

AE 202
Aerospace Flight Mechanics
Fall 2023

Syllabus Ver. 2.0

- Course Description: Fundamental principles of aerospace flight mechanics applied to spacecraft and aircraft. Orbital mechanics, rocket propulsion, and dynamics and control applied to spacecraft design. Aerodynamics, maneuvering, stability, and flight performance applied to aircraft design. Human centered engineering design process fundamentals incorporated throughout.
- Course Objectives: To build on classical physical mechanics and calculus and develop methods for predicting aerospace flight vehicle motion, forces, and performance. This is paired with aerospace flight vehicle design fundamentals and aerospace industry conventions to create a baseline in aircraft and spacecraft flight mechanics to prepare the learners for upper-level aerospace engineering curriculum.
- Course Meeting: TR 2:00-3:20 PM CST (UTC-6)
- Instructor: Dr. Elle Wroblewski (“El-lee” “Ro-bleh-ski” or “Vroo-blev-ski” if you’re feeling fancy)
wroblew3@illinois.edu
Ph.D. Aerospace Engineering 2022
M.S. Aerospace Engineering 2016
B.S. Aerospace Engineering 2014
- my gender is **nonbinary**
my pronouns are **they/them/theirs**
my professional/personal address is **Doctor (Dr) or Professor (Prof)**
please do not use these forms of address refer to me:
Mr., Ms., Mrs., Ma’am, Miss, or “the lady”
- Office Hours: **Day and Time TBD**
“The Aero Space” Second Floor Computer Lab, Talbot Laboratory 206
<https://www.when2meet.com/?20981625-bk4RU>
- You can request an in-person or zoom meeting with me if you cannot make it to office hours, this is subject to my availability during business hours.
- Teaching Assistants: Koushik Udayachandran
koushik3@illinois.edu
Office Hours: TBD
- Prerequisites: TAM 212 Concurrent > TAM 210/211 > PHYS 211, MATH 241, MATH 257
- Credit: 3 Credit Hours
- Course Website: Canvas
- Textbook: There is no required textbook.

Attendance: Mandatory with Participation Grades

Projects: Projects will be announced in class. Two video projects are due this semester.

Assignments: Collaboration with classmates on assignments is encouraged: you can assist and direct, check numerical values for solutions with other students, and explain components of the process, but you ***should not volunteer to do the work for anybody besides yourself***. If you do the work for someone else or copy work from someone else, it is an infringement of academic integrity policy and I am mandated to report such infringements. [See the Student Code for more information on academic integrity.](#)

Quizzes: Quizzes are given weekly

- Timed
- No notes
- Use calculators

You will take your paper quiz home with you before turning it in to correct any errors, this is equivalent to homework but hopefully will not take too much time outside of class. You are responsible for bringing your paper quiz back to class the following class period to turn it in for credit. I will not accept them early unless you have a planned absence.

Exams: The final exam will be cumulative and based on the quizzes, the quizzes are based on the class content.

Grading:	Attendance and Class Participation	(15%)
	Communications Assignments	(15%)
	Individual Video Project	(10%)
	Group Video Project	(15%)
	Quizzes	(30%)
	Final Exam	(15%)

GPA Grade Scale: A+ = 4.0; A = 4.0; A- = 3.67; B+ = 3.33; B = 3.0; B- = 2.67; C+ = 2.33; C = 2.0; C- = 1.67; D+ = 1.33; D = 1.0; D- = 0.67; F = 0.0.

Grading from Canvas Breakdown:

97.00 – 100.00	A+
93.00 – 96.99	A
90.00 – 92.99	A-
87.00 – 89.99	B+
83.00 – 86.99	B
80.00 – 82.99	B-
77.00 – 79.99	C+
73.00 – 76.99	C
70.00 - 72.99	C-
67.00 – 69.99	D+
63.00 – 66.99	D
60.00 - 62.99	D-
below 60	F

Extra Credit Assignment: There is an extra credit assignment option that will add two percentage points to your final grade out of 100%. It is writing a current event article that you post on the Canvas forum, answering a question I pose to you about it, and asking someone else a question on their extra credit assignment (if any are posted, you are responsible for one question to another student and to answer all questions posed to you by a point in time. This assignment will be released October 1st.

The instructor reserves the right to make any changes they consider academically advisable. Such changes, if any, will be announced in class.

Additional Resources: Any book at the library that you like about aerospace engineering that is written in a way that you understand it is fantastic. I recommend you read the books you find most interesting.

Otherwise:

John D Anderson Jr. "Introduction to Flight"

Thomas R Yechout "Introduction to Aircraft Flight Mechanics"

William E Wiesel "Spaceflight Dynamics"

Roger R Bate, Donald D Mueller, Jerry E White "Fundamentals of Astrodynamics"

Campus Information & Mandated Reporting Notice

Disability Resources and Educational Services

To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES, you may visit 1207 S. Oak St., Champaign, call 333-4603, e-mail disability@illinois.edu or go to the DRES website. If you are concerned you have a disability-related condition that is impacting your academic progress, there are academic screening appointments available on campus that can help diagnosis a previously undiagnosed disability by visiting the DRES website and selecting "Sign-Up for an Academic Screening" at the bottom of the page.

Writer's Workshop

If you are interested in obtaining information to improve writing, study skills, time management or organization, the following campus resources are available to all students: [Writers Workshop \(illinois.edu\)](#)

Academic Assistance Links

[Office of the Dean of Students at the University of Illinois \(uiuc.edu\)](#)

[Office of Minority Student Affairs at the University of Illinois](#)

[Home | International Student & Scholar Services \(illinois.edu\)](#)

[Center for Academic Resources in Engineering \(CARE\)](#)

Health

If you are experiencing symptoms of anxiety or depression or are feeling overwhelmed, stressed, or in crisis, you can seek help through the following campus resources:

[McKinley Health Center | University of Illinois at Urbana-Champaign](#)

You can make an appointment with your primary care physician at McKinley to discuss possible treatment for anxiety and depression, or other physical or emotional responses to stress. They are currently conducting appointments over the phone and via zoom in addition to in-person appointments.

8:00 a.m.-5:00 p.m., Monday through Friday

Phone: 217-333-2700

University of Illinois Counseling Center

7:50 a.m.-5:00 p.m., Monday through Friday

Phone: 217-333-3704

Mental Health | McKinley Health Center

8:00 a.m.-5:00 p.m., Monday through Friday

Phone: 217-333-2700

Sexual Misconduct Policy and Reporting

The University of Illinois is committed to combating sexual misconduct. As such, you should know that faculty and staff members are required to report any instances of sexual misconduct—which can include harassment, sexual assault, sexual exploitation, dating violence, domestic violence, and stalking—to the University’s Title IX & Disability Office. What this means is that as your instructor, I am required to report any incidents of sexual misconduct that are directly reported to me, or of which I am somehow made aware. When a report is received, an individual with the Title IX & Disability Office reaches out to provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options.

There is an exception to this reporting requirement about which you should be aware. A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here: [Resources for Students, At Illinois We Care.](#)

University of Illinois Nondiscrimination Statement

The commitment of the University of Illinois at Urbana-Champaign (Illinois) to the most fundamental principles of academic freedom, equality of opportunity, and human dignity requires that decisions involving students and employees be based on merit and be free from invidious discrimination in all its forms. This policy is designed to promote a safe and healthy learning and work environment and to comply with multiple laws that prohibit discrimination, including: Equal Pay Act of 1963, Title VI and VII of the Civil Rights Act of 1964, the Americans with Disabilities Act Amendments Act, the Rehabilitation Act of 1973, the Age Discrimination in Employment Act of 1967, the Age Discrimination Act of 1975, Title IX of the Education Amendments Act of 1972, the Pregnancy Discrimination Act of 1978, the Uniformed Services Employment and Re-employment Act, the Vietnam-Era Veterans Readjustment Assistance Act of 1974, the Genetic Information Nondiscrimination Act of 2008, and the Illinois Human Rights Act. This policy and the associated procedures are established to provide a means to address complaints of discrimination or harassment based on the protected categories described herein.

It is the policy of the University not to engage in discrimination or harassment against any person because of race, color, religion, sex, pregnancy, disability, national origin, citizenship status, ancestry, age, order of protection status, genetic information, marital status, sexual orientation, gender identity, arrest record status, unfavorable discharge from the military, or status as a protected veteran and to comply with all federal and state nondiscrimination, equal opportunity, and affirmative action laws, orders, and regulations.

Land Acknowledgement Statement suggested by Native American House

“I/We would like to begin today by recognizing and acknowledging that we are on the lands of the Peoria, Kaskaskia, Piankashaw, Wea, Miami, Mascoutin, Odawa, Sauk, Mesquaki, Kickapoo, Potawatomi, Ojibwe, and Chickasaw Nations. These lands were the traditional territory of these Native Nations prior to their forced removal; these lands continue to carry the stories of these Nations and their struggles for survival and identity.

As a land-grant institution, the University of Illinois has a particular responsibility to acknowledge the peoples of these lands, as well as the histories of dispossession that have allowed for the growth of this institution for the past 150 years. We are also obligated to reflect on and actively address these histories and the role that this university has played in shaping them. This acknowledgement and the centering of Native peoples is a start as we move forward for the next 150 years.”

How to respond to an emergency

When we’re faced with any kind of emergency – like fire, severe weather or if someone is trying to hurt you – we have three options: **run, hide** or **fight**.

Run

Leaving the area quickly is the best option if it is safe to do so.

- Take time now to learn the different ways to leave your building.
- Leave personal items behind.
- Assist those who need help but consider whether doing so puts yourself at risk.
- Alert authorities of the emergency when it is safe to do so.

Hide

When you can’t or don’t want to run, take shelter indoors.

- Take time now to learn the different ways to seek shelter in your building.
- If severe weather is imminent, proceed to the nearest indoor storm refuge area.
- If someone is trying to hurt you and you can’t evacuate, get to a place where you can’t be seen, lock or barricade your area, silence your phone, don’t make any noise and don’t come out until you receive an Illini-Alert indicating it is safe to do so.

Fight

You may need to fight to increase your chances of survival.

- Think about what kind of common items are in your area which you can use to defend yourself.
- Team up with others to fight if the situation allows.
- Mentally prepare yourself – you may be in a fight for your life.

Please be aware of persons with disabilities who may need additional assistance in emergency situations.

Learn more about your building

Taking a minute to review exits, storm refuge areas, areas of rescue assistance and evacuation assembly areas in building that you use often could save your life in an emergency.

[View your building floor plan.](#)