

Syllabus: Introduction to Scientific Computing PHYS 105A Sections 1 & 2 Fall 2019

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Office Hours: Wednesday 10 am, PAS Room 555, or by appointment.

Include PHYS 105A in the subject line of all emails

Class: **Section 1** Wednesday 2:00-3:50 PM. PAS Room 272 Computer Lab
Section 2 Wednesday 4:00-5:50 PM. PAS Room 272 Computer Lab

Prerequisite: Calculus I - Math 122B or Math 125 or equivalent

Co-requisites: Mechanics - PHYS141 or PHYS161H

Textbook: A Student's Guide to PYTHON For Physical Modeling. (Updated Edition)
Jesse M Kinder, Philip Nelson
ISBN 978-0-691-18057-1

Course Goals:

- 1) Learn the Python programming language
- 2) Learn to use Jupyter Notebooks
- 3) Learn basic graphical techniques
- 4) Apply programming to physics problems
- 5) Walk away feeling confident in your abilities to code.

Evaluation:

(Almost) Weekly Problem Sets. 90%
In Class Participation 10%

You will be required to submit assignments through D2L.

No extensions, however your final grade will be computed *excluding the two lowest score problem sets*.

“Participation” includes attending class regularly, completing in-class assignments, asking relevant questions during class, seeking help during study sessions and office hours, etc.

Final course grades will be assigned as follows: A (90-100%); B (80-89%); C (70-79%); D (60-69%); E (<60%).

Incomplete (I) or withdrawal (W) Grades: Requests must be made in accordance with University policies, which are available at:

<http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete>

<http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal>

Tentative class schedule (subject to change, depending on our in-class progress)

Week 1 (8/28): Unix commands, what's a computer program

Week 2 (9/4): Jupyter and Python Syntax, Variables and Operators

Week 3 (9/11): Conditional Statements and Loops

Week 4 (9/18): Functions

Week 5 (9/25): Strings and Lists

Week 6 (10/2): Arrays

Week 7 (10/9): File I/o and Plotting

Week 8 (10/16): More Plotting: Histograms and Error Bars

Week 9 (10/23): Statistics with Numpy

Week 10 (10/30): Animation

Week 11 (11/6): Recursion, Sorting

Week 12 (11/13): Fractals

Week 13 (11/20): Linear Algebra with Numpy

Week 14 (12/4): Image data

Week 15 (12/11): Current Research Applications

Absence and Class Participation Policy: Lecture material and in class assignments are essential to this course. **Attendance is required.** Students who miss class due to illness or emergency are required to bring documentation from their health-care provider or other relevant third parties. The UA policy concerning Class Attendance, Participation, and Administrative Drops is available at:

<http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable:

<http://policy.arizona.edu/human-resources/religious-accommodation-policy>

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored.
<https://deanofstudents.arizona.edu/absences>

Classroom Behavior

- **Academic Integrity:** All students in this course are expected to abide by the University of Arizona's Code of Academic Integrity
<http://dos.web.arizona.edu/uapolicies/>
- **Cheating is not tolerated in any form.** If a student is caught cheating on any assignment or presentation the penalty will be failure in the course. In all cases a

letter will be sent to the Dean of Students describing the incident. If you are aware that someone else is cheating, it is your obligation to inform the instructor.

- We allow, even encourage, collaboration on assignments. However, **you must always write the final version of an assignment yourself**, and use your own words to describe what you have concluded. In particular, if we receive verbatim code from more than one person we will ask you to explain your answers in your own words.
- **Plagiarism is strictly prohibited.** If you are uncertain as to what constitutes plagiarism see: <http://deanofstudents.arizona.edu/codeofacademicintegrity>
- **Cell Phones:** The use of cell phones is not allowed in the class.
- **Attendance is mandatory.** In class attendance is required for this course.

Subject to Change Notice

Information contained in the course syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor of this course.

ASSISTANCE

We are here to help you, so please take advantage of help sessions. We also want to get to know you, so you are very welcome to stop by to introduce yourself. Please contact us promptly if you have any questions or concerns regarding this class.

If you anticipate barriers related to the format or requirements of this course, please meet with me so that we can discuss ways to ensure your full participation in the course. If you determine that disability-related accommodations are necessary, please register with **Disability Resources** (621-3268; drc.arizona.edu) and notify me of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations.

The University of Arizona provides a wide variety of resources to help you feel more at home in the UA environment. Examples of student resource/cultural centers include:

African-American Student Affairs Center <https://aasa.arizona.edu/>

Asian & Pacific American Student Affairs Center <https://apasa.arizona.edu/>

Guerrero Student Center <https://chsa.arizona.edu/>

Immigrant Student Resource Center <https://eao.arizona.edu/isrc>

LGBTQ+ Student Affairs Center <https://lgbtq.arizona.edu/>

Native American Student Affairs Center <https://nasa.arizona.edu/>

Transfer Student Center <https://transfer.arizona.edu/>

Veterans Education and Transition Services Center <https://vets.arizona.edu/>

Women & Gender Resource Center <https://wrc.arizona.edu/>

Where to go, who to call if you're in crisis:

Are you a University of Arizona student? If it is not an emergency and you are a UA student, call or walk-in to Counseling and Psych Services at 520-621-3334 Monday - Friday. Walk-in triage is available between 9 am and 4 pm Monday - Friday.

Are you a concerned friend? Concerned friends can find out more about helping a friend who might be experiencing problems through our [Friend 2 Friend](#) website.

[Resources for sexual assault, relationship violence, and stalking.](#)

24-Hour Hotlines:

[The National Suicide Prevention Lifeline](#) is a 24-hour, toll-free, confidential suicide prevention hotline available to anyone in suicidal crisis or emotional distress. By dialing [1-800-273-TALK](#) (8255), the call is routed to the nearest crisis center in our national network of more than 150 crisis centers. The Lifeline's national network of local crisis centers provides crisis counseling and mental health referrals day and night.

[Crisis Text Line](#): Text HOME to 741741 from anywhere **in the United States**, anytime, about any type of crisis. A live, trained Crisis Counselor receives the text and responds, all from a secure online platform. Find out more about how it works at [crisistextline.org](#).

[Suicide Prevention for LGBTQ Youth through the Trevor Project:](#)

- **The Trevor Lifeline** is a 24/7 suicide hotline: 866-4-U-TREVOR (1-866-488-7386)
- **TrevorChat**: Online instant messaging available 7 days a week, 3 pm - 10 pm ET (12 pm -- 7 pm PT)
- **TrevorText**: Confidential and secure resource that provides live help for LGBTQ youth with a trained specialist, over text messages. Text TREVOR to 1-202-304-1200 (available 7 days a week, 3 pm - 10 pm ET, 12 pm -- 7 pm PT)

[Veterans' Suicide Prevention Lifeline](#): 1-800-273-TALK (1-800-273-8255)

[SAMHSA Treatment Referral Hotline](#) (Substance Abuse): 1-800-662-HELP (1-800-662-4357)

[National Sexual Assault Hotline](#): 1-800-656-HOPE (1-800-656-4673)

[Loveisrespect \(National Dating Abuse Helpline\)](#): Call 1-866-331-9474 (TTY: 1-866-331-8453). Text LOVEIS to 22522 - you'll receive a response from a peer advocate prompting you for your question. Go ahead and text your comment or question and we will reply.

