

ENG ME406 Dynamics of Space Vehicles
Professor Brian Walsh
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Spring 2019

Lecture: ENG 202, 12:20pm-2:05pm

Office Hours: Thursday 10am-12pm or by appointment.

Graduate Teaching Fellow: Emil Atz (emilatz@bu.edu)

No networked technology (phones, laptop, tablet) permitted in the classroom.

Text: Howard D. Curtis, Orbital Mechanics for Engineering Students,
Third Edition, Elsevier, 2014.

Description: The Dynamics of Space Vehicles will cover the space environment and motion of space vehicles within it. The dynamics and composition of the neutral and plasma material in the space environment ranging from low-Earth orbit to distant heliospheric spacecraft trajectories will be covered. A physical understanding of orbital motion and precession at the Earth as well as orbital maneuvers will be covered. These maneuvers will cover Earth-centric transfers as well as interplanetary motion through theory and simulation. Rocket dynamics and multiple stage propulsion systems will also be covered as a means to propel space vehicles.

Website: The course website is on BlackBoard (learn.bu.edu). Electronic materials will be posted periodically throughout the semester, so check the website often for updates. **Note** that while grade assignments will be posted for your review, we do NOT use the Blackboard Grade Center to calculate semester grades. Ignore any interpretation of your grade based on whatever Blackboard-reported "points" that are displayed.

Required	Grade Fraction
Homework	20%
Midterm Exam 1	22.5%
Midterm Exam 2	22.5%
Final Exam	25%
Class Participation	10%

Exams:

Exam 1 is scheduled for February 20 in class. Exam 2 is scheduled for April 3 in class. Both exams will be closed book. Calculators will be permitted, but networked devices are not allowed during exams. If a student needs to use the restroom during an exam, his or her cell phone must be left in the exam room and not carried into the bathroom.

Make-up exams will be given only in extreme circumstances. It is your responsibility to let your instructor know as far in advance as possible of an unavoidable conflict or medical emergency.

Grades: All course grades will be posted to Blackboard. The final grade will be based on the grades from blackboard applied to the weighting above.

Homework: Unless otherwise stated, homework will be due at the beginning of class on the prescribed due date. Since solutions to the problem sets will be posted following the lecture, **late problem sets are not permitted** and will receive a zero. Group collaboration is encouraged on homework, but each student must hand in his or her own work. No digital material may be transferred between students when collaborating.

Accommodations for students with documented disabilities: If you are a student with a disability or believe you might have a disability that requires accommodations, please contact the Office for Disability Services (ODS) at (617) 353-3658 to coordinate any reasonable accommodation requests. ODS is located at 19 Deerfield St, on the second floor. I will make every effort to accommodate such requests but (a) please notify me at the beginning of the semester if you've received approved accommodations in previous semesters (even if you haven't received your paperwork for this semester yet!) and (b) my policy is that I need at least one week's notification prior to each exam so we can make the necessary arrangements.

Ethical Responsibilities

Cheating on homework, quizzes, exams, project reports, or any form of assignment, may be a form of plagiarism and is an infringement of every code of engineering ethics. Plagiarism is a serious academic offense and should not be taken lightly. Understanding your ethical responsibilities is an integral part of becoming a professional. A copy of the Code of Ethics of engineers, promulgated by the Accreditation Board for Engineering and Technology (ABET) and the National Society of Professional Engineers, can be found on the main course web site.

Please recall that when you enrolled at Boston University, you agreed to an Academic Honesty Pledge. The Academic Conduct Code details your responsibilities as well as the results of code violations, and is posted at:

<https://www.bu.edu/academics/policies/academic-conduct-code/>

Class Schedule:

	Week Beginning	Topic
1	1/21	Two body dynamics
2	1/28	Two body dynamics
3	2/4	Elliptical orbits
4	2/11	3D Orbits at Earth
5	2/19	Orbital precession, Review, Exam 1
6	2/25	Exam 1 Review, Orbital maneuvers
7	3/4	<i>Spring Recess</i>
8	3/11	Interplanetary trajectories
9	3/18	Rockets +Staging
10	3/25	Numerical modeling of orbits, Don Eyles guest lecture
11	4/1	Exam review, Exam 2
12	4/8	Neutral/plasma space environment
13	4/17	Space weather
14	4/22	Space hardware, Space collisions
15	4/29	Final Week