A&AE 190
Introduction to Aerospace Engineering

1. Instructor Professor Dominick Andrisani
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2. Purposes of the Course

a. Give you some experience in the basics of aerospace engineering,
b. Show you many of the various parts of the field,
c. Show you examples of the career you can achieve after a successful undergraduate education at Purdue,
d. Introduce you to engineering homework and what is expected of our students,
e. Discuss the aero classes which lie ahead of you.

3. Textbook: None, handouts will be provided.

4. Teams: Next class you will be assigned to a 5-person team. You will be assigned a seat in the classroom alongside your team members. The primary basis for team assignment will be campus address. Students with the same campus address will be assigned to the same team. Having assigned seats will allow us to take attendance by seat.

5. Grading is based primarily on the seriousness of your participation in this course. You must attend each class and participate in all team projects. At the end of the semester, your team members will each have a chance to evaluate your contribution to team activities.

6. Class attendance is required. Attendance will be taken.

Missed classes without approved reason	Maximum possible grade
0-3	A
4-6	B
7-9	C
10-14	D
15-30	F

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8. This course will consists of

Tuesday lectures that typically introduce the topic to be pursued on Thursday. Tuesday sessions may also include miscellaneous interesting topics.

Thursday 2-hour sessions in which students perform various engineering related tasks, including

Tours of laboratories of the School of Aeronautics and Astronautics,

Projects on such things as glider construction or performance of water rockets,

9. What we expect of you when you arrive

If you were already an expert in aerospace engineering, you wouldn't be attending college. On the other hand, there is a level of knowledge that the faculty expects of you. Here in AAE 190 you have just arrived on campus, so we don't expect a lot right away. The type of things we expect you to include

1. High–school level physics including basic mechanics (F = m*a, work, energy, ...), working with basic English and metric units, basic plotting, gravity, and concepts such as density, mass, vectors, springs.

2. Fundamentals of trigonometry such as sine, cosine, where to look up the sum– and difference–formulas for trigonometric identities, etc.

2. High–school geometry; law of sines, conic sections, triangles.

4. Basics of high–school chemistry such as temperature, pressure, molecular weight, and the ideal gas law.

Note that calculus is not in the list. AAE 190 is structured to avoid it only so that the class can reach the largest possible group of first–semester freshmen. Every other AAE class you take will assume that you are learning calculus or remember where to find things in your calculus texts.

10. Your duties in AAE 190

- Take the opportunity to gain engineering experience.
- Ask questions in class, on tours, and in your projects.
- Discuss technical questions with your teammates.
- Start homework and projects early; read the assignments the day they are handed out, have your questions ready for the next lecture.

These will serve you very well in your other courses, both engineering and non–engineering. You may choose to enter some other engineering field other than aeronautics and astronautics, but don't do so because you think there's too much work in aero – it's no different in other fields. Hard work pays off. America is still the land of opportunity, although not for lazy people.

11. When you want the details…

Because of the introductory and interactive nature of this course, many topics are not covered in detail. You will likely find yourself wanting more details on several topics. Two textbooks, typically used in AAE 251, which you may find useful are

1. *Introduction to Flight*, John Anderson, McGraw–Hill,
2. *Fundamentals of Flight*, Shevell, Prentice–Hall.

The history of aviation is rich with ingenious accomplishments. The book above by Anderson has some historical accounts of engineering significance, as do two other texts of his, which you may find in the library. While these are aerodynamics texts, they are somewhat unique in their inclusion of historical notes that many students and faculty find interesting.

1. *Fundamentals of Flight, John Anderson*, McGraw–Hill (used in AAE 334),
2. *Modern Compressible Flow*, John Anderson, McGraw–Hill (AAE 414),
3. *What makes Airplanes Fly? History, Science, and Applications of Aerodynamics*, Peter P. Wegener, Springer-Verlag, 1991.

AAE 190 Schedule

Day and Date	Location	Activity
Tuesday, August 22	EE 270	Introduction by teaching assistants. Professor Andrisani is at NASA Dryden Flight Research Center for a NASA Advisory Committee on Flight Research. Student information will be obtained.
Thurs., August 24	EE 270	Professor Andrisani returns. General discussion of the course. About Professor Andrisani and the School of Aeronautics and Astronautics. Student information will be obtained.
Tuesday, August 29	EE 270	Andrisani briefs students about the Flight Research Advisory committee meeting at NASA Dryden.
Thurs., August 31	EE 270	"A Taste of Aerospace," an interactive program of simple experiments that illustrate scientific principles of aerospace vehicles. This program will be presented by Professor Andrisani. Teams will be assigned.
Tuesday, Sept. 5	EE 270	Teams 1-9 make 5-minute presentations of their simple interactive experiment(s). 9 teams x 5min / team = 45 minutes
Thurs., September 7	EE 270	Teams 10-30 make 5-minute presentations of their simple interactive experiment(s). 21 teams x 5min / team = 105 minutes

Team Project #1
Due Tuesday, September 5, for Teams 1-9.
Due Thursday, September 7, for Teams 10-30.

Each team (4-5 persons per team) will design one or more simple experiments that illustrate fundamental scientific principles that are important to aerospace engineering. Team members should work together. The experiment(s) should represent a team effort. At least one team meeting after class will be required to design this(these) experiment(s).

Interactive experiments that require the participation of a member of the audience (typically a middle school student) are preferred. Experiments should not require expensive props. If an experiment does require a prop the team must provide that prop for their demonstration.

Teams should practice their experiments to insure they work. Remember interactive experiments will involve persons not informed as to the expected experimental result. The experiment must be hard to do incorrectly.

On the due date each team will present their experiment to the rest of the class. The entire team will move to the front of the classroom for the presentation. One or more team members will perform the experiment. If the experiment is interactive an audience member must be used, not a team member.

Each team will hand in a written description of their experiment, the underlying scientific principle, any equipment required, and the method of presentation.

A team may design more than one experiment but they have only 5 minutes to present their experiments during class. The 5-minutes per team will be rigidly enforced since we have only a limited amount of class time. When you practice your experiment, note the amount of time to set up and perform your experiment.

Teams 10-30 must not repeat (duplicate) an experiment presented by teams 1-9 on Tuesday. There may, for example, be many ways to illustrate Newton's Third Law of Motion.