MA 502 Course Syllabus
MA 502: Advanced Mathematics for Engineers and Scientists II
Section 601

Instructor: Dr. Molly Fenn
Email: mafenn2@ncsu.edu

Textbook
Advanced Engineering Mathematics by Peter O'Neil, 7th edition
ISBN: 978-1111427412
Cost: $250

Course Description
Determinants and matrices; line and surface integrals, integral theorems; complex integrals and residues; distribution functions of probability. Not for credit by mathematics majors. Any student receiving credit for MA 502 may receive credit for at most one of the following: MA 405, MA 512, MA 513.

Course Structure
This is an online course. Video lectures and notes are available online and should be viewed according to the schedule posted on the course website. Weekly homework assignments will be given which correspond to the lectures. Homework assignments should be submitted as pdf documents through the course website and will be due by midnight on Sundays. The course is organized in 3 independent sections, the first covering topics in multivariable calculus, the second covering topics in complex variables and integration, and the third covering topics in linear algebra. There will be three examinations, one after each section of the course.

Course Website
We will be using the Moodle learning management system (http://wolfware.ncsu.edu) for this course. You will login using your Unity ID and password. After the beginning of the semester, you will see a link to our course site. Once in the site, you can Bookmark or add the site as a Favorite in your web browser so that you can return directly to that page. The schedule for the course is posted on the moodle website, including due dates for all homework and exam dates.

Topics and Sections Covered
1. Vectors, the dot product, the cross product (Sections 6.1 - 6.4).
2. Vector functions of one variable, velocity and curvature, the gradient field (Sections 11.1 - 11.4)
3. Line integrals, independence of path and potential theory (Sections 12.1 - 12.4)
4. Surface integrals and flux integrals, surface area. (Sections 12.5 - 12.6).
5. The divergence theorem and Stokes’ theorem (Sections 12.8, 12.9).
6. Complex numbers, complex functions, the Cauchy - Riemann equations, exponential and trigonometric functions, the complex logarithm, powers (Sections 19.1 - 19.5).
7. Complex integration, Cauchy’s theorem, Cauchy’s integral formula (Sections 20.1 - 20.3).
8. Power series, the Laurent expansion (Sections 21.1 - 21.2).
9. Singularities, the residue theorem, evaluation of real integrals (Sections 22.1 - 22.3).
10. Matrices, row and column spaces, homogeneous and nonhomogeneous linear systems (Sections 7.1 - 7.7).
11. Determinants, inverse matrices, Cramer’s rule (Sections 8.1 - 8.5).
12. Eigenvalues and eigenvectors, diagonalization, special types of matrices (Sections 9.1 - 9.3).

Weekly Schedule

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Course Communications

Modes of communication in use for this course include email, telephone, skype, and Moodle discussion forums. There will be no set office hours, instead conversations will be scheduled on an individual basis as needed. Email me to schedule a time to talk.

- Moodle discussion forums will be used to facilitate class discussion. Check these forums often and please feel free to reply to your fellow students’ posts.
- I will do my best to respond to weekday e-mails and posts within 24 hours. Email messages or posts left after 4 pm Friday will be responded to by the following Monday.
- If you would like to speak with me by phone or on skype, please email me to schedule a time that is convenient. Include several time slots that would work for
you in your email. Calls can be arranged in the evenings and other times outside of normal business hours.

Please be aware that ALL email communications for this course will be sent to your NCSU unity email. If you do not regularly use your ncsu.edu account, there are settings within Gmail that allow you to forward your e-mail to another account. For more information see:

http://google.ncsu.edu/what-best-way-forward-my-nc-state-gmail-non-nc-state-e-mail-address

Homework Policies

Technology

For most problems, the part I care about and want you to really work through is the set up. For example, if you’re asked to compute a surface integral, the meat of the problem is in coming up with a parametrization for the surface, remembering what the integral means, and doing all the substitutions in order to get a double integral set up. For some problems, I will ask you to do the entire problem by hand, even the straightforward computational part. But often, it will be fine for you to get the problem set up and then use whatever calculator or computing software you want to find the actual answer. If I want you to do a computation strictly by hand, I will state this on the assignment.

Grading

Each homework problem will be graded out of 3 points according to the rubric below. The sum of all homework points earned will be divided by the total possible homework points for the semester to determine the homework component of your grade. Occasionally, some homework problems will not be graded but merely checked for completeness. In this situation, if the problem is complete it will be given 3 points automatically.

Homework Grading Rubric

0 points: problem not turned in or no correct work done on problem
1 point: problem turned in but minimal correct work was done
2 points: problem mainly correct but there were significant errors
3 points: problem correct or only minimal errors (such as small computational errors)

Homework Help

If you have a homework question that the whole class may benefit from hearing the answer to, please post on the “Homework Questions and Hints” forum. I will check this forum often to respond to open questions. You should also check frequently to answer or ask questions.

If you have a homework question that is very specific to the work you have done (i.e. if you nearly finished your work but got stuck towards the end), you can email me with your question. Including a scan or photo of your work can help. However, I will not look over homework you send me unless you have a specific question about it. (In other words, I won’t just check it over to see if it looks correct, you must ask me about a specific step or steps in a given problem.)
If I receive an email with a question more appropriate to the forum, I may copy and paste the question there without identifying the student who sent it.

**Late Homework**
Under exceptional circumstances, late assignments may be accepted. Any penalty for late homework will be at my discretion.

**Exams**
There will be 3 exams throughout the course, each only dealing with the material for that section of the course. (In other words, there is no cumulative exam at the end of the course.) Each exam will be 2 hours long and will be made up of 8-10 questions. The questions are long answer and partial credit will be given so make sure you show all your work when answering.

You will be allowed to use a calculator but you cannot use a computer or any device with an internet connection during the exam. You are responsible for arranging a proctor and scheduling the exams. The Engineering Online office will guide you through this. Each exam is given on two dates, they are 9/25-9/26, 11/6-11/7, and 12/8-12/9.

**Final Grade Calculation**
There are 4 components to this course: homework and 3 examinations. Each component will be weighed equally.

- **Homework:** 25%
- **Exam 1 (covering multivariable calc):** 25%
- **Exam 2 (covering complex variables):** 25%
- **Exam 3 (covering linear algebra):** 25%

This course uses standard NCSU letter grading:
- 90 ≤ A- < 93
- 93 ≤ A < 97
- 97 ≤ A+ ≤ 100
- 80 ≤ B- < 83
- 83 ≤ B < 87
- 87 ≤ B+ < 90
- 70 ≤ C- < 73
- 73 ≤ C < 77
- 77 ≤ C+ < 80
- 60 ≤ D- < 63
- 63 ≤ D < 67
- 67 ≤ D+ < 70
- 0 ≤ F ≤ 60

**Unity ID and Password**
Students need to be familiar with their Unity ID and password to login to the Moodle course site or to access lecture recordings and other university-provided resources. Refer to online information at: [http://oit.ncsu.edu/unityid](http://oit.ncsu.edu/unityid) or contact the NCSU HELP desk at (919) 515-HELP or HELP@ncsu.edu for assistance.

**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](http://policies.ncsu.edu/policy/pol-11-35-01)
The NCSU Student Code of Conduct covers all work done in this course.
Any suspected violations will be promptly reported. Academic dishonesty will result in an automatic failing grade for the course.

**Course Evaluations**
A formal evaluation is conducted by the University at the end of the semester and the goal is to achieve 100% class participation in this survey. Online class evaluations will be available for students to complete during the last two weeks of class. Students will receive an email message directing them to a website where they can login using their Unity ID and complete evaluations. All evaluations are confidential; instructors will never know how any one student responded to any question, and students will never know the ratings for any particular instructor.

**Accommodations for Disabilities**
Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, student must register with the Disability Services Office (http://www.ncsu.edu/dso), 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 at http://policies.ncsu.edu/regulation/reg-02-20-01.

**Non-Discrimination Policy**
NC State University provides equality of opportunity in education and employment for all students and employees. Accordingly, NC State affirms its commitment to maintain a work environment for all employees and an academic environment for all students that is free from all forms of discrimination. Discrimination based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation is a violation of state and federal law and/or NC State University policy and will not be tolerated. Harassment of any person (either in the form of quid pro quo or creation of a hostile environment) based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation also is a violation of state and federal law and/or NC State University policy and will not be tolerated. Retaliation against any person who complains about discrimination is also prohibited. NC State's policies and regulations covering discrimination, harassment, and retaliation may be accessed at http://policies.ncsu.edu/policy/pol-04-25-05 or http://www.ncsu.edu/equal_op/. Any person who feels that he or she has been the subject of prohibited discrimination, harassment, or retaliation should contact the Office for Equal Opportunity (OEO) at 919-515-3148.

**Copyrighted Materials**
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