Instructor
Dr. Charles Allen
Email: charles.allen@angelo.edu
Phone: 325-486-6780
Contact hours location: North side of VIN, next to the planter wall.
Virtual office: https://us.bbcollab.com/guest/76cf58d693914009a3e302b1f8ecb918

Course Information

Course Description
An introduction to using numerical methods and computational techniques to solve physics problems, including numerical solutions to differential equations, Monte Carlo simulations, and graphical analysis. Case studies are largely drawn from the material presented in the introductory physics courses.

Prerequisite and Co-requisite Courses
Prerequisites: Physics 2326/2126 and Computer Science 1314.

Prerequisite Skills
Ability to utilize a modern web browser.

Student Learning Outcomes
Upon completion of this course, students will be able to use numerical methods to:
- Evaluate finite and infinite series,
- Solve ordinary differential equations,
- Use random numbers to investigate systems governed by statistics, and
• Convey the results of all of these using plots of functions and experimental or simulated data.

Course Delivery
This is an online course that will be delivered via Blackboard. If you choose, you can complete this course without visiting the ASU campus.

The VIN 245 computer lab has been reserved for optional in-person help on Thursday evenings. Planned plexiglass shielding is not yet in place, so the occupancy limit of this room is currently smaller than the enrollment of this class. While this is the case, students will be placed in one of two teams and given a 50-minute time slot during which they will be allowed in the room.

Please refer to this Health and Safety web page for updated information about campus guidelines as they relate to the COVID-19 pandemic.

Required Texts and Materials
Learning Scientific Programming with Python, Hill, Cambridge University Press

Technology Requirements
To successfully complete this course, students will need a computer (not just a tablet or phone) and an internet connection. Almost all work will be done by remotely logging in to a server to edit and run programs.

Communication
Faculty will respond to email and/or telephone messages within 24 hours during working hours Monday through Friday. Weekend messages may not be returned until Monday.

Written communication via email: All private communication will be done exclusively through your ASU email address. Check frequently for announcements and policy changes. In your emails to faculty, include the course name and section number in your subject line.

Virtual communication: Office hours and/or advising will be done with the assistance of the telephone or Collaborate.
Grading

Evaluation and Grades
Course grades will be determined as indicated in the table below.

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Percent of Total Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes</td>
<td>20</td>
</tr>
<tr>
<td>Homework</td>
<td>80</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Grading System
Course grades will be dependent upon completing course requirements and meeting the student learning outcomes.

The following grading scale is in use for this course:
- A = 90.00% and above
- B = 80.00-89.99%
- C = 70.00-79.99%
- D = 60.00-69.99%
- F = 0-59.99%

The instructor reserves the right to lower the numerical threshold between letter grades, but the thresholds will never be raised.

Assignment and Activity Descriptions
The course material is split into modules, each designed to be completed in one week. Each module contains a short online lecture and/or reading to introduce the material. This may include additional reading from external online resources. Students will then complete a short quiz based on that material. A homework assignment, consisting of modifying, adding to, or creating a Python program will end the week.

The programming environment and methods for distributing handouts, quizzes, and homework will be covered during the first week of class. You will not be required to install any software on your computer. Instead, an online programming environment, available through any modern browser, will be used.

General Policies Related to This Course
All students are required to follow the policies and procedures presented in these documents:
Academic Integrity

Students are expected to maintain complete honesty and integrity in all work. Any student found guilty of any form of dishonesty in academic work is subject of disciplinary action and possible expulsion from ASU.

The College of Science and Engineering adheres to the university’s Statement of Academic Integrity.

Accommodations for Students with Disabilities

ASU is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs or activities of the university, or be subjected to discrimination by the university, as provided by the Americans with Disabilities Act of 1990 (ADA), the Americans with Disabilities Act Amendments of 2008 (ADAAA) and subsequent legislation.

Student Disability Services is located in the Office of Student Affairs, and is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability. It is the student’s responsibility to initiate such a request by contacting an employee of the Office of Student Affairs, in the Houston Harte University Center, Room 112, or contacting the department via email at ADA@angelo.edu. For more information about the application process and requirements, visit the Student Disability Services website.

The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dallas Swafford
Director of Student Disability Services
Office of Student Affairs
325-942-2047
dallas.swafford@angelo.edu
Houston Harte University Center, Room 112

Incomplete Grade Policy

It is policy that incomplete grades be reserved for student illness or personal misfortune. Please contact faculty if you have serious illness or a personal misfortune that would
keep you from completing course work. Documentation may be required. See ASU Operating Policy 10.11 Grading Procedures for more information.

**Plagiarism**

Plagiarism is a serious topic covered in ASU’s Academic Integrity policy in the Student Handbook. Plagiarism is the action or practice of taking someone else’s work, idea, etc., and passing it off as one’s own. Plagiarism is literary theft.

In your discussions and/or your papers, it is unacceptable to copy word-for-word without quotation marks and the source of the quotation. It is expected that you will summarize or paraphrase ideas giving appropriate credit to the source both in the body of your paper and the reference list.

Papers are subject to be evaluated for originality. Resources to help you understand this policy better are available at the ASU Writing Center.

**Student Absence for Observance of Religious Holy Days**

A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. See ASU Operating Policy 10.19 for more information.

**Title IX at Angelo State University**

The University prohibits discrimination based on sex, which includes pregnancy, sexual orientation, gender identity, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination including: sexual assault, sex-based discrimination, sexual exploitation, sexual harassment, public indecency, interpersonal violence (domestic violence and/or dating violence), and stalking. As a faculty member, I am a Responsible Employee meaning that I am obligated by law and ASU policy to report any allegations I am notified of to the Office of Title IX Compliance.

Students are encouraged to report any incidents of sexual misconduct directly to ASU’s Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator at:

Michelle Boone, J.D.
Director of Title IX Compliance/Title IX Coordinator
Mayer Administration Building, Room 210
325-942-2022
michelle.boone@angelo.edu
You may also file a report online 24/7 at www.angelo.edu/incident-form.

If you are wishing to speak to someone about an incident in confidence you may contact the University Health Clinic and Counseling Center at 325-942-2173 or the ASU Crisis Helpline at 325-486-6345.

For more information about Title IX in general you may visit www.angelo.edu/title-ix.9

**Required Use of Masks/Facial Coverings by Students**

As a member of the Texas Tech University System, Angelo State University has adopted the mandatory [Facial Covering Policy](#) to ensure a safe and healthy classroom experience. Current research on the COVID-19 virus suggests there is a significant reduction in the potential for transmission of the virus from person to person by wearing a mask/facial covering that covers the nose and mouth areas. Therefore, in compliance with the university policy students in this class are required to wear a mask/facial covering before, during, and after class. Faculty members may also ask you to display your daily screening badge as a prerequisite to enter the classroom. You are also asked to maintain safe distancing practices to the best of your ability. For the safety of everyone, any student not appropriately wearing a mask/facial covering will be asked to leave the classroom immediately. The student will be responsible to make up any missed class content or work. Continued non-compliance with the Texas Tech University System Policy may result in disciplinary action through the Office of Student Conduct.

**Modifications to the Syllabus**

This syllabus, including grade evaluation and course schedule, is subject to modification. In particular, the COVID-19 pandemic may require significant changes in course delivery and content on potentially short notice.
Tentative Course Schedule

<table>
<thead>
<tr>
<th>Wk#</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>jupyter, scipython.com site, other intro material</td>
</tr>
<tr>
<td>2</td>
<td>numbers, variables, strings</td>
</tr>
<tr>
<td>3</td>
<td>control flow</td>
</tr>
<tr>
<td>4</td>
<td>lists, tuples, loops</td>
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<tr>
<td>5</td>
<td>numpy introduction</td>
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<tr>
<td>6</td>
<td>plotting, matplotlib</td>
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<tr>
<td>7</td>
<td>differential equations, Euler method, linear motion with drag</td>
</tr>
<tr>
<td>8</td>
<td>simple harmonic motion, Euler-Cromer method, nonlinear pendulum</td>
</tr>
<tr>
<td>9</td>
<td>scipy introduction, scipy.odeint</td>
</tr>
<tr>
<td>10</td>
<td>projectile motion with drag</td>
</tr>
<tr>
<td>11</td>
<td>reading, writing, and fitting data</td>
</tr>
<tr>
<td>12</td>
<td>random numbers, 1-d diffusion</td>
</tr>
<tr>
<td>13</td>
<td>2-d diffusion or other interesting application</td>
</tr>
<tr>
<td>14</td>
<td>3-body decay or other interesting application</td>
</tr>
<tr>
<td>15</td>
<td>review, ideas for things to do after this course</td>
</tr>
</tbody>
</table>

Some students using an “old” course catalog for their graduation plan may not have taken Computer Science 1314. The rate at which the initial Python material is covered will depend on how many students are not yet familiar with it. In addition, the programming environment is new, which may lead to further alterations of the above schedule.

1. [https://www.angelo.edu/student-handbook/](https://www.angelo.edu/student-handbook/)
2. [https://www.angelo.edu/catalogs/](https://www.angelo.edu/catalogs/)
4. [https://www.angelo.edu/services/disability-services/](https://www.angelo.edu/services/disability-services/)
5. [https://www.angelo.edu/content/files/14197-op-1011-grading-procedures](https://www.angelo.edu/content/files/14197-op-1011-grading-procedures)
7. [https://www.angelo.edu/dept/writing_center/academic_honesty.php](https://www.angelo.edu/dept/writing_center/academic_honesty.php)
8. [https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of](https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of)
9. [https://www.angelo.edu/services/title-ix/](https://www.angelo.edu/services/title-ix/)