

SYLLABUS

AME 599: Modern Topics in Aero Design

Fall Semester, 2013

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Course Sections: 28955D

Course Unit: 3 Units

Prerequisite: This class is open to all graduate students with a strong interest in the aerospace industry. These are not prerequisites or requirements, but it is recommended that the student's have a strong background in the following areas:

- AME441 Senior Project, or equivalent
- AME481 Design, or equivalent
- Student interest in overall air vehicle design

Class Hours: Industry Panel Discussion Days—on 3 days during the semester the class will meet with an industry panel from 10:00 am to 3:00 pm.

- Panel #1—High Speed Flight Friday, 6 Sept
- Panel #2—Hybrid Airship Design Friday, 11 Oct
- Panel #3—Next Gen Subsonic Commercial Transports Friday, 8 Nov

The first class of the semester (Aug 30th) and on the weeks following each panel discussion the class will meet from 1:00 to 3:00 pm.

Class Location: Panel Discussions: EEB 248
Regular class meetings: RRB 2nd floor, Laufer Library

Office Hours: Tuesday: 2:00 pm to 5:00 pm
Thursday: 1:00 pm to 2:00 pm
Friday: 10:00 am to 1:00 pm

- Meetings with students may be held in on-campus office

- Students may drop by during posted office hours for informal visits; however, significant meetings/discussions should be arranged in advance and appointment times set by phone or e-mail.

Course Background:

The department of Aerospace and Mechanical Engineering desires to take advantage of the wealth of local aerospace industry by the direct involvement of local companies and other experts in this class. This class adds relevance to the curriculum content, helps to increase the students awareness of the challenges faced by contemporary aerospace development projects and in general adds to the richness of the student experience while it strengthens ties between the industry and the department.

This is a 3 credit hour class for graduate students. The class consists of 3, one day “Panel Discussion” sessions, followed by student team self-study projects based on the panel discussion topic. Prior to each panel discussion the student teams will be identified and the teams will be assigned a self-study topic directly related to the overall panel topic theme. The students will then meet weekly (for about three consecutive weeks) with one or more faculty members to review their team progress and to discuss work-to-go for their project completion. The final meeting with the faculty will conclude with each student team making a presentation of their project results to the course instructor. This cycle will be completed three times throughout the semester—once for each of the three panel topics.

For the Fall 2013 semester the three panel topics will cover different regimes of flight. Panel 1) High Speed Flight—covering hypersonic, transatmospheric, pulse detonation engines, supersonic bizjets and supersonic commercial transports, Panel 2) Hybrid Airships—including vehicles for military as well as heavy lift and cargo utility, and Panel 3) Next Generation Subsonic Commercial Transports—including green flight (bio-fuels, hydrogen, nuclear, electric-hybrid...), nano-materials, blended-wing-body, channel wings, trust-braced wings and double-bubble. The assigned self-study topics will cover a wide range of disciplines including configuration design, aerodynamics, structures, propulsion and flight controls.

Course Components:

Students’ learning experience in this course will come from three (3) interrelated components:

- **Participation in Panel Discussions**

Each panel will consist of 4 invited experts on the selected topics from the aerospace industry or academia. These will be interactive sessions. The students are expected to be active participants—asking questions and adding to the exchange.

- **Classroom Activity Following Each Panel Session**

The class will meet each Friday following the panel sessions to discuss their team progress on their self study topics. In these sessions the instructor along with other faculty knowledgeable of the topic will review and advise the student teams on their respective self-study projects.

- **Conclusion of Team Self-Study—Final Report and Briefing**

At the end of each of the three self-study projects the student teams will deliver a final report on their assigned topic and give a briefing on their findings.

Required Textbook:

- No textbook is required for this class; however, extensive research will be required as part of the team self-study projects.
- The industry panel members and the instructor may recommend additional reading materials and website reference resources during the semester whenever appropriate.

Course Website:

Students' learning of this course is supplemented by use of the UCS Blackboard instruction system (<https://blackboard.usc.edu/>). All registered students have access to this website and should go to AME599. The course website structure is implemented to support the specific organization of the course instruction as described in this syllabus. All students should browse around the entire site to familiarize themselves with various areas and functions of this course website.

- Announcements -- important announcements of this course.
- Syllabus – contains an up to date copy of the class syllabus.
- Content – pdf copies of panel discussion slides.
- Discussions – a place for the students to share their thoughts about interesting subjects with the class.
- Groups -- all communication tools, including emails and roster.
- Websites – links to reference material.

Course Grading:

Students will be graded according to the following scheme:

- 15%--Classroom/Panel Discussion Participation
- 15%--Panel #1 Team Final Report
- 10%--Panel #1 Team Briefing
- 15%--Panel #2 Team Final Report
- 10%--Panel #2 Team Briefing
- 15%--Panel #3 Team Final Report
- 10%--Panel #3 Team Briefing
- 10%--Final Exam

Each of the above grading components is described in more details below.

Grading Components:

- **Classroom/Panel Participation (15%)**

The students are expected to attend all panel discussions, attend the classroom sessions in between each panel discussion. Active participation in all is expected.

- **Team Final Reports (total of 3, 45%)**

Homework will constitute 30% of the student's total grade. Homework assignments will be posted on a regular basis—almost every week, with the exception of exam weeks. Students are expected to submit homework on time. Late homework will not be accepted unless there is a valid and credible excuse.

- **Team Final Briefings (total of 3, 30%)**

Short (~1 hour) quizzes will be given approximately 3 times throughout the semester to test understanding of recent lecture and text assignment material. In total these quizzes will constitute 10% of the semester grade.

- **Final Exam (10%)**

The final will consist of the submission of individual reports by each student. This is not a normal final exam—during finals week each student will submit a final report and have a 15 minute conference with the faculty team. This will relate to the overall class experience. Since this is a relatively new offering and because of its non-standard nature the department wants feedback from the student participants. This report will be in three parts. First—a technical section on what were the key things that each student learned from the class. Secondly—a critique of what each student thought were the key strengths (things that should be continued or strengthened) and the weaknesses—with suggestions on how to improve the program. Third—the faculty will present a list of potential new/different topics for the next class on which the students can vote or add their own suggested topics.

Academic Integrity:

"The Viterbi School of Engineering adheres to the University's policies and procedures governing academic integrity as described in SCampus. Students are expected to be aware of and to observe the academic integrity standards described in SCampus, and to expect those standards to be enforced in this course."

Students with Disabilities:

Any Student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m. - 5:00 p.m., Monday through Friday. The phone number for DSP is (213)740-0776.

The Instructor reserves the right to change this schedule and topics during the semester:

Week No	Date	Class Subject	Comments
1	8/30	Introduction to the Class, Overview of Class Expectations	Rapp Engr Bldg, RRB 2 nd Floor Laufer Library
2	9/6	Panel #1 High Speed Flight	Taper Hall, THH, Rm 115 10 am to 3 pm
3	9/13	Team Status	Rapp Engr Bldg, RRB Laufer Library
4	9/20	Team Status	Rapp Engr Bldg, RRB Laufer Library
5	9/27	Team Status	Rapp Engr Bldg, RRB Laufer Library
6	10/4	Submit Team Self-Study Report and Briefing	Rapp Engr Bldg, RRB Laufer Library
7	10/11	Panel #2 Hybrid Airships	Taper Hall, THH, Rm 115 10 am to 3 pm
8	10/18	Team Status	Rapp Engr Bldg, RRB Laufer Library
9	10/25	Team Status	Rapp Engr Bldg, RRB Laufer Library
10	11/1	Submit Team Self-Study Report and Briefing	Rapp Engr Bldg, RRB Laufer Library
11	11/8	Panel #3 Next Gen Subsonic Commercial Transports	Taper Hall, THH, Rm 115 10 am to 3 pm
12	11/15	Team Status	Rapp Engr Bldg, RRB Laufer Library
13	11/22	Team Status	Rapp Engr Bldg, RRB Laufer Library
14	11/29	Thanksgiving Holiday	
16	12/6	Submit Team Self-Study Report and Briefing	Rapp Engr Bldg, RRB Laufer Library
17	12/13	Final Exam—submitted report—see syllabus	TBD