

SYST 660/OR 750
AIR TRANSPORTATION SYSTEMS ENGINEERING
SPRING 2007
(3:0:3)

Research I, Room 405

Instructor: Prof. Sherry

Office: Rm. 409, Research I

Office Hours: Tue 4pm – 6pm

COURSE OBJECTIVE:

The student will be introduced to a wide range of current issues in air transportation. The issues include: industry economics, system capacity, current system modeling capability, human factors considerations, safety analysis, technology innovation and public policy. The student is expected to develop a broad understanding of the contemporary and future issues through simulation and analysis of the NAS and its stakeholders. The course will be conducted as a seminar course and will emphasize development of student's critical reading skills. The student's knowledge will be evaluated through class discussions, class presentations, homework and exams.

PRE (CO) REQUISITES: graduate standing, experience in air traffic control, transportation, or permission of instructor

TEXT BOOKS: (Required)

Air Transportation Systems Engineering, Donohue and Zellweger (Editors), Progress in Astronautics and Aeronautics Volume 193, American Institute of Aeronautics and Astronautics, 2001.

TEXT BOOKS (Optional)

(Optional) The Airline Handbook – The Online Version, Air Transport Association, <http://members.airlines.org/about/d.aspx?nid=7946>

(Optional) Profit Strategies for Air Transportation, George Radnoti, Aviation Week Books

(Optional) Fundamentals of Air Traffic Control, 3rd Edition, Michael Nolan, International Thomson Publishing, 2001

(Optional) Commercial Aviation Safety, Alexander Wells, McGraw Hill

(Optional) Straight and Level: Practical Airline Economics, Stephen Holloway, Ashgate

| Week | Topic | Materials | Lead | Notes |
|-----------|---|--|----------------------------|-------|
| 1 Jan 23 | Introduction – Air Transportation | Handout | Sherry | |
| 2 Jan 30 | <ul style="list-style-type: none"> Air Traffic Management Capacity-Driven Operational Concept Through 2015 Airport Capacity Assessment | Donohue Chap 2 Donohue Chap 5 | Student A Student B | |
| 3 Feb 6 | <ul style="list-style-type: none"> Forecasting & Economic Analysis for Aviation System Engineering Economic Benefits of Increased Enroute Sector Capacity from Controller Pilot Data-Link | Donohue Chap 6 Bennet, Knorr, Rakas | Student C Student D | |
| 4 Feb 13 | <ul style="list-style-type: none"> Equitable Allocation of Limited Resources | Hoffman & Davison | Student E | |
| 5 Feb 20 | <ul style="list-style-type: none"> Existing & Required Modeling Capabilities for Evaluating ATM Systems and Concepts | Odoni et. al. | Student F | |
| 6 Feb 27 | Airport Queueing Model | Handout | Wang, L. | |
| 7 Mar 6 | <ul style="list-style-type: none"> Price Policies for Air Traffic Assignment Assessing the Benefits of CDM in Air Traffic Management | Donohue Chap 9 Donohue Chap 10 | Student G Student H | |
| 8 Mar 14 | Spring Break | | | |
| 9 Mar 20 | Mid-Term Exam | | | |
| 10 Mar 27 | Approaches to Incorporating Robustness into Airline Scheduling | Ageeva | Student I | |
| 11 Apr 3 | Modeling an Airline Operations Control Center | Donohue Chap 16 | Student J | |
| 12 Apr 10 | Aviation Environment – Noise Model | Noise Model | Thompson | |
| 13 Apr 17 | Safety Relevant Operational Cases in Air Traffic Management | Watkins & Lygeros | Student K | |
| 14 Apr 24 | SRO/Wake Vortex Model | Handouts | Shortle | |
| 15 May 1 | Review | | | |
| 16 May 8 | Final Exam | | | |

GRADING:

- 40% mid-term exam
- 40% final exam
- 20% class presentation, homework, and class discussion

Mid-term Exam: Take home, open book exam. 10 - 15 page paper, double spaced.

Focus Topic of Mid-term Exam: Describe the stakeholders in the Air Transportation System (ATS). Identify their objective functions, and the relationship between the objective functions. Describe any dynamics that may exist due to conflicting or non-congruent objective functions.

Final Exam: Take home, open book exam. 10 - 15 page paper, double spaced.

Focus Topics of Final Exam: (1) Describe the stakeholders in the Air Transportation System (ATS). Identify their objective functions, and the relationship between the objective functions. Describe any dynamics that may exist due to conflicting or non-congruent objective functions, (2) Describe how airlines respond to limited capacity in the NAS (e.g. runway slots, metering fix slots, departure slots, etc. by scheduling, flight plan filing, re-routing, and maneuvering tricks, (3) Methodologies for Benefits Analysis, (4) Economic models for air transportation, (5) Aviation environmental issues, (6) Air transportation safety

ACADEMIC HONESTY:

- Honor code strictly enforced
- Suspected violations will be reported