

MAE 394: Special Topics – Aeronautics in England
Arizona State University
Summer 2017

INSTRUCTORS

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ERC 383

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OFFICE HOURS

Open door policy at the Dorms at Winchester, UK

COURSE DESCRIPTION

The United Kingdom is a nation rich in a shared history with the United States. We know of our common political background through our study of history, law and political science. What is not widely known is how these two great nations collaborated in shared technological innovation

This class will cover foundation technical material in aeronautics; a comparative analysis of history of aeronautics development, international aerospace public policy, and aeronautics operational regulations between the United Kingdom and the United States; and case studies of European aircraft design.

COURSE SUMMARY

MAE 394 is a special topics class associated with the Summer Study Abroad program “Aero Mechanics Summer in England”

COURSE OBJECTIVES

- Students will explore historical connections between the United States and the United Kingdom regarding shared research and development in aeronautics – through reading select primary source papers (US – NACA Technical Reports, UK – Aeronautical Research Council R&M)
- Students will become aware of the differences between the United States and the United Kingdom regarding certification of the design and operation of commercial aircraft (US – FAA Airworthiness Rules – 14 CFR 25, UK – BCAR and JAR 25 rules)
- Students will be motivated to explore the differences engineering teams on either side of the Atlantic that developed when applying common research findings to new aircraft
 - Learning opportunities
 - lectures on aerodynamic principles – classroom lecture
 - study of fundamental reports – classroom discussion
 - visits to aircraft museums – seeing and touching
 - writing – exam final exam
 - Specific topics to study
 - Optimum Aerodynamic Efficiency - Induced Drag – the elliptical wing vs. the twisted wing

- Optimum Aerodynamic Efficiency – Zero-Lift Drag – the buried engine vs. the pod mounted engine
- Transonic Flow Characteristics – correlation between wing sweep, thickness and wing-loading
- Supersonic Cruise Aircraft – the ogive wing
- Propulsion technologies – the fixed pitch propeller vs. the constant speed variable pitch propeller and the racing sea-plane

COURSE MATERIALS

- No textbook is required for this course.
- Instructor will prepare and supply a course reader

COURSE FORMAT

This course will comprise a mix of formal lectures given by Professor Takahashi as well as guest lecturers from academic institutions in the United Kingdom. The lectures will expect significant student participation and group discussions. This course will be augmented by trips to a variety of museums and other facilities specializing in aerospace and defense technology.

COURSEWORK

Final grades for the course will be assigned on basis of the following:

- Term Paper 100% of total score
- Your nominal grade is based on essay score
- Essay grade may be bumped up one step for strong participation in class discussions (i.e. B+ → A-)

Attendance problems result in grade loss

- 1 missing class allowed w/o penalty
- 2 missing classes one step demerit (i.e. A → A-)
- 3 missing classes whole letter demerit (i.e. A → B)
- 4 missing classes two letter demerit (i.e. A → C)
- 5 missing classes do not pass, no matter how good the essay is
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SCHEDULE OF READINGS AND ASSIGNMENTS

Example from Summer 2016

Date	CLASS	MAE394
Monday, July 11, 2016		Welcome / Check In / Dinner / Arrival Briefing
Tuesday, July 12, 2016	1	FIELD TRIP: BRITISH MUSEUM (London)
Wednesday, July 13, 2016	2	FIELD TRIP: IWM MUSEUM (London)
Thursday, July 14, 2016	3	FIELD TRIP: R.A.F. MUSEUM (London/Hendon)
Sunday, July 17, 2016	4	OPTIONAL: FARNBOROUGH AIR SHOW
Monday, July 18, 2016	5	Intro / Case Studies / Government Research (I,II,III)
Tuesday, July 19, 2016	6	Commercial Flight Rules and Regulations
		- Discuss NACA TM23, Air Commerce Act, Liability

Wednesday, July 20, 2016	7	Key Operational Regulations (V) - 14 CFR 91, 121 and JAR OPS
Thursday, July 21, 2016	8	GUEST LECTURE: Weather
Friday, July 22, 2016	9	Transport Category Airworthiness (VI)
Monday, July 25, 2016	10	Mathematical Foundations (VII)
Tuesday, July 26, 2016	11	Collaborative R&D (VIII) – Fundamentals
Wednesday, July 27, 2016	12	Collaborative R&D (IX) – Compressibility
Thursday, July 28, 2016	13	Collaborative R&D (X) – Flaps
Friday, July 29, 2016	14	Collaborative R&D (XI) - Induced Drag
Monday, August 01, 2016	15	Collaborative R&D (XII,XIII) - Propellers & Turbine Propulsion
Tuesday, August 02, 2016	15	Collaborative R&D (XIV) - Wing Sweep and Transonics
Wednesday, August 03, 2016	16	Guest Lecture: Of Reindeer and Mighty Hunters (1 of 2)
Thursday, August 04, 2016	17	Guest Lecture: Of Reindeer and Mighty Hunters (2 of 2)
Friday, August 05, 2016	18	Case Studies for Museum Visit - Supermarine, Spitfire & Shorts Flying Boat
Saturday, August 06, 2016	19	FIELD TRIP: SOLENT SKY MUSEUM
Sunday, August 07, 2016	20	Imperial War Museum (Duxford) - BUS TRIP
Monday, August 08, 2016	21	Case Studies seen at Duxford - Trident, BAC-111, VC10
Tuesday, August 09, 2016	22	Case Studies seen at Duxford - Concorde, TSR2, Harrier
Wednesday, August 10, 2016	23	Guest Lecture: High Altitude Flight
Thursday, August 11, 2016	24	Guest Lecture: Parametric Geometry and Optimization
Friday, August 12, 2016	25	TERM-PAPER DUE (5pm)

FINAL GRADES

Course grades will be given on the A+/A/A-/B+/B/B-/C+/C/D/E scale

A-/ A/ A+	89.5-92.4/ 92.5-97.4/ 97.5-100	Excellent
B- /B/ B+	79.5-82.4/ 82.5-87.4/ 87.5-89.4	Good
C/ C+	69.5-77.4/ 77.5-79.4	Average
D	59.5-69.4	Passing
E	<60	Failure
XE		Failure due to Academic Dishonesty

STUDENT RESPONSIBILITIES

- Attendance is required and will be recorded for all classroom and field trip sessions.
- Assignments must be turned in by the deadline. No late assignments will be accepted.

GRADING POLICY

Academic success depends heavily on active student participation in the learning process: attending class, taking part in class activities, and completing homework assignments. Since this course is designed to help you be successful, your grade is based on your involvement in the learning process.

ASSIGNMENTS

All assignments are due IN CLASS on the due date

Grade Appeals

ASU has formal and informal channels to appeal a grade. If you wish to appeal any grading decisions, please see <http://catalog.asu.edu/appeal>.

Incompletes

A mark of "I" (incomplete) is given by the instructor when you have completed most of the course and are otherwise doing acceptable work but are unable to complete the course because of illness or other conditions beyond your control. You are required to arrange with the instructor for the completion of the course requirements. The arrangement must be recorded on the **Request for Grade of Incomplete form** (<http://students.asu.edu/forms/incomplete-grade-request>).

Student Standards

Students are required to read and act in accordance with university and Arizona Board of Regents policies, including:

The ABOR Code of Conduct: Arizona Board of Regents Policies 5-301 through 5-308:
<https://students.asu.edu/srr>

Academic Integrity

Academic honesty is expected of all students in all examinations, papers, laboratory work, academic transactions and records. The possible sanctions include, but are not limited to, appropriate grade penalties, course failure (indicated on the transcript as a grade of E), course failure due to academic dishonesty (indicated on the transcript as a grade of XE), loss of registration privileges, disqualification and dismissal. For more information, see <http://provost.asu.edu/academicintegrity>.

If you fail to meet the standards of academic integrity in any of the criteria listed on the university policy website, sanctions will be imposed by the instructor, school, and/or dean. Academic dishonesty includes borrowing ideas without proper citation, copying others' work (including information posted on the internet), and failing to turn in your own work for group projects. Please be aware that if you follow an argument closely, even if it is not directly quoted, you must provide a citation to the publication, including the author, date and page number. If you directly quote a source, you must use quotation marks and provide the same sort of citation for each quoted sentence or phrase. You may work with other students on assignments, however, all writing that you turn in must be done independently. If you have any doubt about whether the form of cooperation you contemplate is acceptable, ask the TA or the instructor in advance of turning in an assignment. Please be aware that the work of all students submitted electronically can be scanned using SafeAssignment, which compares them against everything posted on the internet, online article/paper databases, newspapers and magazines, and papers submitted by other students (including yourself if submitted for a previous class).

Note: Turning in an assignment (all or in part) that you completed for a previous class is considered self-plagiarism and falls under these guidelines. Any infractions of self-plagiarism are subject to the same penalties as copying someone else's work without proper citations. Students who have taken this class previously and would like to use the work from previous assignments should contact the instructor for permission to do so.

Prohibition of Commercial Note Taking Services

In accordance with **ACD 304-06 Commercial Note Taking Services**, written permission must be secured from the official instructor of the class in order to sell the instructor's oral communication in the form of

notes. Notes must have the notetaker's name as well as the instructor's name, the course number, and the date.

Student Support and Disability Accommodations

In compliance with the Rehabilitation Act of 1973, Section 504, and the Americans with Disabilities Act of 1990, professional disability specialists and support staff at the Disability Resource Center (DRC) facilitate a comprehensive range of academic support services and accommodations for qualified students with disabilities.

Qualified students with disabilities may be eligible to receive academic support services and accommodations. Eligibility is based on qualifying disability documentation and assessment of individual need. Students who believe they have a current and essential need for disability accommodations are **responsible for requesting accommodations and providing qualifying documentation** to the DRC. Every effort is made to provide reasonable accommodations for qualified students with disabilities. Qualified students who wish to request an accommodation for a disability should contact their campus DRC at: <http://www.asu.edu/studentaffairs/ed/drc/>

If you are a student in need of special arrangements, we will do all we can to help, based on the recommendations of these services. For the sake of equity for all students, we cannot make any accommodations without formal guidance from these services. Typically, once a student discloses the need for an accommodation through their study abroad application, the Study Abroad Office, the academic unit, the student and DRC will develop a plan on how to best accommodate the student within the parameters available within the onsite locations.

Drop and Add Dates/Withdrawals

Please refer to the **academic calendar** on the deadlines to drop/withdraw from this course. Consult with your advisor and notify your instructor if you are going to drop/withdraw this course. If you are considering a withdrawal, review the following ASU policies: **Withdrawal from Classes, Medical/Compassionate Withdrawal.**

Please note that the ASU Academic Calendar only refers to withdrawal for the academic portion of your study abroad program. Please refer to the **Study Abroad Withdrawal Policies** for important dates regarding withdrawing from your Faculty Directed program.

Email Communications

All email communication for this class will be done through your ASU email account. You should be in the habit of checking your ASU email regularly as you will not only receive important information about your class(es), but other important university updates and information. You are solely responsible for reading and responding if necessary to any information communicated via email. For help with your email go to: http://help.asu.edu/sims/selfhelp/SelfHelpHome.seam?dept_pk=822 and file a help desk ticket by clicking on "My Help Center."

Campus Resources

As an ASU student you have access to many resources on campus. This includes tutoring, academic success coaching, counseling services, financial aid, disability resources, career and internship help and many opportunities to get involved in student clubs and organizations.

- Tutoring: <http://studentsuccess.asu.edu/frontpage>

- Counseling Services: <http://students.asu.edu/counseling>
- Financial Aid: <http://students.asu.edu/financialaid>
- Disability Resource Center: <http://www.asu.edu/studentaffairs/ed/drc/>
- Major/Career Exploration: <http://uc.asu.edu/majorexploration/assessment>
- Career Services: <http://students.asu.edu/career>
- Student Organizations: <http://www.asu.edu/studentaffairs/mu/clubs/>

Harassment Prohibited:

ASU policy prohibits harassment on the basis of race, sex, gender identity, age, religion, national origin, disability, sexual orientation, Vietnam era veteran status, and other protected veteran status. Violations of this policy may result in disciplinary action, including termination of employees or expulsion of students. Contact Student Life (UCB 221) if you feel another student is harassing you based on any of the factors above; contact EO/AA (480-965-5057) if you feel an ASU employee is harassing you based on any of the factors above.

Establishing a Safe Environment:

Learning takes place best when a safe environment is established in the classroom. Students enrolled in this course have a responsibility to support an environment that nurtures individual and group differences and encourages engaged, honest discussions. The success of the course rests on your ability to create a safe environment where everyone feels comfortable to share and explore ideas. We must also be willing to take risks and ask critical questions. Doing so will effectively contribute to our own and others intellectual and personal growth and development. We welcome disagreements in the spirit of critical academic exchange, but please remember to be respectful of others' view points, whether you agree with them or not.

Syllabus Disclaimer:

The course syllabus is an educational contract between the instructor and students. Every effort will be made to avoid changing the course schedule but the possibility exists that unforeseen events will make syllabus changes necessary. The instructor reserves the right to make changes to the syllabus as deemed necessary. Students will be notified in a timely manner of any syllabus changes via email, or in the *Announcements* section on Blackboard.

Student Conduct Statement:

Students are required to adhere to the behavior standards listed below:

- Arizona Board of Regents Policy Manual Chapter V – Campus and Student Affairs: Code of Conduct <http://www.azregents.edu/policymanual/default.aspx>,
- ACD 125: Computer, Internet, and Electronic Communications <http://www.asu.edu/aad/manuals/acd/acd125.htm>, and
- the ASU Student Academic Integrity Policy <http://www.asu.edu/studentaffairs/studentlife/srr/index.htm>.

Students are entitled to receive instruction free from interference by other members of the class. If a student is disruptive, an instructor may ask the student to stop the disruptive behavior and warn the student that such disruptive behavior can result in withdrawal from the course. An instructor may withdraw a student from a course when the student's behavior disrupts the educational process under USI 201-10 (<http://www.asu.edu/aad/manuals/usi/usi201-10.html>).

Course discussion messages should remain focused on the assigned discussion topics. Students must maintain a cordial atmosphere and use tact in expressing differences of opinion.

Inappropriate discussion board messages may be deleted if an instructor feels it is necessary. Students will be notified privately that their posting was inappropriate. Student access to the course Send Email feature may be limited or removed if an instructor feels that students are sending inappropriate electronic messages to other students in the course.

Religious Accommodations for Students:

Students who need to be absent from class due to the observance of a religious holiday or participate in required religious functions must notify the faculty member in writing as far in advance of the holiday/obligation as possible. Students will need to identify the specific holiday or obligatory function to the faculty member. Students will not be penalized for missing class due to religious obligations/holiday observance. The student should contact the class instructor to make arrangements for making up tests/assignments within a reasonable time.