Department: Civil Engineering

Course Number: 590

Course Title: Airport Planning and Design

Designation: Graduate; Technical Elective – UG

Catalog Description: Impacts of national transportation policies with emphasis on ground, aviation and intermodal facilities; financing resources; collection and use of traffic and passenger data for airport planning and design; travel demand forecasting; capacity analysis; visual aids and air traffic control; runway orientation and geometric design; design of terminal areas and ground access; basic pavement structural design and maintenance management; environmental impacts and economic assessment; airport applications of remote sensing and spatial technologies, GIS, and Intelligent Transportation System (ITS) technologies.(3)

Pre-Requisite: Senior standing or consent of instructor

Textbook and Required Material:

• R. Horonjeff and F.X. McKelvey, *Planning and Design of Airports*, Fourth Edition, McGraw-Hill, 1994

Course Objectives: To introduce the impact of national transportation policies on society and present advanced topics in transportation engineering with emphasis on ground, aviation and intermodal facilities, to present methods for collection and use of traffic and passenger data for design and planning needs, and to provide basic understanding of transportation planning models, design methodologies, and maintenance management principles. Topics include financing, forecasting, capacity analysis and geometric design, drainage and environmental considerations, planning and design of terminal areas and ground access, visual aids and air traffic control, basic pavement structural design, and economic assessment. If possible a field trip to a nearby air carrier airport will be arranged.

Topics Covered:

- 1. Overview of transportation policies; administrative agencies and financing (2 classes)
- 2. Basic aeronautics, aircraft technologies; effects on airport facilities; air space and site selection (4 classes)
- 3. Runway length requirements and taxiway design; noise zoning and control; air traffic control (4 classes)
- 4. Airport planning; environmental assessment; aviation forecasting (3 classes)
- 5. Airport configurations; wind analysis; obstruction management (3 classes)
- 6. Mid-term examination (1 class)
- 7. System effectiveness; airside capacity, airspace utilization (2 classes)
- 8. Airfield design; airport classification and design standards (4 classes)
- 9. Planning and design of terminal building; ground access and parking (4 classes)
- 10. Structural design of airport pavements, FAA/ICAO methods; new concepts (4 classes)
- 11. Pavement evaluation, rehabilitation, maintenance management; computer applications (6 classes)
- 12. Economic evaluation and life-cycle cost analysis; computer applications (3 classes)
- 13. Airport lighting; visual aids; drainage; environment and social impacts; new technologies; review (4 classes)
- 14. Project report presentation of assigned term projects (1 class)

Class/Laboratory Schedule: Classes—twice a week and 75 minutes long

Professional Component:

(Highlight those apply)

- differential and integral calculus
- probability
- statistics
- chemistry
- calculus-based physics
- structure
- water resources and environmental engineering
- geotechnical engineering
- transportation and construction management
- laboratory experiment
- critically analyze and interpret data
- design
- professional practice issues
- professional licensure and continuing education

Outcomes:

(Highlight those apply)

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs
- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills and modern engineering tools necessary for engineering practice

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