Course Title: Computational Astrophysics
Course Semester: Fall 2019
Course Institution: University of Florida
Course Instructor: Professor Desika Narayanan
Instructor Contact Information:
email: desika.narayanan@gmail.com/ufl.edu
Office Phone: 352-294-1865
Office: BRT 216
Website: http://www.astro.ufl.edu/~desika.narayanan/computational_fall19.html
Office Hours: Friday 3-5 pm and by email appointment
TA: Sidney Lower (s.lower@ufl.edu)
TA Office Hours: Wed 1-2:30pm BRT 309

Other help: Undergraduate lounge on Bryant 2nd floor

Course Objectives/Goals:
This course is an introduction to computational methods in physics and astronomy. We will cover basic numerical techniques (integration, differentiation, fitting methods, Monte Carlo methods, Machine Learning, Artificial Intelligence etc.), as well as how to devise and conduct numerical experiments. The main goal of this course is to empower students in using numerical techniques to solve both scientific, and every-day problems.

Required Textbook:
"Computational Physics" by Newman

Assignments, quizzes and exams:
There will be homeworks due roughly every week. They will be uploaded to your GitHub repository for an individual assignment. Unexcused late assignments will be accepted with 20% of the maximum allowable points lost per day, with an obvious maximum of 5 days late. Exceptions include medical or other extenuating circumstances. Note, your homework will be automatically pulled down at the due date/ time. If you submit late homework, it is up to you to inform me that you have pushed a late assignment to your GitHub repository so that I can manually pull it down or I won't know that it exists.

There will be a number of projects in the class as well. For these, late assignments are not allowed.

Grading:
Homeworks: 75%, Projects: 25%. HW will typically be worth 15 points with rubrics pre-defined and listed on the course website, though some HW will be worth more, based on the content.

The strictest grade policy that I will adopt will follow:

Letter	% Points	GPA	Letter	% Points	GPA	Letter	% Points	GPA
A	93-100	4.0	B-	80-82	2.67	D+	67-69	1.33
A-	90-92	3.67	C+	77-79	2.33	D	63-66	1.0
B+	87-89	3.33	C	73-76	2.0	D-	60-62	0.67
B	83-86	3.0	C-	70-72	1.67	E	0-60	0

UF grade policies may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Attendance: Requirements for class attendance and other work in this course are consistent with university policies that can be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Honor Code:

Formal Language: UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (http://www.dso.ufl.edu/sccr/process/student-conduct-honorcode/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class”

My Language: Collaboration is an important aspect of science, and you will likely learn as much from one another as you will from me. Hence, you are encouraged to work together and consult one another as you work on your assignments. You may additionally consult the internet as well as any books necessary to complete your assignments. You must, however, turn in your own individual homework, and this must be written on your own. Copying and pasting is not permitted.

You may not obtain materials from students who have taken this course in previous years, nor may you distribute your current materials to students not currently enrolled in this class. You may also not consult materials from students who have taken similar courses in other departments. Please consult me if you have any questions.

Evaluations:
“Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.”

Disabilities: I am committed to supporting the learning process for all students. Please contact me as soon as possible if you are having difficulties in the course. If you need a special accommodation due to a disability, please let me know. Students with disabilities requesting accommodations should additionally register with the Disability Resource Center (352-392-8565), **www.dso.ufl.edu/drc** by providing appropriate documentation. Once registered, students will receive an accommodation letter which should be presented to the instructor when requesting accommodation.

Learning Environment and Day to Day: I embrace the diversity of age, background, ethnicity, gender identity and expression, national origin, religious affiliation, sexual orientation and other visible and non visible categories that you bring with you to our shared study of physics. We will all be working closely together throughout the semester, and I expect that all students will contribute to a respectful, welcoming, and inclusive environment. This includes showing respect for all questions asked by members of the class. You are encouraged to bring a laptop to class every day, and be prepared to move seats to sit in groups when required.

Tentative Weekly Agenda (Subject to change at instructor's discretion):

Week Of	Tentative Topic(s)
August 20th	Introduction/Linux/Git
August 26th	GitHub, HiPerGator, Python begins
September 2nd	Python continued; Grids and Convergence
September 9th	Differentiation; Begin Integration
September 16th	Continue Integration
September 23d	Linear Algebra; Begin Root Finding
September 30th	ODEs
October 7th	Monte Carlo Methods
October 14th	Fitting
October 21st	Machine Learning/AI
October 28th	Pull Requests; Smoothing/Signal Processing
November 4th	Coding in Distributed Environments
November 11th	Flex for overflow
November 18th	Grup Projects
November 25th	Group Projects
December 2nd	Presentations