PHYS 4335: Solar System Physics
Course Syllabus for Fall 2018, MWF 11:00-11:55 am

Instructor:	Dr. Wayne Keith: 793-3874, keith.wayne@mcm.edu
Office Hours:	S 110-C: TWRF 9-11, WR 2:30-5, and F 1-2
Web:	http://www.mcm.edu/~keith.wayne
Text:	*Planetary Sciences (Updated 2nd)*, by Imke de Pater and Jack J. Lissauer
Required:	scientific calculator, paper, pencil
Corequisite:	PHYS 3300 (Modern Physics)

Course Description: This is an advanced elective for physics majors. This course is intended to introduce the student to various topics in space physics, including the formation of the Solar System, Kepler's Laws of motion, and the structure and properties of the planets, moons, and small bodies that make up our Solar System.

Grading: 40% Homework: Assignments will be made in class and posted online. Homework will be due at the beginning of class on the date indicated. Also includes any graded activities conducted during class (quizzes, presentations, discussions, etc.)
15% Project: All students will be required to complete a research project during the semester. Students who attended the summer trip to Lowell Observatory should use their final report for this grade.
30% exams (10% each): In-class exams.
15% Final exam: Comprehensive, concentrating on the final quarter of the course.

Attendance/Make up policy: Make-up exams will be given for excused absences only at the discretion of the instructor. Contacting the instructor via email or phone prior to missing class for any reason is strongly encouraged, even if it is for a school sponsored event.

Classroom Rules: Students are expected to be present and on-time for all class meetings. Excessive absences (more than 3 unexcused) may result in the student being dropped from the course. Late homework loses 10% per week (up to a maximum of 40%), unless an extension is granted by the instructor. All late work requires a written explanation of why it was not turned in on time.

ADA Policy: If you have a documented disability that may impact your performance in this class and for which you may require accommodations, you must be registered with and provide documentation of your disability to the Disability Services Office, President Hall, 793-4880.

Final notes: Class discussion is strongly encouraged; please feel free to ask questions, during class or outside of class, about anything that is not clear. Properly preparing for class by reading the textbook and keeping up with the homework is the most important factor in doing well in this course.

PHYS 4335 Course Schedule

All dates and topics are tentative and subject to change except **bold** dates.

Date	Lecture #	Topic	Reading
8/27	1	Introduction and Overview	1.1
8/29	2	Inventory of the Solar System	1.2, 1.3
8/31	3	Kepler's Laws	2.1
9/3	4	Kepler's Laws	2.2
9/5	5	Celestial Mechanics	2.3
9/7	6	Lagrange and Tides	2.4 – 2.6
9/10	7	Dissipative Forces	2.7
9/12	8	Energy Balance	3.1
9/14	9	Solar Heating and Energy Transport	3.2
9/17	10	Radiative Equilibrium – Greenhouse Effect	3.3
9/19	11	Test 1 Review	
9/21		**Test 1**	
9/24	12	Planetary Atmospheres - composition	4.1-4.3
9/26	13	Planetary Atmospheres - evolution	4.5, 4.9
9/28	14	Planetary Atmospheres - dynamics	
10/1	15	Planetary Surfaces	5.1, 5.3
10/3	16	Impacts, comparative geology	5.4, 5.5
10/5	17	Planetary Interiors - Earth	6.1, 6.2
10/8	18	Planetary Interiors – Other bodies	6.3, 6.4
10/10	19	Test 2 Review	
10/12		**Homecoming – NO CLASS**	
10/15		**Test 2**	
10/17	20	Interplanetary Medium	7.1
10/19	21	Magnetohydrodynamics	7.2
10/22	22	Particle Motions	7.3
10/24	23	Adiabatic Invariants	7.4
10/26	24	Adiabatic Invariants	7.4
10/29	25	Planetary Magnetospheres	7.5, 7.6
10/31	26	Meteorites	8.1 – 8.7
11/2	27	Asteroids	9.1 - 9.6
11/5	28	Comets	10.1, 10.2
11/7	29	Comets	10.7, 10.8
11/9	30	Tidal Forces and Roche's Limit	11.1, 11.2
11/12	31	Planetary Rings	11.3, 11.4, 11.7
11/14	32	Test 3 Review	
11/16		**Test 3**	
11/19	33	Extrasolar Planets - Detection	12.1 – 12.3
11/21		**Thanksgiving – NO CLASS**	
11/23		**Thanksgiving – NO CLASS**	
11/26	34	Extrasolar Planets - Models	12.4
11/28	35	Life in the Universe	12.5 – 12.7
11/30	36	Stellar Formation	13.1 – 13.3
12/3	37	Planet Formation	13.4 – 13.7, 13.11
12/5	38	The Rocket Equation	
12/7	39	Test 4 Review	
12/10		**Finals week – NO CLASS**	
12/12		**Final Exam – Test 4 (M 10:30am – 12:30pm)**	

Course objectives and goals	Linked to which departmental program goal(s)	Linked to which institutional goal(s)?	Types of evidence used to demonstrate student achievement of objectives & goals
Students will demonstrate conceptual understanding of the basic principles of Solar System Physics.	- to prepare physics graduates for a wide range of career opportunities including not only graduate study in physics or astronomy; but also, science teaching and careers in industry and science-related business.	1,2,3,8	Successful completion of in-class exam essay questions.
Students will demonstrate the ability to apply various mathematical methods towards solutions of Solar System Physics problems.	- Same as above	1,2,3,8	Successful solving of appropriate problems during in-class discussions, homework and exams.
Students will demonstrate conceptual and practical understanding of the physics behind the Sun, Planets, minor bodies, and the Interplanetary Medium.	- Same as above	1,2,3,8	Successful completion of in-class exam essay questions and solving of appropriate problems during in-class discussions, homework and exams.