MATH 340 PROGRAMMING IN MATH

COURSE INFORMATION

Class Days: MW

Class Times: 14:00-15:15

Class Location: zoom.us* (Live online classes)

Mode of Delivery: Live lectures, LAB, lecture videos

Instructor: Professor Uduak George

Instructor's Email: ugeorge@sdsu.edu

Instructor's Office Hours: MW 15:15-16:15 or by appt.

Instructor's Office Hours Location: zoom.us*

Student Assistant: Dewayani Windy

Student Assistant Office Hours: W 16:15-17:15

Zoom Link for Windy's Office Hours: https://SDSU.zoom.us/j/97287420691

Meeting ID: 972 8742 0691

* Zoom link to join live lectures and instructor's office hours:

https://SDSU.zoom.us/j/95531701255?pwd=N2UybmRIOXpsN1RDUkpTc1JtQjZGZz09

Meeting ID: 955 3170 1255

Passcode: 4321

ADDITIONAL COURSE INFORMATION

I'll try to respond to emails within 2 working days, my email is ugeorge@sdsu.edu. For quick questions, the turnaround time may be much shorter. For questions that involve, say, the clarification of course concept, you may want to meet during office hours (see above for days and time for office hours).

Homework will be posted on Gradescope, you can access Gradescope via the course page on Canvas (https://canvas.sdsu.edu).
Homework and exam grades will be posted on Canvas
Course notes will be posted on GitHub: https://nbviewer.jupyter.org/github/uduakgeorge/

We will be using the Top Hat (www.tophat.com) classroom response system in class. You will be able to submit answers to in-class questions using Apple or Android smartphones and tablets, or laptops.

You can visit the Top Hat Overview (<https://success.tophat.com/s/article/Student-Top-Hat-Overview-and-Getting-Started-Guide> https://success.tophat.com/s/article/Student-Top-Hat-Overview-and-Getting-Started-Guide) within the Top Hat Success Center which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system.

An email invitation will be sent to you by email, but if don't receive this email, you can register by simply visiting our course website: *https://app.tophat.com/e/458710*

Note: our Course Join Code is: 458710

Top Hat may require a paid subscription, and a full breakdown of all subscription options available can be found here: *www.tophat.com/pricing.*

COURSE DESCRIPTION

Introduction to programming in mathematics. Modeling, problem solving, and visualization.

ENROLLMENT INFORMATION

Prerequisites: MATH 151 and MATH 245 (or equivalent) with a grade of C or better in each course; or Instructor's permission

COURSE MATERIAL

REQUIRED TEXTS: COURSE NOTES

OPTIONAL TEXT

- Scientific Computation: Python Hacking for Math Junkies, by Bruce E. Shapiro. ISBN-10: 0692452001; ISBN-13: 9780692452004. Publisher: Sherwood Forest Books
- Single Variable Calculus: Early Transcendentals 8th Edition, by James Stewart. ISBN 978-1-305-27033-6; ISBN-10: 9781305270336; ISBN-13: 978-1305270336. Publisher: Cengage

STUDENT LEARNING OUTCOMES

The overarching outcomes in this course will be for students to, using the Python programming language, (i) Learn the `science' of computer programming. (ii) Learn the `art' of computer programming. (iii) Represent abstract mathematics as computer code and translate computer code into mathematics. (iv) Visualize and describe data. (v) Learn in what ways modern computing is done. This will be accomplished by achieving the following.

1. Procedural Programming in Python: Students will define and use
   i. data types
   ii. conditional statements
   iii. while and for loops
   iv. functions
   Since no one of these topics is useful without the other, synthesis is critical. Problems will build in complexity from week to week as new skills are learned to promote an integrated view of programming.
2. Basic Data Structures: For storing and manipulating data, students will use
   i. NumPy arrays
   ii. lists
   iii. tuples
   iv. dictionaries
   The students will use "Pythonic" data manipulation techniques such as list comprehension and lambda functions. Basic sorting techniques and their analysis will be covered and implemented. Students will be required to synthesize these techniques with other learning outcomes so that, for example, students master the use of appropriate control structures for different data types and problems involving data. Taken together with the Procedural Programming outcome, this ensures students learn the 'science' of computer programming.
3. Doing Mathematics on Computers: Throughout the course, students will practice translating problems and notation in mathematics into algorithms via the Python language. The reverse skill of translating code into mathematical notation will be studied and practiced as well. While this will be a focus throughout the course, the last third of the course is devoted to realizing abstract mathematical frameworks in the form of Python.
4. Data Visualization and Manipulation: Students will learn how to read and write to files. They will make several types of plots and use the plotting capabilities available in Matplotlib. Students will be required to synthesize various techniques in order to produce different plots of data, and written interpretations of said plots will be a part of assignments. Taken together with the Doing Mathematics outcome, students will have ample opportunity to practice the 'art' of computer programming.

5. Working in Modern Computing Environments: Students will use the features of various programming environments to solve problems and present their work. They will use stand-alone interpreters such as Canopy. They will use web-based interpreters such as Jupyter. They will use Jupyter to present results in mathematics by taking advantage of the LaTeX markup language. Thus, students will also be exposed to the breadth of ways in which programming is done.

COURSE ASSESSMENT AND GRADING

- Your final score will consist of homework (70%), two exams (20%) and final exam (10%). In-class quizzes/participation is worth 3% bonus points. Homework is due twice per week (i.e. on Tuesdays and Fridays), though please pay attention to the schedule since there may be exceptions to this rule.
- Homework Policy: Work you submit should be Python programs, stand-alone Python files, or Jupyter notebooks per the request of the problem. Any homework that is more that 3 days late but not more than 7 days late will be worth 80%. Any homework that is more than 7 days late will not be graded unless you make arrangement with me in advance.
- Homework will be submitted via Canvas. Students must adhere to the format for naming Jupyter notebook files when handing in their homework.
- Exams submitted after the deadline will be worth 80%.
- You are encouraged to work with one another to solve homework problems, but you should write solutions individually. Do not allow someone else to copy your work. If you suspect a student of cheating please inform me. The Mathematics and Statistics Department expects academic honesty from our students, as laid out in the University Policies below. Violations will be reported to the Center for Student Rights and Responsibilities.
- Attendance to all lectures is required. Attendance will be recorded.
- The following grading scale will be used:
  A   93% - 100%   A- 90% - 93%
  B+ 87% - 90%   B   83% - 87%   B- 80% - 83%
  C+ 76% - 80%   C   72% - 76%   C- 68% - 72%
  D+ 64% - 68%   D   60% -64%   D- 55% - 60%   F   Below 55%

TENTATIVE COURSE SCHEDULE

WK	Dates	Schedule	HW & Exam
1	Aug 24 – 28	Course Overview; Python programming: Introduction; Jupyter Notebook HW 1, HW 2, HW 3 and HW 4 assigned	HW 1 Due 08/25 HW 2 Due 08/28
2	Aug 31 – Sep 4	Python programming: Introduction; Approximations; Taylor Series HW 5 and HW 6 assigned 09/04 (7:59pm deadline) - Last day for students to add, drop, or change grading basis	HW 3 Due 09/01 HW 4 Due 09/04
3	Sep 7 – 11	Taylor Series; Taylor's Remainder Theorem HW 7 and HW 8 assigned 09/07 – Labor Day holiday, no classes.	HW 5 Due 09/08 HW 6 Due 09/11
4	Sep 14 – 18	Conditionals; While Loops HW 9 and HW 10 assigned	HW 7 Due 09/15 HW 8 Due 09/18
5	Sep 21 – 25	Bessel Functions; While Loops; For Loops Midterm-Exam 1 Assigned HW 11 and HW 12 assigned	HW 9 Due 09/22 Exam 1 09/25 Exam submitted after 09/25 will be worth 80%
6	Sep 28 – Oct 2	For Loops; Fibonacci Sequence HW 13 and HW 14 assigned	HW 10 Due 09/29 HW 11 Due 10/02
7	Oct 5 – 9	Loops Review; Zeros of Functions; Integration; Parametric Equations HW 15 and HW 16 assigned	HW 12 Due 10/06 HW 13 Due 10/09
8	Oct 12 – 16	Parametric Equations; Integration; Root Finding Problems HW 17 and HW 18 assigned	HW 14 Due 10/13 HW 15 Due 10/16

9	Oct 19 – 23	Simpson Rule; Trapezoid Rule HW 19 and HW 20 assigned	HW 16 Due 10/20 HW 17 Due 10/23
10	Oct 26 – 30	Quadrature; Lagrange Interpolation HW 21 and HW 22 assigned *Prerecorded lecture (asynchronous)	HW 18 Due 10/27 HW 19 Due 10/30
11	Nov 2 – 6	Divided Differences HW 23 and HW 24 assigned *Prerecorded lecture (asynchronous) l	HW 20 Due 11/03 HW 21 Due 11/06
12	Nov 9 – 13	Splines 11/11- Veterans Day Exam 2 assigned *Prerecorded lecture (asynchronous)	HW 22 Due 11/10 Exam 2 Due 11/13 Exam submitted after 11/13 will be worth 80%
13	Nov 16 – 20	Hermite Interpolation; Nested *For* Loop; Matrix Multiplication HW 25 and HW 26 assigned	HW 23 Due 11/17 HW 24 Due 11/20
14	Nov 23 – 27	HW 27 assigned 11/25 - 11/27 – Thanksgiving recess, no classes	Thanksgiving Recess - No classes on 11/25
15	Nov 30 - Dec 4	Floating Point Arithmetic	HW 25 Due 12/01 HW 26 Due 12/04
16	Dec 7 -Dec 10	Review; 12/09-Last day of classes for MATH 340	HW 27 Due 12/08
17	Dec 14	12/10- Final Exam Assigned Exam submitted after 3:00PM will be worth 80%	Final Exam due 3:00PM in Canvas
	Dec 31	Last day of Fall semester. Grades due from instructors.	

*This course will be a delivered through live lectures (synchronous) except for the three weeks shown on the schedule above where material will be delivered through prerecorded lectures (asynchronous).

CLASSROOM CONDUCT STANDARDS

SDSU students are expected to abide by the terms of the Student Conduct Code in classrooms and other instructional settings. Prohibited conduct includes:
- Willful, material and substantial disruption or obstruction of a University-related activity, or any on-campus activity.
- Participating in an activity that substantially and materially disrupts the normal operations of the University or infringes on the rights of members of the University community.
- Unauthorized recording or dissemination of virtual course instruction or materials by students, especially with the intent to disrupt normal university operations or facilitate academic dishonesty. This includes posting of exam problems or questions to on-line platforms.
- Conduct that threatens or endangers the health or safety of any person within or related to the University community, including
  1. physical abuse, threats, intimidation, or harassment.
  2. sexual misconduct.

Violation of these standards will result in referral to appropriate campus authorities.

ACADEMIC HONESTY

The University adheres to a strict policy prohibiting cheating and plagiarism. Examples of academic dishonesty include but are not limited to:
- copying, in part or in whole, from another's test or other examination;
- obtaining copies of a test, an examination, or other course material without the permission of the instructor;
- collaborating with another or others in work to be presented without the permission of the instructor;
- falsifying records, laboratory work, or other course data;

- submitting work previously presented in another course, if contrary to the rules of the course;
- altering or interfering with grading procedures;
- assisting another student in any of the above;
- using sources verbatim or paraphrasing without giving proper attribution (this can include phrases, sentences, paragraphs and/or pages of work);
- copying and pasting work from an online or offline source directly and calling it your own;
- using information you find from an online or offline source without giving the author credit;
- replacing words or phrases from another source and inserting your own words or phrases.

The California State University system requires instructors to report all instances of academic misconduct to the Center for Student Rights and Responsibilities. Academic dishonesty will result in disciplinary review by the University and may lead to probation, suspension, or expulsion. Instructors may also, at their discretion, penalize student grades on any assignment or assessment discovered to have been produced in an academically dishonest manner.

STUDENTS WITH DISABILITIES

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Ability Success Center at (619) 594-6473. You can also learn more about the services provided by visiting the Student Ability Success Center website. To avoid any delay in the receipt of your accommodations, you should contact Student Ability Success Center as soon as possible. Please note that accommodations are not retroactive, and I cannot provide accommodations based upon disability until I have received an accommodation letter from Student Ability Success Center.

STUDENT PRIVACY AND INTELLECTUAL PROPERTY

The Family Educational Rights and Privacy Act (FERPA) mandates the protection of student information, including contact information, grades, and graded assignments. I will not post grades or leave graded assignments in public places. Students will be notified at the time of an assignment if copies of student work will be retained beyond the end of the semester or used as examples for future students or the wider public. Students maintain intellectual property rights to work products they create as part of this course unless they are formally notified otherwise.

RELIGIOUS OBSERVANCES

According to the University Policy File, students should notify the instructors of affected courses of planned absences for religious observances by the end of the second week of classes.

MEDICAL-RELATED ABSENCES

Medical-related absences: Students are instructed to contact their professor/instructor/coach in the event they need to miss class, etc. due to an illness, injury or emergency. All decisions about the impact of an absence, as well as any arrangements for making up work, rest with the instructors. Student Health Services (SHS) does not provide medical excuses for short-term absences due to illness or injury. When a medical-related absence persists beyond five days, SHS will work with students to provide appropriate documentation. When a student is hospitalized or has a serious, ongoing illness or injury, SHS will, at the student's request and with the student's consent, communicate with the student's instructors via the Vice President for Student Affairs and may communicate with the student's Assistant Dean and/or the Student Ability Success Center.

TURNITIN

Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com (or Gradescope similarity detector tool) for the detection of plagiarism. All submitted papers will be included as source

documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. You may submit your papers in such a way that no identifying information about you is included. Another option is that you may request, in writing, that your papers not be submitted to www.turnitin.com. However, if you choose this option you will be required to provide documentation to substantiate that the papers are your original work and do not include any plagiarized material.

COPYRIGHT POLICY

SDSU respects the intellectual property of others and we ask our faculty & students to do the same. It is best to assume that any material (e.g., graphic, html coding, text, video, or sound) on the Web is copyrighted unless specific permission is given to copy it under a Creative Commons License. More information about the use of copy written material in education as part of the TEACH Act and Copyright Fair Use Guidelines. Whenever possible, you should attribute the original author of any work used under these provisions.

SDSU ECONOMIC CRISIS RESPONSE TEAM

SDSU Economic Crisis Response Team: If you or a friend are experiencing food or housing insecurity, or any unforeseen financial crisis, visit http://sdsu.edu/ecrt, email ecrt@sdsu.edu, or walk-in to Well-being & Health Promotion on the 3rd floor of Calpulli Center.

RESOURCES FOR STUDENTS

A complete list of all academic support services--including the Writing Center and Math Learning Center--is available on the Student Affairs' Academic Success website. Counseling and Psychological Services (619-594-5220) offers confidential counseling services by licensed therapists; you can Live Chat with a counselor at http://go.sdsu.edu/student_affairs/cps/therapist-consultation.aspx between 4:00pm and 10:00pm, or call San Diego Access and Crisis 24-hour Hotline at (888) 724-7240.