

Syllabus: Basics of Space Flight Astronomy 0087, Fall 2020

Lecture: TuTh 2:50PM - 4:05PM
For now: Online only
After pandemic: Thaw Hall 102

Professor: Dr. David Pekker
Allen Hall 218
Department of Physics and Astronomy
pekkerd@pitt.edu

Office Hours: immediately following each lecture and by appointment as needed. Please schedule appointments by email.

Grader: Tianyi Wang
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Office Hours: TBD



Apollo 11: the beginning of the first human voyage to the moon (NASA)

Course description:

Course Materials: There is no required text to purchase for this course. Instead, the course will rely on a free online resource:

Regina E. Schulte-Ladbeck "Basics of Spaceflight" (2016).

An online text book available at: <https://reslscience.weebly.com/space-books.html>

Course notes, homework assignments, links, videos, etc. will be posted on Canvas. Students should consult Canvas regularly for announcements and updates.

Major content areas:

- (1) Astronomy
 - (1) The solar system: Sun, Planets, Moons
 - (2) Stars & Galaxies
 - (3) Cosmology
- (2) Rocket science (rocket engineering)
 - (1) Newton's laws of motion
 - (2) History of rocketry

- (3) The rocket equation
- (4) Orbital motion
- (5) Rocket engines
- (6) Spacecraft failures & engineering ethics
- (3) What is science?
 - (1) Philosophy of scientific inquiry
 - (2) What do scientist actually do all day?
 - (3) From Newton to Einstein
- (4) Applications of spaceflight
 - (1) National defense
 - (2) Human and robotic space exploration
 - (3) Commercial uses of space
 - (4) Space policy
- (5) Spaceflight & science fiction
- (6) Outlook on future of spaceflight

Flipped Classroom: In reaction to the pandemic we will implement a flipped classroom. Instead of live online lectures, I will pre-recorded the lectures and post them to youtube.

Before each class period, students are expected to:

- (1) Watch the relevant lecture video.
- (2) Read the relevant sections of “Basics of Spaceflight” textbook.
- (3) Submit a short question regarding the lecture via canvas/

The class period will be used for

- (1) Discussion of topics covered by the pre-recorded lecture.
- (2) Clicker questions, via **tophat.com**, will be used to measure class participation and understanding. Class participation points will be given for answering clicker questions, regardless of whether the questions were answered correctly or not. Points will not be given if you are not in class to answer the questions.
- (3) In order to compensate for the time that students spend on watching class videos outside of class time, we will use class time to work on the homework problems.

Exams and Exam policy: In reaction to the pandemic there will be **no exams this year!** Instead of exams, we will have three essay assignments which will cover topics that are usually covered by exams. You will have one week to complete each of the essays. The essays are “open book”, you are encouraged to consult any resources that you want as long as you properly cite those resources. The **text** and **illustrations** that you submit **must be your own work** (no submitting text written by someone else and no copying pictures from the internet, please draw them yourself and take a photo with your phone). See university policy on academic integrity.

The tentative essay due dates are:

Essay 1 (astronomy): Thursday, September 26

Essay 2 (rocket science): Thursday October 24

Essay 3 (what is science/applications/science fiction): Thursday November 21

Generally, there will be no make-up essays as you are allowed to drop one essay grade. Exceptions to this rule will only be made in case of extreme circumstances, at the discretion of the professor.

Homework and homework policy:

There will be ten homework sets. All homework sets will have equal point value. The lowest two homework grades will be dropped.

Each homework will have a challenge problem. The challenge problems will be optional, but solving these problems will give you extra credit on your homework score (the point value will be indicated on the problem set).

Generally, late homework will not be accepted as you are allowed to drop two homework assignment. Exceptions to this rule will only be made in case of extreme circumstances, at the discretion of the professor.

Score	Grade
0-60	F
60-70	D
70-80	C
80-90	B
90-100	A
100+	A+

Grading policy: The course grade will consist of the following components:

Essays (best 2 out of 3) — 50%

Homework (best 8 out of 10) — 40% (plus points from challenge problems)

Questions on pre-recorded lectures — 5%

Class participation — 5%

Overall score: My goal is not to have to grade the class on a curve. Overall score will be translated to a grade using the table to the right. For example, a score of 80.00 points would be a B, while a score of 79.99 points would be a C. At present, with the exception of A+, I am not planning to use half-letter grades like C+ or B-.

Extra-credit projects:

In addition to the above mentioned components, students can earn extra-credits. Extra-credits can be used to earn up to a 10% overall grade boost. You can select one or more extra-credit projects from the list below. Additionally, I encourage you to think about extra-credit projects that are not on the list. If you have a creative idea for such a project please discuss it with the professor in order to (1) verify that the project is appropriate and (2) come to an agreement about the amount of extra-credits that it will be worth.

- (a) 5% — 1-3 minute video about space or spaceflight broadly defined. Your video could be shown and briefly discussed in class (so please make it appropriate for the audience).
- (b) 5% — construct a water rocket and send me a picture (depending on the status of the pandemic we will attempt to have a “launch day” where we fly the rockets).
- (c) 5% — construct a space-related artwork and provide a brief explanation of what it is. Feel free to use any medium that you like: painting, model, performance piece, poem, etc.

Succeeding in this course:

Be curious! Be organized! Watch the videos and read the assigned sections before class. Bring your questions to class and ask them during class time. This is especially important for homework problems, which we will discuss extensively in class, but only if there are questions.

Students are strongly encouraged to **form study groups** to work on the homework problems! I am sure that everyone in the class is sufficiently tech savvy so as to be able to figure out how to connect to their peers via Zoom, Google hangouts, facebook, etc. Of course, the exact text of your homework answers must be your own.

Recording of live lectures: I would like to record the live lectures so that students have the content available in case they were not able to make it to the lecture. Please let me know if you are not comfortable with this setup as soon as possible.

Academic Integrity Policy:

Students in this course will be expected to comply with the University of Pittsburgh's Policy on Academic Integrity. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators.

Turnitin: Students agree that by taking this course all required papers and other assignments may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin reference database solely for the purpose of detecting plagiarism of such papers. Use of Turnitin page service is subject to the Usage Policy and Privacy Pledge posted on the Turnitin.com site.

Disability Resources:

If you have a disability that requires special testing accommodations or other classroom modifications, you need to notify both the instructor and the Disability Resources and Services no later than the 2nd week of the term. You may be asked to provide documentation of your disability to determine the appropriateness of accommodations. To notify Disability Resources and Services, call 648-7890 (Voice or TTD) to schedule an appointment. The Office is located in 216 William Pitt Union.

E-mail Communication Policy:

Each student is issued a University e-mail address (username@pitt.edu) upon admittance. This e-mail address may be used by the University for official communication with students. Students are expected to read e-mail sent to this account on a regular basis. Failure to read and react to University communications in a timely manner does not absolve the student from knowing and complying with the content of the communications. The University provides an e-mail forwarding service that allows students to read their e-mail via other service providers (e.g., Hotmail, AOL, Yahoo). Students that choose to forward their e-mail from their pitt.edu address to another address do so at their own risk. If e-mail is lost as a result of forwarding, it does not absolve the student from responding to official communications sent to their University e-mail address. To forward e-mail sent to your University account, go to <http://accounts.pitt.edu>, log into your account, click on Edit Forwarding Addresses, and follow the instructions on the page. Be sure to log out of your account when you have finished. (For the full E-mail Communication Policy, go to www.bc.pitt.edu/policies/policy/09/09-10-01.html.)

Classroom Recording Policy:

This course will adhere to the University's Senate Educational Policy Committee recommendation on classroom recording of May 4, 2010:

To ensure the free and open discussion of ideas, students may not record classroom lectures, discussions, recitations, and/or other activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.

Intellectual Property Policy:

Per the University's policies regarding copyright and intellectual property, <http://www.library.pitt.edu/copyright-pitt>, the instructor retains the rights to all original course materials – including, but not limited to, lectures, lecture notes, slides or other presentations, assignments, exams, papers, diagrams, etc. – and none of this material may be used, shared, or reproduced in any way, for other than a student's own private educational use.

In addition, legal rights for all third-party materials, whether used by direct permission or under the Fair Use educational rules, is fully retained by the original authors. None of this material may be used, shared, or reproduced, in any way, for other than a student's own private educational use, unless permission is granted by the original authors or sources.

Sexual Misconduct, Required Reporting, and Title IX:

The University is committed to combatting sexual misconduct. As a result, you should know that University faculty and staff members are required to report any instances of sexual misconduct, including harassment and sexual violence, to the University's Title IX office so that the victim may be provided appropriate resources and support options. What this means is that as your professor, I am required to report any incidents of sexual misconduct that are directly reported to me, or of which I am somehow made aware.

There are two important exceptions to this requirement about which you should be aware:

A list of the designated University employees who, as counselors and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here: <http://www.titleix.pitt.edu/report/confidentiality>

An important exception to the reporting requirement exists for academic work. Disclosures about sexual misconduct that are shared as part of an academic project, classroom discussion, or course assignment, are not required to be disclosed to the University's Title IX office.

If you are the victim of sexual misconduct, Pitt encourages you to reach out to these resources:

Title IX Office: 412-648-7860

SHARE @ the University Counseling Center: 412-648-7930 (8:30 A.M. TO 5 P.M. M-F) and 412-648-7856 (AFTER BUSINESS HOURS)

If you have a safety concern, please contact the University of Pittsburgh Police, 412-624-2121.

Other reporting information is available here: <http://www.titleix.pitt.edu/report-0>

Diversity and Inclusion:

I consider this classroom – i.e. both our shared physical and digital spaces - to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. Students in this class are encouraged to speak up, share their ideas, and participate during class meetings, and in online forums and assignments. All members of this class are also expected to conduct themselves in a professional manner that contributes to a respectful, welcoming, and inclusive environment for every other member of the class.

“Exploration is in our nature. We began as wanderers, and we are wanderers still. We have lingered long enough on the shores of the cosmic ocean. We are ready at last to set sail for the stars.”

— Carl Sagan, Cosmos