

RULES

1. Arrive on time; depart on time.
2. Take notes, and bring calculator to each class.
3. No eating, no cell phones.

Final Project

Numerical calculation of restricted three-body problem.

Due Date: Thu 5 Dec.

Parts 1-4 should be finished by 31 Oct.

Tests

One-hour; closed book; closed notes.

Tools: pen or pencil, calculator, equation sheet.

Dates: Thu 26 Sep, Thu 31 Oct, Tue 26 Nov.

Problems

Must be neat and stapled.

Due Dates: every Tuesday.

Graded on completeness, correctness and effort.

All assignments are due at the *beginning* of class on the due date, after which they will be considered late and the score will be reduced by 50%. After the beginning of the *next* class period, they will not be accepted.

Code of Behavior

In order for learning to take place, we all must act with civility (formal politeness) and respect (polite consideration, courtesy) toward each other. My responsibilities include coming to class prepared and on time, and evaluating you in a fair and impartial manner. Your responsibilities include coming to class prepared and on time, not disrupting the class (for example, talking without being called on, eating, reading newspapers, sleeping, shuffling papers, talking on cell phones, etc.), and treating your fellow students as colleagues (see the Student Handbook). Violations of this code can result in your removal from the class.

* This syllabus incorporates all existing University policies, especially those sections of the *Student Handbook* pertaining to academic integrity, civility, and respect. *

General study habits

Repetition is critical for creating long-term memories. A good method for learning is the following sequence: read, listen, write, re-read, re-write, practice, and review. The textbook should be read THREE times: read once before class, read deeply (at least) once after class, and once as a review. In addition, you do not read textbooks as you would the newspaper. You must work through the examples, all mathematical steps should be confirmed, and you should write notes in the margins (it is your book, you can write in it!).

Notes

Taking notes during lecture is important – but you must review and re-copy those notes after class (within a few hours) for them to be useful. Notes that are never reviewed are less than worthless: they give you a false sense of security. It is important that you get into the habit studying every day.

Problem Solving

Solving problems is **critical** to your success in this course. An excellent method to prepare for the exams is to attempt problems at home in an exam-type environment. That is, once you have solved a group of problems, put aside the solutions and pretend that they are questions on an exam – attempt to solve them again, but without any help. Solve problems according to the following rules of coherence and readability:

- Describe *briefly*, but in clear and complete sentences, the basic principles used to solve the problem and explain the basic equations that are used in the solution [DO NOT simply rewrite the question].
- If a physical situation is discussed in the problem, draw an appropriate diagram.
- Identify in words, or by clear references to the diagram, all the symbols you use.
- Work through the problem symbolically, getting a simplified symbolic answer, and only substitute numbers (if appropriate at all) at the very end.
- If you obtain an explicit numerical solution, comment on whether the value you get is reasonable.
- Put boxes around your final answers.
- Write up the problem sets neatly.

Do not simply copy another student's work, and do not simply copy from the solutions manual, but I recommend that you form study groups and work together. This can help you through difficult sections and problems. I encourage you to discuss, argue, arm-wrestle, and finally master the problems. However, I expect you to write up your solutions individually, showing your own insights.

Study Groups

I strongly suggest that you form study groups. “For most individuals, learning is most effectively carried out via social interactions.” (Ed Redish)

SCHEDULE

Part 1. Mechanics review, the two-body problem, 2D orbits, time

READING:

Curtis, Sections 1.4-1.7, 2.1-2.12, 3.1-3.4

Problem Set #1	Due Tue 9/3	Ch 1: 9, 10, 11, 12, 14, 15; Ch 2: 1, 2
Problem Set #2	Due Tue 9/10	Ch 2: 7, 8, 10, 11, 18, 19, 20, 21, 23
Problem Set #3	Due Tue 9/17	Ch 2: 24, 30, 31, 35, 37, 38, 39, 40, 41
Problem Set #4	Due Tue 9/24	Ch 2: 47; Ch 3: 1, 2, 5, 6, 7, 8, 13 (EC: 3.4, R1)

Exam #1 – Thu 9/26

Part 2. 3D orbits, coordinate systems and orbit determination

READING:

Curtis, Sections 3.5-3.6, 4.1-4.8, 5.1-5.2, 5.4-5.8

Problem Set #5	Due Tue 10/8	Ch 3: 14, 15, 16, 17, 18; Ch 4: 1
Problem Set #6	Due Tue 10/15	Ch 4: 3, 4, 6, 7, 8, 9, 10
Problem Set #7	Due Tue 10/22	Ch 4: 14, 18, 19, 21, 23, 24, 25, 27
Problem Set #8	Due Tue 10/29	Ch 5: 1, 2, 8, 9, 10, 11, 12, 13, 14, 15

Exam #2 – Thu 10/31

Part 3. Orbital maneuvers, rendezvous, interplanetary trajectories

READING:

Curtis, Sections 6.1-6.5, 6.9, 7.1-4, 8.4, 8.9

Problem Set #9	Due Thu 11/7	Ch 6: 10, 13, 14, 16
Problem Set #10	Due Thu 11/14	Ch 6: 19, 37, 39, 42, 44
Problem Set #11	Due Thu 11/21	Ch 7: 1, 2, 3, 4; Ch 8: 5, 12

Exam #3 – Tue 11/26