

**NORTHEASTERN UNIVERSITY**  
**College of Engineering**

**GE 1102/1702**  
**Engineering Problem Solving with Application Software**  
**Winter 2003 Course Outline**

**Instructor:** Beverly K. Jaeger, Ph.D.  
**Telephone:** 617.373.5995

**Office:** 363 Snell Engineering  
**Email:** bkjaeger@coe.neu.edu

**Conference Hours\*:** Monday 5:10-6:00 pm, Wednesday 9:15-10:20 am, Thursday 12:30-1:30 pm, 2:50-3:55 pm  
\*First priority will go to students with classes that immediately follow the posted office hours on a particular day.  
Additional times: Thursdays after 5:10 by appointment. Other times may also be arranged by appointment.

**Texts:** D. C. Kuncicky, *Introduction to EXCEL 2002*  
D. M. Etter, *Engineering Problem Solving with MATLAB*

**Course Objectives:** The successful student will learn how to apply computational tools to solve a variety of engineering problems. Specific skills and exercises include:

- Formulating engineering problems for numerical solutions;
- Selecting appropriate techniques and computational tools to arrive at a numerical answer;
- Mastering and applying computational concepts and skills such as variables, functions, flowcharting, looping, conditional branching, and general programming logic;
- Learning to check and debug programs and confirm solutions;
- Demonstrating facility with two software packages, *EXCEL* and *MATLAB*, which can be used throughout your Northeastern experience and beyond to solve theoretical and real-world problems;
- Analyzing, organizing and presenting computational projects and results with clarity and accuracy;

**Hardware and Software:** *MATLAB 6.0 or MATLAB 6.1 for Windows*<sup>®</sup> (Releases 12 or 12.1) and Microsoft<sup>®</sup> *EXCEL XP* are installed on NU-NET can be accessed in 208 SN and in other university computer labs. If desired, *EXCEL* and *The Student Edition of MATLAB* may be purchased for use on your own computer through Microsoft.com and MathWorks.com websites or elsewhere. Students may also use *EXCEL* from *Microsoft Office 2000*.

<b>Grading Formula:</b>	Projects / Homework:	60%
	Written and Lab Quizzes:	30%
	Attendance & Preparation:	10%

**Examinations:** There will be no final exam. There will be a week of short quizzes near the middle of the quarter and possibly again near the end of the quarter. Each quiz week consists of two quizzes, one written and one in lab on computer. This schedule is subject to change according to the progress of the course.

**Course Format:** Class meets in two relatively integrated segments for each topic and assignment (module). There are 10 modules planned for this course, 4 for Microsoft Excel and 6 for MATLAB. All class sessions are conducted in the ECALC Laboratory, 208 Snell.

The first segment of a module is referred to as *lecture* and the second segment of the module is referred to as *lab*. Typically, topics will be introduced in the lecture portion with some limited opportunities for computer practice. Lab time will be primarily dedicated to student work on lessons and assignments. Lab time is made available to ensure that the student understands the assignment and to make inquiries to the professor about the course material. Lab time is a *supplement* to time the student invests outside class, not a substitute. Finally, *prelab* work may be assigned to prepare the student for lab.

**Lab Assignments/Homework:** Laboratory/homework assignments will be distributed and explained in lecture and will be due at the beginning of the *lecture* the following week. *Late homework is not acceptable.* The assignments are designed to be completed in less than 1 week's time. In addition, preparatory work called *prelabs* may be required to be completed and submitted at the beginning of each *lab* period to help with the assignment.

**Ethical Behavior:** Plagiarism and cheating will not be tolerated and will be handled in accordance with Northeastern University policies described in the Student Handbook. All engineering majors should be familiar with the Honor Code of the College of Engineering, which is included in the GE 1001 course material, and with professional engineering codes of ethics (see, for example, the NSPE Code of Ethics presented in the Engineering by Design textbook on pages 511-514). Although the students may occasionally discuss homework assignments and work together to develop a deeper understanding of the topics presented in this course, submission of others' work as your own is *not* permitted. Each student is expected to prepare and submit his/her own prelabs, programs, reports, graphs, cover letters, and other materials. *Copying computer files, documents, programs, or code is not allowed. If two or more students' work is suspiciously similar, a penalty may be assessed to all students involved.*

In the case of allegations of academic dishonesty, the involved students will be referred to the Student Court for review. Penalties for violators may include but are not restricted to: zero credit on the work, student placed on academic probation, submission of information on the judgement in the students' permanent record, course failure, or expulsion from the program. If a situation arises in which you are uncertain whether cooperation with another student would constitute cheating or some other violation of the Honor Code, please ask the instructor for guidance and clarification of these rules.

**Revised Course Outline:**

**2-Feb-03**

<b>Week Beginning</b>	<b>Proposed Topics - All Lab Assignments / Projects are due 1 week following lecture</b>	<b>Software / Reading</b>
6 Jan	Introduction to Excel, Functions & Dependencies: <i>Spreadsheet Work</i>	EXCEL / Kuncicky: Chapters 1 - 3.9.2 Chapters 1-3 Relevant Practice & Applications
13 Jan	Calculating and Graphing in Excel: <i>Data Plotting and Curve Fitting</i>	EXCEL / Kuncicky: Chapters 4, 5.1–5.4, 5.6 Ch 4 & 5 Relevant Practice & Applications
20 Jan*	Solving Equations / Optimizing in Excel: <i>Using Matrix Functions or Solver Techniques</i>	EXCEL / Kuncicky: Chapter 3.9.2 & 5.7 -5.8 Ch 3 & 5 Relevant Practice & Applications
27 Jan	Introduction to MATLAB: <i>1<sup>st</sup> Script m-file and Writing a Basic MATLAB program</i>	MATLAB / Etter: Chapters 1-4
3 Feb	First MATLAB Lab Session (Monday) PLUS Extra MATLAB Session (instead of Lecture ☺)	MATLAB / Etter: Chapters 1-4; <b>PREPARE FOR QUIZ: Review Textbooks, Notes, &amp; Programs</b>
10 Feb	During Lab Time Monday: <b>Quiz I:</b> Computer and Written quiz combined Open book, Open Notes; Bring diskette	<b>Quiz I Topics:</b> Excel functions, plotting formatting, trendlines, material in notes & text <b>MATLAB:</b> All intro material, esp. trajectory asmt
	Lecture: <b>Trajectory Problem Due</b> Solving Simultaneous Equations in MATLAB: <i>Using Matrix Functions</i> →	MATLAB / Etter: Chapter 5
17 Feb	Script m-files vs. Function m-files in MATLAB: <i>Generating Functions Outside the Script File</i>	MATLAB / Etter: Chapter 3.3, 3.5, & 3.8
24 Feb	Loading, Generating, Plotting, and Analyzing Data using MATLAB: <i>Analysis of a Data Set</i>	MATLAB / Etter: Chapter 3
3 March	Due: Complete MATLAB Program w/ functions Written Quiz (closed book, closed notes) + one MATLAB Assignment (due Date TBA)	REVIEW: Textbook, Notes, & Programs
10 March	Final Exam Week	<b>No Final Exam</b>

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**Logging on & Accessing GE 1102 Applications & Printers in 208 SN**

**208 SN:** Ctrl + Alt + Delete → User name: Lab-208SN → OK → (leave password blank) →  
IF: "Profile not available ...": → OK  
ALSO: System may have to load Microsoft Office Applications for Excel

**Excel 2002:** Start → NUnet Applications (Installed Locally) → Microsoft Office XP → Microsoft Excel XP

**MATLAB:** Start → NUnet → Applications → Statistical and Computational Packages → MATLAB Release 12.1 → MATLAB 6.1

**Printer:** \\NT\_NU\_20\SNSNLP01 ( \\NT\_NU\_20\SNSNLP02 is in 274 SN )

**Proposed Course Outline (subject to revision):**

<b>Week Beginning</b>	<b>Proposed Topics - All Lab Assignments / Projects are due 1 week following lecture</b>	<b>Software / Reading</b>
6 Jan	Introduction to Excel, Functions & Dependencies: <i>Spreadsheet Work</i>	EXCEL / Kuncicky: Chapters 1 - 3.9.2 Chapters 1-3 Relevant Practice & Applications
13 Jan	Calculating and Graphing in Excel: <i>Data Plotting and Curve Fitting</i>	EXCEL / Kuncicky: Chapters 4, 5.1–5.4, 5.6 Ch 4 & 5 Relevant Practice & Applications
20 Jan*	Solving Equations / Optimizing in Excel: <i>Using Matrix Functions or Solver Techniques</i>	EXCEL / Kuncicky: Chapter 3.9.2 & 5.7 -5.8 Ch 3 & 5 Relevant Practice & Applications
27 Jan	Introduction to MATLAB: <i>1<sup>st</sup> Script m-file and Writing a Basic MATLAB program</i>	MATLAB / Etter: Chapters 1-4
3 Feb	Solving Simultaneous Equations in MATLAB: <i>Using Matrix Functions (due in 2 weeks)</i>	MATLAB / Etter: Chapter 5
10 Feb	Written Quiz I and Computer Quiz I	REVIEW: Textbooks, Notes, & Programs
17 Feb	Script m-files vs. Function m-files in MATLAB: <i>Generating Functions Outside the Script File</i>	MATLAB / Etter: Chapter 3.3, 3.5, & 3.8
24 Feb	Loading, Generating, Plotting, and Analyzing Data using MATLAB: <i>Analysis of a Data Set</i>	MATLAB / Etter: Chapter 3
3 March	A Complete MATLAB Program with functions 2 Quizzes - Written Quiz II and Lab Quiz II <i>or</i> one Quiz + one MATLAB Assignment	REVIEW: Textbook, Notes, & Programs
10 March	Final Exam Week	<b>No Final Exam</b>

- Since Monday 20 January is a university holiday, classes will not meet on that day. For sections that meet *twice* weekly, lab work will be completed by the students independently. For sections that meet once weekly, there will be no class meeting that week. Special help sessions will be held on Tuesday 21 January at a time to be arranged and Thursday 23 January during Activities Period for this reason. More information will follow later about the location and exact time frames for the extra help sessions.

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- Excel 2002:** Start → NUNet Applications (Installed Locally) → Microsoft Office XP → Microsoft Excel XP
- MATLAB:** Start → NUNet → Applications → Statistical and Computational Packages → MATLAB Release 12.1 → MATLAB 6.1
- Printer:** \\NT\_NU\_20\SNSNLP01 ( \\NT\_NU\_20\SNSNLP02 is in 274 SN )