Syllabus

Contents

2.1 Instructor and Basic Course Information

Instructor:	Dr. Bevin Maultsby
Moodle Page:	`https://moodle-courses1819.wolfware.ncsu.edu/course/view.php?id=4748`
Communication:	Moodle will be used for most communications in this course. In particular, math/coding questions should be asked in class, in office hours, or on the Moodle forum. You are encouraged to discuss concepts and homework (with discretion) in the Moodle forum.
Office Hours:	– Mondays and Thursdays, 3:15-4:15pm – Thursdays, 12:00-1:00pm – by appointment There is ample time in class to work on assignments and ask me questions; however, please restrict confidential matters (grades, etc.) to office hours.
Office:	SAS Hall 3230
Class:	TR, 1:30–2:45pm in Cox Hall 105 Please note that Cox 105 is a special SCALEUP room. There should be no eating nor drinking inside. I must secure the door after every class, thus you cannot remain in the room after 2:45pm.
Instructor Contact:	bmaults@ncsu.edu, 919-515-1876 (no voicemail)

2.2 Course Prerequisites or Restrictive Statements.

Prerequisite: MA 141, and E 115 (or equivalent)
Corequisite: MA 241

2.3 GEP Designation

This class does not satisfy a GEP requirement.

2.4 Student Learning Outcomes

This course is an introduction to elementary programming concepts with mathematical problem solving. Starting with a problem suitable for mathematical analysis, students will be able to analyze the problem, and either identify appropriate Matlab tools to solve the problem, or create new tools. Scientific visualization is included.

Outcomes: See §2.7 for a list of the 16 major learning outcomes. These outcomes are grouped into four large topics which may be characterized by

A. Using Matlab to set up and solve standard math problems.

B. Writing user-defined functions to perform tasks and solve problems with flexible input. Communication between the program and the user is emphasized.

C. Selecting and using programming control-flow constructs that include

- relational and logical operators
- if-then-else (and switch)
- for-loops
- while-loops
- nesting control-flow constructs.

D. Numerical approaches to problem solving.

2.5 Student Expenses

2.5.1 Textbook information

Required: *Matlab for Engineers* by Holly Moore, 3rd Edition or later, ISBN 9780134589640.

2.5.2 Other expenses

Recommended: You will use the classroom computers for Matlab. In addition, I encourage you to install a recent version of Matlab on your own computer. The Student Version is available at

`https://software.ncsu.edu/student/`

2.6 Course Overview (Catalog Description)

Computer-based mathematical problem solving and simulation techniques using MATLAB. Emphasizes scientific programming constructs that utilize good practices in code development, including documentation and style. Covers user-defined functions, data abstractions, data visualization and appropriate use of pre-defined functions. Applications are from science and engineering.

2.7 Course Structure

This course meets twice a week in Cox 105 for lecture and coding time. I rarely lecture for the full 75 minutes–you are strongly encouraged to use the coding time wisely. If you waste in-class time, I cannot guarantee that I will be able to help you when due dates approach.

Homework. There are homework sets posted on Moodle; to see the homework sets, go to the ACTIVITIES "block" on the right-hand side of the Moodle page and find the Quizzes link. Most of the questions are automatically graded by Moodle. It is possible to answer some of the questions without using Matlab at all, but using a graphing calculator or other application defeats the purpose of homework. Homework sets are usually due on Friday by 11pm. You are responsible for tracking due dates and completing the assignments on time.

Projects. There are four projects, each viewed as an expanded homework problem. Each project description will be posted on Moodle with a rubric to determine your project grade.

Each project submission consists of an m-file (submitted through Moodle). Projects are graded out of 100 points. You will collaborate closely with 1-3 other student(s) on each project and submit one project for all students with all names on it. *Collaboration is required; otherwise 10 points will be deducted from your project score.*

Occasionally a student is routinely absent while his/her group completes the project. If I observe this behavior, then the absent student does not get credit for the assignment.

Tests and the Final Exam. This course uses a mastery-based approach to testing. Your test score depends on your ability to show mastery of 16 total "outcomes" (aka objectives, skills, competencies):

Skill	Outcome Name	Chapter	Tests (5 = Final)
#1	Array operations and basic function plotting	2, 5	1, 2, 3, 4, 5
#2	Built-in functions	3	1, 2, 3, 4, 5
#3	Matrix manipulations	4	1, 2, 3, 4, 5
#4	Advanced plotting	5	1, 2, 3, 4, 5
#5	Function m-files and anonymous functions	6	2, 3, 4, 5
#6	Input and output	7	2, 3, 4, 5
#7	Relational and logical operators, logical functions	8	2, 3, 4, 5
#8	Selection structures	8	2, 3, 4, 5
#9	For loops	9	3, 4, 5
#10	While loops	9	3, 4, 5
#11	Vectorizing code	8,9	3, 4, 5
#12	Large loops/nesting	8,9	3, 4, 5
#13	Systems of linear equations	10	4, 5
#14	Interpolation and curve fitting	13	4, 5
#15	Numerical differentiation and integration	13	4, 5
#16	Differential equations	13	4, 5

Each skill may be tested with several questions. There is no partial credit–you either show mastery of the outcome (as determined by me) or you do not. Once you have demonstrated mastery of a

skill, you do not need to attempt questions which test explicitly for that particular skill on future tests. You should think of each test as an opportunity to demonstrate that you have mastered a skill.

Tests will be in-class coding assignments submitted via Moodle. **You must use the classroom computers (and not your own laptop) for the tests.**

- The first test will check for mastery of skills 1-4. You will not receive a typical grade like 82%, but rather a report on your skills, e.g.

#1 Array operations and basic function plotting	Mastered
#2 Built-in functions	Not yet mastered
#3 Matrix manipulations	Mastered
#4 Advanced plotting	Mastered

  This sample report indicates that this student needs to work harder on built-in functions. S/he would have a chance on tests 2–4 and on the final to demonstrate mastery of built-in functions. **There is no penalty for "late mastery."**

- The second test will check for mastery of skills 5-8. *If you have not yet shown mastery of any of skills 1-4, you have a chance to demonstrate those skills on test 2.*
- The third test will check for mastery of skills 9-12. *If you have not yet shown mastery of any of skills 1-8, you have a chance to demonstrate those skills on test 3.*
- The fourth test will check for mastery of skills 13-16. *If you have not yet shown mastery of any of skills 1-12, you have a chance to demonstrate those skills on test 4.*
- The fifth test/final exam will have a section for each of the 16 outcomes. If you are missing any outcomes, you can demonstrate mastery of those missing outcomes on the final. You do not need to re-demonstrate mastery of previous outcomes.

Please note: You may pick and choose which skills you want tested on any test. For example, if you are not comfortable yet with while loops on test 3, don't waste time on those questions!

Your semester test score is the number of outcomes you have mastered divided by 16.

Examples.

A. Alice is an experienced coder who has used Matlab before. She demonstrates mastery of outcomes 1-4 on the first test, outcomes 5-8 on the second test, and outcomes 9-12 on the third test, and outcomes 13-16 on the fourth test. Therefore, her test score is 100 and she does not take the final exam.

B. Bob is new to Matlab. On the first test, he masters outcomes 2-4, but misses an array operations question. On the second test, he attempts the questions relevant to outcomes 1 and 5-8. Going into the final, he is missing outcomes 7, 11, 12, and 16. Therefore, on the final exam he attempts the four sets of questions pertaining to those outcomes.

- If Bob does not take the final or does not show mastery of any of the four needed outcomes, his test score is 75.
- If Bob shows mastery of 1 skill, his test score improves to 81.25.

…	2 skills,	…	87.5.
…	3 skills,	…	93.75.
…	4 skills,	…	100.

C. Chelsea demonstrates mastery of outcomes 1, 3 and 4 on the first test. Unfortunately, she is sick on the day of the second test and does not take it. She decides to focus on outcomes 5-10 for test 3 and outcomes 11-16 for test 4. She has a chance to redo outcome #2 on the final.

D. David skips tests 1-4 (**not recommended**). On the final, he demonstrates mastery of 10 out of 16 outcomes. His semester test score is a 62.5.

Tests are typically based on in-class exercises, the homework practice problems, and the projects. If you do not practice, it is unlikely that you will do well on the tests.

Note: No exam question is to leave the classroom. All assessments are kept in the instructor's office. Students may not make copies, take photos of, or otherwise take graded problems home. You will have the opportunity to practice the material on the Moodle quizzes and using the in-class exercises.

2.8 Weekly Course Schedule

2.8.1 List of topics

We will cover approximately 1-2 chapters per week:

Course introduction, Ch 1.
Ch 2. Matlab Environment
Ch 3. Functions
Ch 4. Matrices
Ch 5. Plotting
Ch 6. User-Defined Functions
Ch 7. User-controlled Input and Output
Ch 8. Logical Functions and Selection Structures
Ch 9. Repetition Structures
Ch 10. Matrix Algebra
Ch 13. Numerical Techniques

Ch 14. Advanced Graphics (brief)

2.8.2 Projected schedule of assignments, quizzes, and tests

There will be 4 tests. These tests are tentatively scheduled for

- Thursday, 1/31
- Thursday, 2/28
- Thursday, 3/28
- Thursday, 4/18

Any changes to the class schedule will be announced on Moodle. Do not unsubscribe from the Announcements forum.

There will be 4 projects; each one is due by 11pm on the listed day. The tentative due dates for these projects are

- 1/25
- 2/22
- 3/22
- 4/26 (Last day of class)

Final Exam: Tuesday, 4/30/2019, from 1–4pm in Cox 105. This date/time is firm. Regardless of how much time you expect to spend on the final exam, **you must be present when the exam begins to take the final exam.**

Note: Typos can occur. You are responsible for establishing your own final exam calendar using the website
`https://studentservices.ncsu.edu/calendars/exam/`.

2.8.3 Required field trips

Not applicable.

2.8.4 Laboratory, studio, or problem sessions

Not applicable.

2.9 Statement on transportation

Not applicable.

2.10 Statement on safety and risk assumption

Not applicable.

2.11 How grades are determined

Your grades will be tracked on Moodle, and you should periodically check to ensure that your grades display correctly.

2.11.1 The relative value of the various evaluation components of the course

Your course grade will be determined as follows:

Weight	Type of Assignment
5%	Attendance
15%	Homework
50%	Test Score
5%	Project 1
5%	Project 2
10 %	Project 3
10 %	Project 4

Attendance: Let n be the number of unexcused absences you accumulate. Your attendance score (out of 5 points) will be calculated as $5e^{-n/4}$. See Section §2.13 for more details.

2.11.2 The conversion system from numerical to letter grading

The final grade will be assigned using the plus/minus grading system according to the following chart:

A+ : 98–100	A : 93–97.99	A– : 90–92.99
B+ : 88–100	B : 83–87.99	B– : 80–82.99
C+ : 78–100	C : 73–77.99	C– : 70–72.99
D+ : 68–100	D : 63–67.99	D– : 60–62.99
	F : 0–59.99	

This policy is strict–I will not move grade lines for individual students. For example, a score of 87.76 is a B, not a B+.

2.12 Late Assignments

As homework can be completed at home, no late homework assignments will be accepted.

As projects involve collaboration of 2–3 students, in general no late projects will be accepted. However, if a student misses several classes due to a hospital stay or other documented and excused reason, an individual project may be graded for full credit if it is submitted within one week of the student's return to class. In this case, you must provide documentation of an excused absences through NCSU Class Absence Verification, see `https://dasa.ncsu.edu/students/absence-verification-process/`.

Individual projects which are late without a documented and excused absence will be graded out of a maximum of 60 points (out of 100).

2.13 Attendance/Absence Policy

Please consult `https://policies.ncsu.edu/regulation/reg-02-20-03-attendance-regulations/`.

As this is a 100-level course, daily attendance is taken. Attendance is tracked on Moodle, and you are responsible for ensuring that you are marked present when you attend. Students who are distracted (on websites, personal devices, etc.) or who leave excessively early may be marked "Absent"–these markings may lower against your attendance score. Your attendance score counts for 5% of your course grade. All excused absences must be documented through NCSU Class Absence Verification, see

`https://dasa.ncsu.edu/students/absence-verification-process/`.

Due to the mastery-based testing approach used in this course, all material tested on midterms can be tested without penalty on later midterms and on the final. Therefore, the midterm policy is strict–**there are no "makeup midterms."**

2.14 Academic Integrity

Students are required to comply with the university policy on academic integrity found in the Code of Student Conduct found at `http://policies.ncsu.edu/policy/pol-11-35-01`.

Examinations: Students will neither give nor receive any assistance on any test or the final exam. Use of cell phones during exams is not permitted. Accessing social media is not permitted (email, Facebook, etc.). Students may be assigned seats for exams.

Homework: You are expected to work together on the practice problems, and also to seek assistance from people like the instructor and the Matlab consultants in SAS 2103. Searching online for help is discouraged in part because the responses you will find may be at a level inappropriate for the course–I will not ask you to write code beyond the scope of MA 116.

Projects: You will work closely in groups of up to 3 on each project and submit one project through Moodle, including the names of all group members as the "authors" of the project.

If you consult with students outside your group, include the names of the people you consulted with. This includes people you give help to and people that you receive help from. You are welcome to seek assistance from the instructor, but you should not seek help from the Matlab consultants or the internet on projects.

Omission of names of people you work with or people you consult will be considered a violation of academic integrity.

Utilization of the Honor Pledge: All examinations must be completed independent of assistance from other people. Your signature on any test or assignment indicates "I have neither given nor received unauthorized aid on this test or assignment."

Penalty for violations: Any violation of this policy will be reported to the Office of Student Conduct with a recommendation of a failing grade for the assignment and/or course.

2.15 Statement for students with disabilities

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with the Disability Services Office at Suite 2221, Student Health Center, Campus Box 7509, 919-515-7653. For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation (REG02.20.01) (`https://policies.ncsu.edu/regulation/reg-02-20-01/`).

2.16 Electronic Course Components

Please be advised this course may be recorded for current and potential future educational purposes. By your continued participation in this recorded course, you are providing your permission to be recorded.

2.16.1 Electronically hosted course components

The course site for the class is hosted on Moodle. You must address the accessibility of this website for you during the course drop/add period.

2.16.2 Privacy or accessibility

Instructor is not responsible for ensuring privacy or accessibility of electronic materials that are not required components of the course (e.g., links to supplemental information that is not part of

the required reading list).

2.16.3 Required statement:

"Students may be required to disclose personally identifiable information to other students in the course, via electronic tools like email or web-postings, where relevant to the course. Examples include online discussions of class topics, and posting of student coursework. All students are expected to respect the privacy of each other by not sharing or using such information outside the course."

2.17 Your Rights and Responsibilities

Students are responsible for reviewing the NC State University PRR's which pertains to their course rights and responsibilities:

- Equal Opportunity and Non-Discrimination Policy Statement
  https://policies.ncsu.edu/policy/pol-04-25-05
  with additional references at https://oied.ncsu.edu/equity/policies/
- Code of Student Conduct https://policies.ncsu.edu/policy/pol-11-35-01
- Grades and Grade Point Average https://policies.ncsu.edu/regulation/reg-02-50-03
- Credit-Only Courses https://policies.ncsu.edu/regulation/reg-02-20-15
- Audits https://policies.ncsu.edu/regulation/reg-02-20-04