MA 493 Course Syllabus

MA 493 – Mathematics of Scientific Computing

Section 002
SPRING 2014
3 Credit Hours

Course Description

This course will provide the students with an overview of methods to solve quantitative problems and analyze data. The tools to be introduced are mathematical in nature and have links to Algebra, Analysis, Geometry, Graph Theory, Probability and Topology. The course will provide our students with the minimum level of literacy in computational mathematics that should be expected of mathematics graduates. They will, at the end of the semester, have an appreciation of (i) the fundamental role played by mathematics in countless applications and (ii) the exciting challenges in mathematical research that lie ahead in the analysis of large data and uncertainties. Each section will last about two weeks and be paired with a project.

The course is not meant to be encyclopedic; different instructors may emphasize different aspects. Some important topics are left out of the proposed syllabus below (approximation theory, optimization, eigenvalues, theory of computation, linear programming, among others).

While this is not a programming class, the students will do some programming through their projects.

Learning Outcomes

Overview of the mathematical aspects of methods of scientific including Monte Carlo approximations, basic linear algebra factorizations and Fourier analysis.

Course Structure

Lectures

Course Policies

Distracting/annoying/rude behavior will not be tolerated.

Instructors

Dr. Pierre A Gremaud (gremaud) - Instructor
Email: gremaud@ncsu.edu
Web Page: www.math.ncsu.edu/~gremaud
Phone: 919-515-3085
Fax: 919-515-3798
Office Location: Sas Hall
Office Hours: W: 4:30-6:00, F: 3:00-4:15
Course Meetings

Lecture

Days: MW  
Time: 3:00pm - 4:15pm  
Campus: Main  
Location: SAS 2229  
This meeting is required.

Meeting Notes

Each student must participate in a critical thinking assessment during the weeks of [DATES TBD]. Performance on this assessment will not impact your grade in class. It will take approximately one hour to take the assessment and you will not need to do anything to prepare. This is an important element of the assessment of the NC State University QEP and General Education Competencies. You are encouraged to do your best work! This information will help us determine the impact of our programs and guide future decisions regarding the education of our students. Additionally, at some point before you take the in-person assessment, you must take a brief online self-assessment. This will take less than 10 minutes and is a necessary component of the overall assessment that must be completed.

You will be receiving an email from Dr. Stephany Dunstan, Assistant Director of the Office of Assessment, with options for dates and times as well as a sign up form. Please pick a date/time and sign up. In order to receive credit you will need to take the assessment during this time frame and complete the entire instrument.

Once you have completed the assessment, your faculty member will be notified. If you have an ADA letter and need special accommodations or if you are having trouble finding a time you can attend, please contact Stephany Dunstan (sbdunsta@ncsu.edu)

Course Materials

Textbooks

Scientific computing with case studies - D.P. O'Leary  
Edition: SIAM  
Cost: $98.00  
This textbook is required.

Expenses

None.

Materials

None.

Requisites and Restrictions

Prerequisites

Some familiarity with linear algebra, basic calculus

Co-requisites
Restrictions
None.

General Education Program (GEP) Information

GEP Category
This course does not fulfill a General Education Program category.

GEP Co-requisites
This course does not fulfill a General Education Program co-requisite.

Transportation
This course will not require students to provide their own transportation. Non-scheduled class time for field trips or out-of-class activities is NOT required for this class.

Safety & Risk Assumptions
None.

Grading

Grade Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects</td>
<td>80</td>
<td>Work has to be done individually although discussing the projects in group is encouraged. Projects have to be turned in on time and written in a professional fashion (typesetting is strongly suggested but not required).</td>
</tr>
<tr>
<td>Final exam</td>
<td>20</td>
<td>Comprehensive, closed book</td>
</tr>
</tbody>
</table>

Letter Grades

This Course uses Standard NCSU Letter Grading:

\[
\begin{align*}
97 \leq & A+ < 100 \\
93 \leq & A < 97 \\
90 \leq & A- < 93 \\
87 \leq & B+ < 90 \\
83 \leq & B < 87 \\
80 \leq & B- < 83 \\
77 \leq & C+ < 80 \\
73 \leq & C < 77 \\
70 \leq & C- < 73 \\
67 \leq & D+ < 70 \\
63 \leq & D < 67 \\
60 \leq & D- < 63 \\
0 \leq & F < 60 
\end{align*}
\]
**Requirements for Credit-Only (S/U) Grading**

In order to receive a grade of S, students are required to take all exams and quizzes, complete all assignments, and earn a grade of C- or better. Conversion from letter grading to credit only (S/U) grading is subject to university deadlines. Refer to the Registration and Records calendar for deadlines related to grading. For more details refer to [http://policies.ncsu.edu/regulation/reg-02-20-15](http://policies.ncsu.edu/regulation/reg-02-20-15).

**Requirements for Auditors (AU)**

Information about and requirements for auditing a course can be found at [http://policies.ncsu.edu/regulation/reg-02-20-04](http://policies.ncsu.edu/regulation/reg-02-20-04).

**Policies on Incomplete Grades**

If an extended deadline is not authorized by the instructor or department, an unfinished incomplete grade will automatically change to an F after either (a) the end of the next regular semester in which the student is enrolled (not including summer sessions), or (b) the end of 12 months if the student is not enrolled, whichever is shorter. Incompletes that change to F will count as an attempted course on transcripts. The burden of fulfilling an incomplete grade is the responsibility of the student. The university policy on incomplete grades is located at [http://policies.ncsu.edu/regulation/reg-02-50-3](http://policies.ncsu.edu/regulation/reg-02-50-3).

**Late Assignments**

Late work will be given a grade of 0.

**Attendance Policy**

For complete attendance and excused absence policies, please see [http://policies.ncsu.edu/regulation/reg-02-20-03](http://policies.ncsu.edu/regulation/reg-02-20-03).

**Attendance Policy**

Attendance of mandatory.

**Absences Policy**

To be discussed on case by case basis.

**Makeup Work Policy**

No make up for late work (and grade of 0).

**Additional Excuses Policy**

None.

**Academic Integrity**

**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).

**Academic Honesty**

See [http://policies.ncsu.edu/policy/pol-11-35-01](http://policies.ncsu.edu/policy/pol-11-35-01) for a detailed explanation of academic honesty.
**Honor Pledge**

Your signature on any test or assignment indicates "I have neither given nor received unauthorized aid on this test or assignment."

**Electronically-Hosted Course Components**

There are no electronically-hosted components for this course.

**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.

**Course Schedule**

**NOTE:** The course schedule is subject to change.

TBD