MATH 300 (2423) Mathematical Computing (Summer 2020)
Chris Kang
M, Tu, W, Th, F 10:30-11:45

Zoom Information: Available through Blackboard or contact instructor.
Office: Neill Hall 127
Email: chris.kang@wsu.edu
Web Page: http://math.wsu.edu/students/ckang
Office Hours: M, W, F 11:45 AM

Textbook: There is no required textbook for MATH 300. However, we will be pulling information from various sources, including the following:

- [Data-Driven Modeling & Scientific Computation](#) by J. Nathan Kutz
- [Python Data Science Handbook](#) by Jake VanderPlas
- Resources from previous Math 300 courses:
  - [http://math.wsu.edu/math/kcooper/M300/welcome.php](http://math.wsu.edu/math/kcooper/M300/welcome.php)
  - [http://www.math.wsu.edu/students/jstreipel/maths300/](http://www.math.wsu.edu/students/jstreipel/maths300/)

Required Software:

- **LaTeX**: You will require a [www.overleaf.com](http://www.overleaf.com) account. Overleaf offers a free, limited subscription. It is okay to setup your own local environment (such as Texmaker), however Overleaf allows real-time compiling, collaboration, and comes with most major packages pre-installed.
- **Matlab**: WSU offers a full access to MATLAB. Refer to the installation guide: [https://www.mathworks.com/academia/tah-portal/washington-state-university-40714885.html](https://www.mathworks.com/academia/tah-portal/washington-state-university-40714885.html)
- **Python**: We will be using the Python version 3.0. You can download and install the full distribution with popular packages using Anaconda [https://docs.anaconda.com/anaconda/install/](https://docs.anaconda.com/anaconda/install/). Jupyter Notebook (an interactive data science and scientific computing web environment) and Spyder come with Anaconda, and we will be using both frequently. However, if you are already familiar with Python and able to complete all the tasks without the use of IDEs, you do not need to install Anaconda.
**Topics:** MATH 300 is a 3-credit course that provides a broad introduction to LaTeX, MATLAB and Python. The first section of the course will focus on developing typesetting skills to produce scientific documents. The second section of the course will focus on basic scientific computing algorithms in MATLAB. In the final section of the course, we introduce popular Python libraries such as NumPy, SciPy, Pandas, and Scikit-learn. Time permitting, we will also explore basic command line scripting.

**Prerequisite:** MATH 220 (Introductory Linear Algebra) or MATH 230 (Honors Introductory Linear Algebra).

**Expected Learning Outcomes and Methods of Evaluation**

At the end of the course, students will be able to
- Typeset a scientific document.
- Write a function or computer program according to some (maybe strict) specifications to accomplish some described task.
- Solve some open-ended mathematical problem and write about the solution and how it was found. These assignments are much more extensive than the other ones and will involve a substantial writing component, on which the student will be graded.

**Grading:** The course grade will be based on weekly assignments and a final project. There will be no exam in this course, as distance-learning complicates exam proctoring. This means that the content of the assignments will be more challenging than previous courses.

Grades will be posted on Blackboard. *It is the student’s responsibility to check the grades* and if there is an error to bring it to the attention to the instructor.

The point distribution will be weighted as follows:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Homework:</strong></td>
<td>70%</td>
</tr>
<tr>
<td><strong>Final Project:</strong></td>
<td>30%</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>100%</td>
</tr>
</tbody>
</table>

Your final grade will be determined on a straight scale:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Grade</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-91.9%</td>
<td>A-</td>
<td>92-100%</td>
</tr>
<tr>
<td>80-81.9%</td>
<td>B-</td>
<td>82-87.9%</td>
</tr>
<tr>
<td>70-71.9%</td>
<td>C-</td>
<td>72-77.9%</td>
</tr>
<tr>
<td>60.0-69.9%</td>
<td>D</td>
<td>78.0-79.9%</td>
</tr>
<tr>
<td>Below 60.0%</td>
<td>F</td>
<td>(A+ can not be given)</td>
</tr>
</tbody>
</table>

In practice, the cutoffs for the grades may be lower than what is given above, but they will not be higher.
Assignments: Assignments will always be turned in electronically, and there will always be a posted deadline. You must submit all source codes and asked output files. Assignments turned in after the deadline, but before assignments have been returned and solutions have been posted will be accepted, though they will incur a 20% penalty. No credit will be given to assignments submitted after the solutions have been posted.

As the assignments will be challenging, it is encouraged for students to start early. Each assignment will be due every Monday at 10:30 AM, before the class starts.

Final Project: The final project will be 30% of your grade. You will be required to produce a script in either MATLAB or Python and write a detailed-report in LaTeX. A rubric for the report will be provided. You may choose your own topic or choose from the suggested list, but it will have to be pre-approved first. You may work in groups of no more than four.

Attendance Policy: There is none. Come and go as you please; we are adults. We do believe the class is valuable and useful, however.

Students with Disabilities
Students with Disabilities: Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center [Pullman] or Disability Services at [name of campus] address on your campus] to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center or Disability Services. For more information contact a Disability Specialist on your home campus. Contact the Access Center for more information: 509-335-3417, Washington Building 217; http://accesscenter.wsu.edu, Access.Center@wsu.edu

WSU Safety Measures
Washington State University is committed to maintaining a safe environment for its faculty, staff, and students. Please visit http://safetyplan.wsu.edu and http://oem.wsu.edu/emergencies to access the Campus Safety Plan and emergency information. You should also become familiar with the WSU Alert Site (http://alert.wsu.edu) where information about emergencies and other issues affecting WSU will be found.

Academic Integrity
I encourage you to work with classmates on assignments. However, each student must turn in original work. No copying will be accepted either from a classmate or an online resource. Occasionally, I will run submitted codes against MOSS (Measure of Software Similarity) to combat plagiarism.
Important Dates:

*Friday July 3:* No class
*Friday July 31:* End of Summer term
*Sunday August 2:* Final project submission
*Tuesday August 4:* Final grade submission ends

Tentative Schedule:

<table>
<thead>
<tr>
<th>Week of</th>
<th>Topics</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 22</td>
<td>LaTeX and introduction to MATLAB Basics</td>
<td></td>
</tr>
<tr>
<td>Jan. 29</td>
<td>Root finding algorithms, linear algebra in MATLAB, Computational complexity</td>
<td>No class on July 3</td>
</tr>
<tr>
<td>July 6</td>
<td>Jacobi Iterative Method, Curve fitting and interpolation, Newton’s Method</td>
<td></td>
</tr>
<tr>
<td>July 13</td>
<td>Introduction to Python, NumPy</td>
<td></td>
</tr>
<tr>
<td>July 20</td>
<td>Data-science with Pandas, Sci-kit Learn, matplotlib</td>
<td></td>
</tr>
<tr>
<td>July 27</td>
<td>Keras, SymPy, Object-oriented Programming</td>
<td></td>
</tr>
</tbody>
</table>

This course syllabus is subject to change. The course schedule may change depending on the actual progress of the students. It is extremely important to attend the class regularly to learn the fundamental materials of the course. **There may be bonus points for class attendance.**