Numerical Computations
http://www.cse.psu.edu/~madduri/teaching/CMPSC451

Instructor. Prof. Kamesh Madduri, 343E IST Building, madduri at cse.psu.edu, 814-865-0883. Office hours: TR 12–1.30 PM (343E IST), or by appointment (madduri.org/cal).

Class Overview and Objectives. This class introduces students to key ideas behind numerical computation, with emphasis on the implementation of common numerical methods. CMPSC/MATH 455 is a related course that covers a subset of the topics we will study in this class. Students may obtain credit for either this class or CMPSC/MATH 455, but not both.

Prerequisites. MATH 230 or MATH 231. Three credits of programming.

Class Material. All class presentations, lecture notes, and homework assignments will be posted on Penn State’s Canvas LMS. Please contact me or the TA through Canvas.

Evaluation and Grading. The final grade will be based on six homework assignments, two in-class exams, a final exam, and a programming test.
Exam 1: 10% (Feb 24), Exam 2: 10% (Apr 4), Final exam: 25%, programming test: 5%
Homework assignments: 50%
Please let me know as soon as possible if you will need to reschedule either exam 1 or exam 2.

Homework Assignments. Most of the homeworks will be due one week after they have been handed out. Please submit them via Canvas before the start of class, or hand them over to me in class. Each homework will be worth 10 points, and the best five out of six will be chosen for the homework grade. Most of the homework assignments will include problems that require MATLAB/Octave programming, and the code should be submitted electronically. Late homework submissions will generally not be accepted. Please contact me at least two days in advance in case you won’t be able to meet a deadline.

Attendance Policy. I strongly encourage students to attend all the lectures. Please let me know if you will be missing multiple classes for legitimate, unavoidable reasons.
Schedule. Here is a tentative schedule of topics to be covered (last updated Feb 7):

- Jan 11–Jan 29. Introduction, Error Analysis, Floating point arithmetic
- Feb 1–Feb 10. Nonlinear equations in one variable
- Feb 12–Mar 4. Linear systems
- Feb 24. Exam 1
- Mar 16–Mar 25. Interpolation
- Mar 28–Apr 20. Numerical Integration and Differentiation
- Apr 4. Exam 2
- Apr 22–Apr 27. ODEs

Academic Integrity. Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity includes a commitment by all members of the University community not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others. Students must abide by the administrative policy for academic integrity (please see http://www.psu.edu/oue/aappm/).

Students should independently perform the homework assignments, and no collaboration is allowed (even with students of the other section). Avoid plagiarism (http://tlt.its.psu.edu/plagiarism/tutorial), and please contact me first if you are in doubt. You can contact the TA if you have any questions about the homework assignments, and for getting started with the programming assignments.

Educational Equity. Penn State welcomes students with disabilities into the University’s educational programs. If you have a disability-related need for reasonable academic adjustments in this course, contact the Office for Disability Services (ODS) at 814-863-1807 (V/TTY). For further information regarding ODS, please visit the Office for Disability Services Web site at http://equity.psu.edu/ods/

In order to receive consideration for course accommodations, you must contact ODS and provide documentation (see the documentation guidelines at http://equity.psu.edu/ods/guidelines/documentation-guidelines). If the documentation supports the need for academic adjustments, ODS will provide a letter identifying appropriate academic adjustments. Please share this letter and discuss the adjustments with your instructor as early in the course as possible. You must contact ODS and request academic adjustment letters at the beginning of each semester.