing_center/. These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student.

If you have a disability for which you will need to request accommodations, please contact me or Mary Zabel at the Disability Resource Center (Thompson Student Services – room 100, 784-6000, or www.unr.edu/drc/), as soon as possible to arrange for appropriate accommodations.

Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some students may have been given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded.

Course Goals: To provide students with:
- Knowledge of how a computer works and how to program computers
- Knowledge of a structured approach to engineering problem solving using computers
- Knowledge of computing packages/software applications that will be useful in their professional careers
- Ability to employ such knowledge in engineering problem solving

Course Topics:
- Introduction to programming and flow-charting
- Structured programming concepts
- MATLAB Engineering problem solving, math functions and operations
- MATLAB plotting and graphing
- MATLAB data types, variables and constants, and arithmetic
- MATLAB one and two dimensional arrays (vectors and matrices)
- MATLAB operators: arithmetic, relational, logical
- MATLAB programming, editing a program, basic structure of a program, documentation
- MATLAB control statements; conditional control (if, switch); loop control (for, while, continue, break)
- MATLAB control statements; loop control (for, while, continue, break)
- MATLAB functions
- MathCAD functions, vectors, matrices, and graphing
- MathCAD solve blocks, statistical functions, and symbolic math
- EXCEL Spreadsheet basics (text, value, and function entry) and graphing
- EXCEL Spreadsheet advanced functions including trend lines and macros

- EXCEL Spreadsheet programming in Visual Basic for Applications (VBA)
- EXCEL Spreadsheet IF, AND, OR functions, solver, and data analysis tools

Course Objective:
Students will demonstrate an understanding of and competent use of computer tools such as Matlab, Mathcad, and Excel for solving engineering problems using structured programming techniques.

Course Outcomes:
The course outcomes are skills and abilities students should have acquired by the end of the course. These outcomes are defined in terms of the Computer Science and Engineering ABET Accreditation Program outcomes which are relevant to this course. All outcomes are listed below and those relevant to this course are identified in the following Table.

1. an ability to apply knowledge of computing, mathematics, science, and engineering.
2. an ability to design and conduct experiments, as well as to analyze and interpret data.
3. an ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs, within realistic constraints specific to the field.
4. an ability to function effectively on multi-disciplinary teams.
5. an ability to analyze a problem, and identify, formulate and use the appropriate computing and engineering requirements for obtaining its solution.
6. an understanding of professional, ethical, legal, security and social issues and responsibilities.
7. an ability to communicate effectively with a range of audiences.
8. the broad education necessary to analyze the local and global impact of computing and engineering solutions on individuals, organizations, and society.
9. a recognition of the need for, and an ability to engage in continuing professional development and life-long learning.
10. a knowledge of contemporary issues.
11. an ability to use current techniques, skills, and tools necessary for computing and engineering practice.
12. an ability to apply mathematical foundations, algorithmic principles, and computer science and engineering theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
13. an ability to apply design and development principles in the construction of software systems or computer systems of varying complexity.

Program Outcomes	Course Outcomes	Course Strategies & Actions
1	Students demonstrate that they can design programs using the proper mathematics to solve specific engineering problems.	Homework & labs requiring students to design, build, and test program solutions
3	Students demonstrate they have the ability to design a system, component, or process to meet desired needs within realistic constraints.	Homework & labs requiring students to design programs and functions to produce engineering solutions within the constraints of specific software packages
5	Students demonstrate that they can interpret problem statements and formulate correct program solutions to engineering problems.	Homework & labs requiring students to interpret engineering design problems and create programs which produce correct solutions.
11	Students demonstrate that they can design and write program solutions using several engineering software packages and programming tools.	Homework & labs requiring specific program functions and solutions using specific programming tools.

Student Participation:
The course will contain three basic and interrelated blocks. First, the textbooks will provide the framework for the course. Second, as material is reached in the textbook it will be related to supplementary material covering advanced computer topics. Third, each student will design and program computer solutions for Lab assignments.

Students are expected to attend all classes and read all of the assigned sections of the textbook. Often, material will not be covered in both lectures and reading assignments. Thus, both are essential to a full understanding of the course content. Students are responsible for checking the **WebCampus page** for the course before each class.

During most classes a short example problem related to the next lab will be assigned. Students will spend a few minutes working alone on this problem followed by a few minutes discussing their solutions with two or three other students. These solutions will be collected and used as a basis for up to 5% extra credit for the course grade.

Completion of laboratory assignments is essential. **Tuesday lab assignments are due before 5PM Wednesday and Thursday Lab assignments are due before 5PM Friday**. All lab assignments must include a completed **cover page** (standard format to be provided) which includes the program design, section number, TA name, student name, and student ID number. Homework for this course consists of preparing for the lab assignments.

Laboratory assignments must be submitted via WebCampus. Lab assignments will be graded one week after they are submitted and grades will be posted on WebCampus. If you notice a mistake on your posted grade you must report it within two weeks after the grade is assigned to guarantee that a correction will be made. If you miss the deadline for submitting a lab you must email your late lab submission to the Teaching Assistant who conducted the lab.

LATE LABS WILL EARN (at most) 50%

Students are encouraged to study together, but each person must prepare his or her solutions and have a firm understanding of any work turned in. This means that it is OK to discuss assignments and solutions, but it is NOT OK to share computer program code. When you put your name on your labs and homework you are stating that it is your own work and not the work of another person. As a reminder of UNR academic standards, please read http://www.cis.unr.edu/ecatalog/Default.aspx?article_list_id=25995%20 defining these standards. Specifically, the following: "*Plagiarism is defined as submitting the language, ideas, thoughts or work of another as one's own; or assisting in the act of plagiarism by allowing one's work to be used in this fashion.*" This means that if another student asks to borrow your work to copy - JUST SAY NO - or you are participating in plagiarism.

Course Grade Structure:
Each course activity will contribute to the course grade as shown below. All activities will be graded on a scale of 0-100 points, and the final course grade will be determined as shown below.

STUDENTS MUST PASS BOTH LECTURE AND LAB IN ORDER TO PASS THE COURSE

Passing the lecture means that the average score for all exams is passing (>=50)

Passing the Lab means that the average for all labs is passing (>=50)

All exams given in this course will be closed notes and closed books. Only calculators and materials handed out at the time of the exam may be used. Students may, however, prepare and use during exams a 3" by 5" index card with any information written on it. Normally, plus/minus grades are not given in this class. The instructor reserves the right to assign plus/minus grades under special circumstances involving borderline grades based upon class participation. Your grade will never be lower than defined here unless you have an excessive number of un-excused absences from class or lab, however, positive class participation can be used as a basis for raising your grade.

LABS and HOMEWORK	35%
EXAM 1	20%
EXAM 2	20%
COMPREHENSIVE FINAL EXAM	25%
= COURSE GRADE	100%

90 - 100 points = A | 80 - 89.9 points = B | 65 - 79.9 points = C | 50 - 64.9 points = D | 00 - 49.9 points = F