Instructor:	Dr. Timothy A. Livengood tlivengo@umd.edu	Class:	ATL2400 TuTh, 9:30AM–10:45AM
Mobile:	443-535-3185	Office: Hours:	ATL1319 TuTh, 11:00AM–12:15PM
TA:	Tobi Hammond ihammond@umd.edu	TA Office: TA Hours:	TBD W, 2:00PM–3:00PM
Text: An Introduction to the Solar System		by Rothery, McBride, and Gilmour	
Submissions:		Online submissions, except tests (paper)	

- ELMS will be used to post materials, submit work except for tests, and update grades.
- Submitted work will be online through ELMS except for the tests. For submitted work, do not share a link to a Google doc – upload a PDF or JPG so we have a locked version as of a specific time.

Course Description: Astronomy 330 is an introduction to the structure and composition of the solar system. What we already know about the solar system is inextricably linked to the methods we have available to explore it. As those methods grow and expand, it changes our opportunities to learn beyond present knowledge —- and what we already know, or think we know, changes the methods that we choose to apply in our next exploration. You will investigate various planetary environments to develop an understanding of the individual planets, their environments, characteristics, interactions, similarities, and differences.

The class structure will consist primarily of a series of design studies for planetary spaceflight missions, conducted as team research efforts. The design studies will be supplemented by guest speakers on space exploration, homework to originate concepts, and in-class tests to review material and concepts presented in the study reports. Design studies will be presented to the class and as a report for detailed evaluation. The ideas for where to go, why to go, how to get there, what to do when you get there, how long it will take to do it, etc., will come from your team's efforts. You will need to research the environment you will be visiting, research what is known and what are the outstanding questions about that destination, research the existing technologies that have been used to explore solar system environments, and estimate what changes in performance will be needed to apply them to your situation. To do that, you will need to learn about the planetary environments, the scale of the solar system, and many other topics. You will be tested on the work presented by your classmates, so pay attention and take notes.

Participation: Roll will not be taken, but be aware that attendance is crucial to a successful outcome. Every student MUST join a mission design team to receive credit. Classroom presentations by the mission design teams are the primary means to receive guidance from the professor and to share work with the rest of the class. If you must be absent, let me and your group leader know in advance, if possible.

Class style: There will be a few professorial lectures, and three presentations by experts prior to each session of design studies. The class will consist mostly of student groups presenting to each other and working together, with the professor available to provide advice and guidance. The majority of coursework will take place outside of the lecture hall, which

will be for sharing the results of your efforts. Pay attention to presentations by fellow students – they are researching the aspects of the Solar System that you are not, and you will be tested on the material they present.

Exams: There will be three tests and a final. The tests will be based on material from the project presentations, from guest speakers, and related concepts that you should be addressing in your own efforts. The professor will assemble a test based on what is in the design studies and in reaction to concepts that are relevant. There will be few trivia questions that could be searched online (except for movie quotes!). Have a calculator that is reliable and feel free to bring internet access to tests.

Grading: There will be nine graded items. Each student will be responsible for three mission concept proposals (1-2 page) as individual homework, worth 50 points each. Each student group will be responsible for three mission design reports, worth 100 points each. Everyone on the design project will get the same grade for the project, except: each mission design team will have a Principal Investigator (PI), who gets an additional 10 points for leading the effort, plus two to three Deputy PI's who get an additional 5 points each. The group will democratically select their own PI, and the PI will select the DPIs. A person can serve as PI only once, but as DPI any number of times. Progress reports and final reports will be delivered to the whole class, making the case for the value and feasibility of the project. Students are expected to engage with each other's work on the fly and to make suggestions for improvements, which is how you will best prepare for the tests. Each test will be taken individually and is worth 50 points.

Creativity: Creativity is encouraged. Use your skills from other subjects. You can write? Then write! You can draw? Then draw! You can cook? Then use food metaphors! You don't think you are very good at it? Do it anyway!

Academic Integrity: The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. As a student, you are responsible for upholding these standards for this course. It is very important for you to be aware of the definitions and consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://www.shc.umd.edu/. Also: just say no to ChatGPT and its ilk.

Resources:

Textbook – the textbook addresses individual planets and planetary processes in a coherent fashion that has passed considerable review. Unlike the professor, it is always available and it has been peer-reviewed. It is an excellent place to start, to refresh your knowledge on a particular process, and to get an overview of the current state of knowledge for various planetary bodies or processes.

Wikipedia – Never cite Wikipedia as a source, but any good Wikipedia page includes references to primary sources. Go to the primary source for the straight scoop and to determine whether the primary information is trustworthy – science is a conversation, and sometimes things are said that are not true. Wikipedia is usually more up-to-date than official NASA sources or the textbook on facts such as when a mission launched, arrived, ended, or did something interesting.

NASA Space Science Data Coordinated Archive (NSSDCA), https://nssdc.gsfc.nasa.gov – Describes missions in detail, instruments, principal investigators. Not always up to date – mission teams often write the mission description before launch and never update it (not even changing the verb tense!). Covers every planetary mission ever launched, at least a little bit, and names the instruments on the mission.

NSSDCA Planetary factsheets, https://nssdc.gsfc.nasa.gov/planetary/planetfact.html – Most reliable source for good current information.

NASA Ames Research Center Trajectory Browser, https://trajbrowser.arc.nasa.gov/traj_browser.php – Explore trajectories past and future from Earth to various Solar System targets. It doesn't know everything, but it knows quite a lot, and more targets are being added. It takes some time to figure out how to use it, so be patient and leave time for exploring.

Nineplanets.org, https://www.nineplanets.org – A classic site for planetary information, history, and context. Check out the Space Travel Calculator link!

Calendar:

HW# due/M# start: homework due, start mission-concept development.

Review the chosen: professor briefly reviews the basics of existing knowledge on mission targets; you are expected to build on this and go beyond.

week	Tue	due	Thur	due	notes
1			26 Jan	The Whole System 1	
2	31 Jan	The Whole System 2	2 Feb	Guest Speaker 1: Adeena Mignogna	Orbits!
3	7 Feb	What makes planets?	9 Feb	HW1 due/M1 start	
4	14 Feb	Review The Chosen#1	16 Feb	M1 progress report	
5	21 Feb	How do instruments work?	23 Feb	M1 progress report	
6	28 Feb	M1 progress report	2 Mar	M1 due	
7	7 Mar	M1 test	9 Mar	Address glaring gaps!	
8	14 Mar	Guest Speaker 2	16 Mar	HW2 due/M2 start	
9	21 Mar	Spring Break	23 Mar	Spring Break	
10	28 Mar	Review The Chosen#2	30 Mar	M2 progress report	
11	4 Apr	M2 progress report	6 Apr	M2 due	
12	11 Apr	M2 test	13 Apr	Address glaring gaps!	
13	18 Apr	Guest Speaker #3: Dr. Barbara Cohen	20 Apr	HW3 due/M3 start	
14	25 Apr	Review The Chosen#3	27 Apr	M3 progress report	
15	2 May	M3 progress report	4 May	M3 due	
16	9 May	M3 test	11 May	Flex day and review	
17	15 May	Final Exam: MONDAY, 8AM–10AM			