



SAN JOSE STATE UNIVERSITY
DEPARTMENT OF AVIATION & TECHNOLOGY

Intro to Air Traffic Control

Aviation 73

Spring Semester 2015

Instructor: Glynn Falcon

Class Days & Hours: Mon-Wed. 9:00 -10:15 pm **Office:** IS-133C

Classroom: IS-216

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Office Hours: Tuesdays 10:45 to Noon. Other days and time will be announced later. I may be found working in the Sim Lab near my office or remaining in IS216. Face to face time can be arranged by prior arrangement. I am available at any reasonable, non-class hours by email or cell phone.

Catalog Description

Study of Air Traffic Control Systems, Structure, and Communications and the current configuration and future design of the National Airspace System. Oceanic and International Air Traffic Control, Automation Issues and Emerging Technologies are explored.

Prerequisite

Aviation 2.

Course Description

This course introduces the history of air navigation for both domestic and international environments. Included subjects are fundamentals of air navigation, the challenges of implementation of a global air navigation system, the visionary concepts of future communication, navigation, surveillance systems and air traffic management, along with emerging technologies, the "Free Flight" concept, and the regulatory challenges, in automation and man machine interface related to human factors, and the legal ramifications of ATC issues, errors and omissions.

Air transportation is a global business entering a dynamic period in the post-cold war era. Air travel will become increasingly dominant as the preferred mode for international travel for business and for pleasure. The amount of passenger and cargo traffic on intercontinental routes, particularly to/from East Asia and the Pacific Rim, is expected to increase rapidly, possibly quadrupling worldwide within the next few years.

International partnerships, expanding air service in developing countries, global environmental concerns, a global trend toward deregulation and liberalization of the airline industry, a growing need for airport and infrastructure capacity and a veritable technological revolution in avionics, air traffic control and information systems are examples of changes and challenges underway.

All aviation students have a critical need to understand the National Airspace System and the roles and responsibilities of all the entities that play a vital role in ensuring safety of flight from gate to gate. Also, this course will discuss individual, as well as team and human-machine related, human factors issues that may lead to errors.

Course Objectives

At the conclusion of this class, the students will be able to:

- Demonstrate an understanding of the general principles and theories of operation of the U.S. air traffic control system.
- Demonstrate an understanding of the procedures used in radar and non-radar air traffic control.
- Have familiarization with international air traffic control.
- Have familiarization with future enhancements to the national airspace system.
- Be able to transition into Aviation 192 (Instrument Flight) with a sound grasp of instrument flight procedures.

Course Content

(Not necessarily in this order)

1. Air navigation- past, present and future
2. Principles of air navigation
3. Flight management systems
4. Emerging Technological Resources
5. Conflict Avoidance
6. Airspace Integration
7. Role of ICAO
8. CNS/ATM
9. Human factors of automation
10. Management of automation
11. Flight deck design
12. Future of air navigation

Required Texts:

- Nolan, M. S. **Fundamentals of Air Traffic Control** (5th Ed 2011). Florence, KY: Brooks/Cole Pub
FAA's **Air Traffic Controller's Handbook** (2009) (Canvas, free on-line) (Order 7110.65S)
FAA's **Instrument Procedures Handbook** (2007) (Canvas, free on-line) (FAA-H-8261-1A)
FAA's **Aeronautical Information Manual** (2013) (Canvas, and available free on-line)
FAA's **Pilot - Controller Glossary** (Canvas, and free on-line)
FAA's **Chart Users Guide 2013** 12th ed. (Canvas, and free on-line)

Reference Texts:

- FAA's ***Advanced Avionics Handbook*** (2009) (Canvas, free on-line) (FAA-H-8083-6)
FAA's ***Instrument Flying Handbook*** (2007) (Canvas, free on-line) (FAA-H-8083-15A).

Suggested Reading:

- McElroy, Paul (2000) ***Tracon*** Mass Market Paperback
Galotti, V. P. (1997). ***The Future (sic) Air Navigation System*** . Burlington, VT: Ashgate.

Other References:

- The Future of Air Traffic Control***, National Research Council, National Academy Press
Coping with Computers in the Cockpit, Sidney Dekker & Erick Hollnagel, Ashgate

Field Trips: We will visit the control tower at Reid-Hillview and on another date, travel to Fremont to tour the "Oakland" Air Route Traffic Control Center. Strict security measures are used at both facilities, and depending upon the then current threat level, may only be accessible to US citizens.

GRADING

All quizzes and exams will be scored electronically via SJSU's Canvas. The Midterm and Final Exam will be in the classroom, so you must bring a fully charged laptop or smart phone to take the exams.

<u>Evaluation</u>	<u>Points</u>	<u>Percentage Weight</u>
13 Chapter Quizzes (10 best scores out of 13)	100	25 %
Weekly Review Questions Home Work (13 papers)	100	25 %
Midterm	100	25 %
<u>Comprehensive Final exam</u>	<u>100</u>	<u>25 %</u>
TOTAL	400	100 %

The midterm exam will cover the first half of the semester and the final exam will emphasize the last half and key foundational parts from the first half. Borderline grades will be influenced by the extent of your classroom participation. **Although working together to understand principles is acceptable, copying another's paper or allowing another person to copy all or a portion of your paper is plagiarism and can result in dismissal from SJSU. I may change your seating arrangements at any time.**

Note: A grade of "C-" or better is required for all courses being used to satisfy any minor or major offered by the Department of Aviation, including preparatory courses.

Make-Ups and Late Work:

Usually, make-up of quizzes or assignments is not allowed. When allowed, it is only by giving prior notice of the problem and making arrangements for makeup, with supplied documentation for the absence.

Policies

Academic Integrity Standards and Policies

Academic honesty is expected without question in this course. Students who are found to have submitted materials that do not adhere to SJSU standards of academic integrity will suffer the following two consequences:

A grade of zero [0] will be given for the assignment in question; and

A report of the incident will be filed with the university. This report may stay on your permanent collegiate record.

You may also be subject to further disciplinary action being taken by the university.

For the SJSU policy on Academic Integrity, refer to: <http://www.sjsu.edu/senate/F06-2.pdf>

Academic integrity statement (from the Office of Student Conduct and Ethical Development):

"Your own commitment to learning, as evidenced by your enrollment at San José State University, and the University's Academic Integrity Policy requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the Office of Student Conduct and Ethical Development. The policy on academic integrity can be found at http://sa.sjsu.edu/student_conduct.

Campus policy in compliance with the Americans with Disabilities Act:

"If you need course adaptations or accommodations because of a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with DRC to establish a record of their disability."

More about Cheating.

At SJSU, cheating is the act of obtaining or attempting to obtain credit for academic work through the use of any dishonest, deceptive, or fraudulent means. Cheating at SJSU includes but is not limited to:

Copying in part or in whole, from another's test or other evaluation instrument;

Submitting work previously graded in another course unless this has been approved by the course instructor or by departmental policy.

Submitting work simultaneously presented in two courses, unless this has been approved by both course instructors or by departmental policy.

Altering or interfering with grading or grading instructions;

Sitting for an examination by a surrogate, or as a surrogate;

any other act committed by a student in the course of his or her academic work which defrauds or misrepresents, including aiding or abetting in any of the actions defined above.

More about Plagiarism.

At SJSU plagiarism is the act of representing the work of another as one's own (without giving appropriate credit) regardless of how that work was obtained, and submitting it to fulfill academic requirements.

Plagiarism at SJSU includes but is not limited to:

the act of incorporating the ideas, words, sentences, paragraphs, or parts thereof, or the specific substances of another's work, without giving appropriate credit, and representing the product as one's own work; and

representing another's artistic/scholarly works such as musical compositions, computer programs, photographs, painting, drawing, sculptures, or similar works as one's own.

Students With Disabilities

Campus policy. In compliance with the Americans with Disabilities Act:

"If you need course adaptations or accommodations because of a Disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with your instructor as soon as possible, or see your instructor during office hours. Presidential Directive 97-03 requires that students with disabilities register with DRC to establish a record of disability."

Cell Phones

Students should turn their cell phones off or put them on vibrate mode while in class. Should you have to take a cell phone call during class, simply leave the classroom and complete the call.

Computer Use

In the classroom, you may use computers only for class-related activities such as taking notes on the lecture underway, following the lecture on Web-based Power Point slides that the instructor has posted, and finding Web sites to which the instructor directs students at the time of the lecture. Students who use their computers for other activities or who abuse equipment in any way, at a minimum, will be asked to leave the class and lose participation points for the day, and may be referred to the Judicial Affairs Officer of the University for prohibited uses of campus computers (Such referral can lead to suspension from the University). Students are urged to report to their instructors computer use that they regard as inappropriate (i.e., used for activities that are offensive or not class related).

Aviation 73 Reading & Exam Schedule

LEGEND

FATC	=	“Fundamentals of Air Traffic Control” by <i>Nolan</i>
ATCH	=	“Air Traffic Controller’s Handbook”
AIM	=	“Aeronautical Information Manual”
PCG	=	“Pilot - Controller Glossary”
CUG	=	“FAA Chart Users Guide 2013 12 th ed.”

This reading schedule means that by the start of class, you will have already read the assigned material (below), answered the review questions, and are prepared to be quizzed upon that chapter during class.

WARNING: as example, by 9 a.m. on Monday, January 26th, you will have read Chapter 13, answered the Chapter’s review questions, and be prepared for the Quiz on Chapter 13. That pattern continues each week during the semester.

<u>Dates</u>	<u>Week #</u>	<u>Assigned Reading & Exams</u>
1/26-28	Week 1	FATC - Chapter 13 - “The FAA”; Introduction and Orientation,
2/2-4	Week 2	FATC - Chapter 1 - “History of ATC”
2/9-11	Week 3	FATC - Chapter 2 - “Navigation Systems” AIM - Chapter 1. Air Navigation §1. Navigation Aids; §2. Area Navigation (RNAV) and Required Navigation Performance (RNP)
2/16-18	Week 4	FATC - Chapter 3 - “ATC System Structure” AIM - Chapter 3 §§ 1-5 - “Airspace”
2/23-24	Week 5	FATC - Chapter 4 - “ATC Communications” PCG - “A - Z” AIM - Chapter 4, §2 “Radio Communications Phraseology and Techniques”
3/2-4	Week 6	FATC - Chapter 5 - “ATC Procedures and Organization”
3/9-11	Week 7	FATC - Chapter 6 - “Control Tower Procedures” AIM - Chapter 4, §3 “Airport Operations” ATCH - Chapter 3. §§1-10 Airport Traffic Control - Terminal
3/16-18	Week 8	MIDTERM; Reid-Hillview Airport Control Tower tour.
March 23 - 27 Spring Break NO CLASS		
4/1	Week 9	FATC - Chapter 7 - “Non-radar En Route & Terminal Separation” ATCH - Chapter 6, §§1-7 - “Non-Radar”
4/6-8	Week 10	FATC - Chapter 8 - “Theory & Fund. Of Radar Operation” AIM - Chapter 4 §5 - “Surveillance Systems”
4/13-15	Week 11	FATC - Chapter 9 - “Radar Separation” ATCH - Chapter 5, §§1-16 “Radar”
4/20-22	Week 12	FATC - Chapter 10 - “Operating in the National Airspace System”
4/27-29	Week 13	FATC - Chapter 11 - “Oceanic and Int’l ATC.” ATCH - Chapter 8, §§ 1-10 “Offshore & Oceanic Procedures
5/4-6	Week 14	FATC - Chapter 12 - “Future of the National Airspace System”
5/11-13	Week 15	Oakland ZOA ARTCC tour (Fremont, CA)
5/16	FINAL EXAM: Wednesday, May 20 from 0715-0930. Location: IS-216	

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