

CE 504-001/601 / CE 497, AIRPORT PLANNING AND DESIGN DRAFT Course Syllabus, Fall 2018

Co-Instructors: Dr. George List, P.E. 423 Mann Hall, 3604 Research IV, gflist@ncsu.edu, 919-515-8038
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Lectures: Tuesday and Thursday, 4:30pm – 5:45pm, 125 Withers Hall

Office hours: Tuesdays and Thursdays, 9:30am – 3:00 pm, except lunch, 423 Mann Hall, or by appointment.

Prerequisite/Corequisite: CE 305 or equivalent..

GEP Requirement: This course does not fulfill any GEP Requirement.

Description: Basic knowledge for the planning, design and construction of civilian and military airports in the United States.

Student Learning Outcomes: Students will become familiar with airport planning and design criteria and standards. During the course students will develop an understanding of professional skills relating to airport planning and design necessary such as: site investigation, selection and preliminary design for a small general aviation airport and understand its relationship to local economic development.

Text: FAA Advisory Circular 150/5300-13A, *Airport Design with Change 1* Copies will be provided by the instructors.
FAA Advisory Circular 150/5320-6F, *Airport Pavement Design and Evaluation*
FAA Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design*
FAA Advisory Circular 150/5070-6B, *Airport Master Plans*

Additional References: Other FAA Advisory Circulars, some of which may be useful as references for this course, are available on the FAA website at http://www.faa.gov/airports/resources/advisory_circulars. Class notes will be available on-line.

Other Expenses: No other expenses besides the textbook are anticipated for the class. Travel to airport field trips is not reimbursed.

Course Overview: Analysis, planning and design of air transportation facilities.

Course Structure: The class will meet twice weekly in lecture format. There will be three field trips. Students will work individually and in teams.

Weekly Course Schedule: The schedule for the class can be found on the last page. It may be updated depending upon the availability of guest speakers and the interests of the class.

Topics: Approximate number of class sessions by topic are as follows:

- Introduction; History & Evolution of Airports (1)
- Aircraft Operation & Aerial Navigation (1)
- Introduction to Airport Components & Airport Design (1)
- Airport Geometric Design (3)
- Airport Environmental Considerations (1)
- Airport Site Investigation, Selection & Planning (1)
- Airfield Marking, Lighting & Signing (1)
- Airport Pavement Design & Construction (1)
- Airport Construction & Safety During Construction (1)
- Energy Conservation & Sustainability (1)
- Airport Terminal Planning (1)
- Government Roles in Air Transport, Airports & Economic Development (1)
- Aerial Navigation Aids & Air Traffic Control (1)
- Air Transport Demand Forecasting (1)
- Airfield Capacities & Delay (1)

- Demand/Capacity Relationships & Facility Requirements (1)
- Airport Ground Access & Parking (1)
- Airport Protection (2)
- Airport Finance (1)
- Project Delivery & Management (1)
- Airport Drainage (1)
- Emerging Technologies in Aviation (1)
- Team Project Time (2)
- Team Project Presentations (1)
- Airport Visits (3)
- Exams (2)

Projected Schedule of Required Readings, Assignments, Quizzes and Tests: See class schedule on last page

Laboratory, Studio, or Problem Session Topics: None

Transportation: Students must arrange their own transportation for the three airport visits.

Saturday, August 25 Albert J. Ellis Airport; Richlands NC

Saturday, September 22 Raleigh Executive Airport, Sanford NC

Saturday, November 17 Ralrigh Durham International Airport, Morrisville NC

Safety and Risk: Class field trips are taken at the student's own risk. There are no labs.

Grades: Grading policy depends upon whether the student is enrolled in CE 504 or CE 497. The policy for both is presented below.

CE504: The final grade will be comprised of the following elements: (a) 40 points - grade earned on student project including team and individual efforts and peer review; (b) 40 points - grades earned on mid-term and final examinations during the semester (20 points each each); (c) 10 points - grades earned on two homework exercises during the semester; (d) a term paper must be prepared worth 20 points, and (e) 10 points - class participation, including attendance of class and airport visits. This means the grade will be based on a 120-point scale. The total points will be normalized to 100 points for purposes of determining grades..

CE497: The same grading scale and grade-related policies as used for the 504 students except that the term paper requirement is dropped. This means the total points will sum to 100 and those points will be used to determine the grade.

Auditing Students: If a student wishes to successfully audit the course, he or she will be expected to attend class regularly.

Conversion of numerical grades to letter grades is in accordance with NC State policy as described at <http://policies.ncsu.edu/regulation/reg-02-50-03>. The breakpoints are as follows:

| | | | | |
|----|---|----|---|-----|
| 97 | ≤ | A+ | ≤ | 100 |
| 93 | ≤ | A | < | 97 |
| 90 | ≤ | A- | < | 93 |
| 87 | ≤ | B+ | < | 90 |
| 83 | ≤ | B | < | 87 |
| 80 | ≤ | B- | < | 83 |
| 77 | ≤ | C+ | < | 80 |
| 73 | ≤ | C | < | 77 |
| 70 | ≤ | C- | < | 73 |
| 67 | ≤ | D+ | < | 70 |
| 63 | ≤ | D | < | 67 |
| 60 | ≤ | D- | < | 63 |
| 0 | ≤ | F | < | 60 |

Late Assignments: Late assignments lose 20 points per day. Make up work for excused absences will be arranged. Missed airport visits cannot be made up.

Attendance: Attendance policies will be in accordance with NC State Academic Regulations. Excuses for absences are to be submitted prior to the class meeting or, if unanticipated, at the next class attended. Make-up tests and other missed assigned work require a doctor's excuse, family emergency, or legitimate conflict. The NC State policies can be found at: <https://policies.ncsu.edu/regulation/reg-02-20-03>

Academic Integrity: The Code of Student Conduct Policy (POL11.35.1) will be followed. See: <https://policies.ncsu.edu/policy/pol-11-35-01>

Relative to the Honor Pledge¹, it is assumed that the student's signature on any test or assignment means that the student neither gave nor received unauthorized aid. The homework submissions are to be individual efforts but students are encouraged to find study partners.

Students with Disabilities: Reasonable accommodation will be made for students with verifiable disabilities. For more information on NC State's policy on working with students with disabilities. The policies can be found at: <https://policies.ncsu.edu/regulation/reg-02-20-01>

Electronic Course Components: A Moodle website will accompany the course. It will be used to post class notes, project information, homework solutions and grades.

Students may be required to disclose personally identifiable information to other students in the course, via electronic tools like email or web-postings, where relevant to the course. Examples include online discussions of class topics, and posting of student coursework. All students are expected to respect the privacy of each other by not sharing or using such information outside the course.

Exams: Each of the two examinations during the semester will cover the material from the classes preceding that examination date back to the date of the prior examination, or the first day of classes in the case of the first exam.

Other: Students are responsible for reviewing the NC State University PRR's which pertains to their course rights and responsibilities:

- Equal Opportunity and Non-Discrimination Policy Statement <https://policies.ncsu.edu/policy/pol-04-25-05>. Additional references are at <https://oied.ncsu.edu/equity/policies/>.
- Code of Student Conduct <https://policies.ncsu.edu/policy/pol-11-35-01>.
- Grades and Grade Point Average <https://policies.ncsu.edu/regulation/reg-02-50-03>.
- Credit-Only Courses <https://policies.ncsu.edu/regulation/reg-02-20-15>.
- Audits <https://policies.ncsu.edu/regulation/reg-02-20-04>

Project: The class will be divided into multi-person teams for project performance. Each team will be given an assigned project. Each team will prepare a proposal (statement of work) for accomplishing the project to be submitted on the date specified in the syllabus. The proposal will discuss each task, clearly indicate the responsible engineer(s) for each task, and include an estimate of the hours required to perform each task. Each team also will prepare and submit a written progress report on the date specified in the syllabus. Formats for the proposal and progress report will be available on line.

Each team will prepare a final technical report and present the project approach, findings, conclusions and recommendations. The due date for the final report and presentation is specified in the syllabus. Each team member must participate in his/her team's presentation. In preparing and making its reports, the team shall consider itself to be the staff of a consulting engineering company reporting and presenting the results of its work to its client, who will be represented by the course instructors and possibly other professionals.

¹ Honor Pledge: "I have neither given nor received unauthorized aid on this test or assignment." It is the understanding and expectation that the student's signature on any test or assignment means that the student neither gave nor received unauthorized aid.

A peer evaluation of each of his/her fellow team members must be prepared and submitted by each team member to accompany the project proposal, progress report and final report. Individual time sheets by date, task and hours will be turned in with the proposal, progress report and final report. The time sheets will be cumulative through the semester and include project work only, not class time. Individual time sheets will be signed by each team member.

| Date | Period | In Charge | Topic |
|------------------------------|-----------|---------------|---|
| Aug. 23 | 1 | All | Introduction; History & Evolution of Airports |
| Aug. 25 Saturday | 2 | Slater | Albert J. Ellis Airport – Jacksonville NC [Lunch Provided] Airport Visit #1) 10:00-12:00 p.m. Chris White, Airport Manager |
| Aug. 28 | 3 | Slater | Introduction to Airport Components & Airport Design |
| Aug. 30 | 4 | Slater | Airport Environmental Considerations (Guests: Jennifer Martin, PE; Robert Jackson (NC DOT)) |
| Sept. 4 | 5 | Slater | Aircraft Operation & Aerial Navigation (Tentative Guest: Col. Ken Menzie, P.E.; USAF (Ret.)) |
| Sept. 6 | 6 | Slater | Airport Geometric Design I |
| Sept. 11 | 7 | Slater | Airport Geometric Design II |
| Sept. 13 | 8 | Slater | Airport Geometric Design III |
| Sept. 18 | 9 | Slater | Airport Site Investigation, Selection & Planning (Guest: Ken Ibold, RS&H) |
| Sept. 20 | 10 | Slater | Airfield Marking, Lighting & Signing (Guest: Richard Walls, P.E.; Walls Engineering LLC) |
| Sept. 22 Saturday | 11 | Slater | Raleigh Executive Airport – Sanford NC (Airport Visit #2) 9:00-11:00 a.m. Bob Heuts, Airport Manager |
| Sept. 25 | 12 | Slater | Airport Pavement Design & Construction (Guest: Tarryn Little, PE, LEED AP, RS&H Inc.) [Project Proposal Due] |
| Sept. 27 | 13 | Slater | Airport Construction & Safety During Construction (Guest: Doug Sander, Delta Airport Consultants) |
| Oct. 2 | 14 | Slater | Energy Conservation & Sustainability (Guest: Richard Walls, P.E.; Walls Engineering LLC) |
| Oct. 4 | | | FALL BREAK |
| Oct. 9 | 15 | Slater | Airport Drainage Systems (Guest: Lindsey Maron, P.E.; RS&H, Inc.) |
| Oct. 11 | 16 | List | Exam No. 1 |
| Oct. 16 | 17 | Slater | Federal, State & Local Government Roles in Air Transport, Airports & Economic Development (Guest: Bobby Walston, P.E. NCDOA) |
| Oct. 18 | 18 | List | Aerial Navigation Aids & Air Traffic Control (Guest: Frank Gozzo or John Greene RDU Tower Chief) |
| Oct. 23 | 19 | Slater | Air Transport Demand Forecasting |
| Oct. 25 | 20 | Slater | Airfield Capacities & Delay |

