

Cover Sheet: Request 10299

EAS4xxxC Aerospace Sciences Lab and Design

Info

Process	Course New Ugrad/Pro
Status	Pending
Submitter	Carroll, Bruce F bfc@ufl.edu
Created	7/9/2015 10:46:55 AM
Updated	11/16/2015 2:50:32 PM
Description	Experimental investigations of aerospace engineering systems. Wind tunnel testing. Design project with experimental validation. (3 credit hours)

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	ENG - Mechanical and Aerospace Engineering 011902000	Carroll, Bruce F		7/9/2015
Added ucc1 Aerospace Sciences Lab and Design.docx					7/9/2015
College	Approved	ENG - College of Engineering	Caple, Elizabeth		10/7/2015
Replaced Syllabus - EAS4xxxC Aerospace Sciences Lab and Design - v1.docx					7/9/2015
University Curriculum Committee	Comment	PV - University Curriculum Committee (UCC)	Baker, Brandi N	Added to November agenda.	10/27/2015
No document changes					
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			10/27/2015
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					
College Notified					
No document changes					

Recommended SCNS Course Identification

1. Prefix: EAS 2. Level: 4 3. Number: 4. Lab Code: C

5. Course Title: Aerospace Sciences Lab and Design
 6. Transcript Title (21 character max.): Aero Sciences Lab

7. Effective Term: Earliest 8. Effective Year: Earliest 9. Rotating Topic: No
 10. Amount of Credit: 3 11. If variable, min. and max. credits per semester.
 12. Repeatable Credit: No 13. If yes, total repeatable credit allowed.
 14. S/U Only: No 15. Contact Type: Regularly Scheduled [base hr]
 16. Degree Type: Baccalaureate 17. If other, specify:
 18. Weekly Contact Hours: 19. Category of Instruction: Advanced
 20. Delivery Method(s): On-campus Off-campus Online

21. Course Description (50 words maximum)

Experimental investigations of aerospace engineering systems. Wind tunnel testing. Design project with experimental validation.

22. Prerequisites

EAS4101 & EML3301C

23. Co-requisites

None

24. Rationale and Placement in Curriculum

This is an advanced undergraduate course taken in the senior year of the aerospace engineering baccalaureate degree. The course builds on material presented in the junior level aeronautics and instrumentation courses.

25. Course Objectives

Students will become proficient in planning and executing a variety of experimental techniques common to aerospace sciences. Experimental techniques will include pressure measurements, pressure scanners, temperature measurements, load balances, and hot film anemometry. Students will gain design experience through participation in a team based project to design, fabricate and experimentally validate an aerospace component.

26. Course Textbook(s) and/or Other Assigned Reading

Course material developed by the instructor will be provided.

27. Weekly Schedule of Topics

Week 1: Introduction and wind tunnel design. Lab orientation.
 Week 2: Pressure and temperature measurements. Pitot static tubes and wind tunnel calibration.
 Week 3: Pressure and temperature measurements. Pressure distribution on a circular cylinder.
 Week 4: Velocity measurements.
 Week 5: Velocity measurements. Time series analysis of hot film data. Wake turbulence.
 Week 6: Force and moments from balances.
 Week 7: Force and moments from balances. Mid term exam. Load Cell measurements.
 Week 8: Boundary corrections.

Week 9: Airfoil Theory. Lift and drag coefficients as function of angle of attack using load cells.
 Week 10: Numerical simulations. Panel method results and comparison to experiments.
 Week 11: Airfoil Design Techniques. Lift and drag coefficients as function of angle of attack using surface pressures and wake profiles. Verification of numerical simulations.
 Week 12: Flow visualization. Design reviews.
 Week 13: Optical techniques. Design reviews.
 Week 14: Optical techniques. Design reviews.
 Week 15: Final design project presentations.

28. Grading Scheme

Type of Assessment, Activity or Other Assignment	Percent of Grade
Lab Reports	60%
Attendance	5%
Mid Term Exam	15%
Design Project	20%

29. Instructor(s)

John Abbitt, 312A NSB, 392-7557, jda@ufl.edu

Itemized Instructions

1. **Prefix.** Enter the three letter code indicating placement of course within the discipline (e.g., POS, ATR, ENC). Note that for new course proposals, in rare cases SCNS will assign a different prefix.
2. **Level.** Select the one digit code preceding the course number that indicates the course level at which the course is taught (e.g., 1=freshman, 2=sophomore, etc.).
3. **Number.** Enter the three digit code indicating the specific content of the course based on the SCNS taxonomy and course equivalency profiles. For new course requests, this may be XXX until SCNS assigns an appropriate number.
4. **Lab Code.** Enter the lab code to indicate whether the course is lecture only (blank), lab only (L), or a combined lecture and lab (C).
5. **Course Title.** Enter the title of the course as it should appear in the Academic Catalog.
6. **Transcript Title.** Enter the title that will appear in the transcript and the schedule of courses. Note that the transcript must be limited to 21 characters (including spaces and punctuation). Titles longer than 21 characters will either be abbreviated as needed or cause the approval request to be recycled.
7. **Effective Term.** Select the requested term that the course will first be offered. Selecting "Earliest" will allow the course to be active in the earliest term after SCNS approval. If a specific term and year are selected, this should reflect the department's best projection. Courses cannot be implemented retroactively, and therefore the actual effective term cannot be prior to SCNS approval, which must be obtained prior to the first day of classes for the effective term. SCNS approval typically requires 2 to 6 weeks after approval of the course at UF.
8. **Effective Year.** Select the requested year that the course will first be offered. See preceding item for further information.
9. **Rotating Topic.** Select "Yes" if the course will have rotating (varying) topics in different terms. For rotating topics courses, the course title in the Schedule of Courses and the transcript can vary with the topic.
10. **Amount of Credit.** Select the number of credits awarded to the student upon successful completion, or select "Variable" if the course will be offered with variable credit and then indicate the minimum and maximum credits per section. Note that credit hours are regulated by Rule 6A-10.033, FAC.
11. If you selected "Variable" for the amount of credit, indicate the minimum and maximum number of total credits.
12. **Repeatable Credit.** Select "Yes" if the course may be repeated for credit. Some courses, such as independent study courses, will have rotating (variable) topics. Students may be allowed to repeat these courses provided the content is different.
13. If you checked "Yes" for repeatable credit, indicate the maximum number of total repeatable credits allowed per student.
14. **S/U Only.** Check this option if students should be graded as S-U in the course. Note that each course must be entered into the UF curriculum inventory as letter-graded or S-U. A course may not have both options.
15. **Contact Type.** Select the best option to describe course contact type. This selection determines whether base hours or headcount hours will be used to determine the total contact hours per credit hour. Note that the headcount hour options are for courses that involve contact between the student and the professor on an individual basis. The following options are available:
 - a. Regularly Scheduled [base hr]
 - b. Thesis/Dissertation Supervision [1.0 headcount hr]
 - c. Directed Individual Studies [0.5 headcount hr]
 - d. Supervision of Student Interns [0.8 headcount hr]
 - e. Supervision of Teaching/Research [0.5 headcount hr]
 - f. Supervision of Cooperative Education [0.8 headcount hr]Contact the Office of Institutional Planning and Research (352-392-0456) with questions regarding contact type.
16. **Degree Type.** Select Baccalaureate, Graduate, Professional or Other.
17. If you selected "Other" for degree type, specify the type.
18. **Total Contact Hours.** Indicate the number of hours faculty will have contact with students each week on average throughout the duration of the course.

19. **Category of Instruction.** Indicate whether the course is introductory, intermediate or advanced. Introductory courses are those that require no prerequisites and are general in nature. Intermediate courses require some prior preparation in a related area. Advanced courses require specific competencies or knowledge relevant to the topic prior to enrollment.
- 1000 and 2000 level = Introductory undergraduate
 - 3000 level = Intermediate undergraduate
 - 4000 level = Advanced undergraduate
 - 5000 level = Introductory graduate
 - 6000 level = Intermediate graduate
 - 7000 level = Advanced graduate
 - 4000/5000 and 4000/6000 levels = Joint undergraduate/graduate (these must be approved by the UCC and the Graduate Council)
20. **Delivery Method(s).** Indicate all platforms through which the course is *currently planned* to be delivered.
21. **Course Description.** Provide a brief narrative description of the course content. This description will be published in the Academic Catalog and is limited to 50 words or less. See course description guidelines.
22. **Prerequisites.** Indicate all requirements that must be satisfied prior to enrollment in the course. Prerequisites will be automatically checked for each student attempting to register for the course. The prerequisite will be published in the Academic Catalog and must be formulated so that it can be enforced in the registration system. Please note that upper division courses (i.e., intermediate or advanced level of instruction) must have proper prerequisites to target the appropriate audience for the course.
- Completing Prerequisites on UCC forms:
 - Use “&” and “or” to conjoin multiple requirements; do not use commas, semicolons, etc.
 - Use parentheses to specify groupings in multiple requirements.
 - Specifying a course prerequisite (without specifying a grade) assumes the required passing grade is D-. In order to specify a different grade, include the grade in parentheses immediately after the course number. For example, "MAC 2311(B)" indicates that students are required to obtain a grade of B in Calculus I. MAC2311 by itself would only require a grade of D-.
 - Specify all majors or minors included (if all majors in a college are acceptable the college code is sufficient).
 - “Permission of department” is always an option so it should not be included in any prerequisite or co-requisite.
 - Example: A grade of C in HSC 3502, passing grades in HSC 3057 or HSC 4558, and major/minor in PPHP should be written as follows:
HSC 3502(C) & (HSC 3057 or HSC 4558) & (HP college or (HS or CMS or DSC or HP or RS minor))
23. **Co-requisites.** Indicate all requirements that must be taken concurrently with the course. Co-requisites are not checked by the registration system.
24. **Rationale and Placement in Curriculum.** Explain the reason for adding the course to the curriculum and how the course will fit into the curriculum.
25. **Course Objectives.** Describe the core knowledge and skills that student should derive from the course. The objectives should be both observable and measurable.
26. **Course Textbook(s) and/or Other Assigned Reading.** Enter the title, author(s) and publication date of textbooks and/or readings that will be assigned, or a representative list of readings.
27. **Weekly Schedule of Topics.** Provide a projected weekly schedule of topics. This should have sufficient detail to evaluate how the course would meet current curricular needs and the extent to which it overlaps with existing courses at UF.
28. **Grading Scheme.** List the types of assessments, assignments and other activities that will be used to determine the course grade, and the percentage contribution from each. This list should have sufficient detail to evaluate the course rigor and grade integrity.
29. **Instructor(s).** Enter the name of the planned instructor or instructors, or “to be determined” if instructors are not yet identified.

Syllabus

EAS4xxxC Aerospace Sciences Lab and Design

1. **Catalog Description:** Experimental investigations of aerospace engineering systems. Wind tunnel testing. Design project with experimental validation. (3 credit hours)
2. **Pre-requisites and Co-requisites:** EAS4101 and EML3301C
3. **Course Objectives:** This is an advanced undergraduate level course. Students will become proficient in planning and executing a variety of experimental techniques common to aerospace sciences. Experimental techniques will include pressure measurements, pressure scanners, temperature measurements, load balances, and hot film anemometry. Students will gain design experience through participation in a team based project to design, fabricate and experimentally validate an aerospace component.
4. **Instructor:** John Abbitt
 - a. Office location: 312A NSB
 - b. Telephone: 392-7557
 - c. E-mail address: jda@ufl.edu
 - d. Office hours: T 10:30 – 11:30 a.m. and Th 1:30 – 3:00 p.m.
5. **Teaching Assistant:** To be announced
6. **Meeting Times and Location:**
 - a. **Lectures**
Tuesday and Thursday, 3rd Period, MAE-B 229
 - b. **Labs**
4, 5, 6, 7, 8 and 9th periods in NSC 312
7. **Material and Supply Fees:** Material and Laboratory fees will be established for this course.
8. **Textbooks Required:** None. Course material developed by the instructor will be provided. Instructor developed material provides detailed operating procedures and data analysis procedures for the wind tunnel experiments.
9. **Recommended Reading:** Barlow, Rae, and Pope, *Low-Speed Wind Tunnel Testing*, 3rd edition, Wiley.

10. **Course Outline and Schedule:** See the detailed schedule available at <https://lss.at.ufl.edu/> (use Canvas system)

Weekly Schedule			
Week	Tues Lecture	Thurs Lecture	Lab
1	Introduction	Wind Tunnel Design	Lab Orientation
2	Pressure & Temperature Measurements	Pressure & Temperature Measurements	Pitot-Static Tube – Tunnel Calibration
3	Pressure & Temperature Measurements	Pressure & Temperature Measurements	Pressure distribution on circular cylinder as function of theta and Re and wake profile
4	Velocity measurements	Velocity measurements	
5	Velocity measurements	Velocity measurements	Time series analysis of hot film data, wake turbulence
6	Force & Moments from Balance	Force & Moments from Balance	
7	Force & Moments from Balance	Mid Term Exam	Load cell measurements of standard shapes
8	Boundary Corrections	Boundary Corrections	
9	Airfoil Theory	Airfoil Theory	Cl and Cd as function of AOA via load cell: NACA 0012 and NACA 4412
10	Numerical Simulations	Numerical Simulations	
11	Airfoil Design Techniques	Airfoil Design Techniques	Cl and Cd as function of AOA via surface pressure and wake profiles: NACA 0012 and NACA 4412. Verification of numerical simulation
12	Flow Viz	Design Reviews	Group Design Project
13	Optical Techniques	Design Reviews	Group Design Project
14	Optical Techniques	Design Reviews	Group Design Project
15	Design Project Due	Reading Day	Design Project Presentations

11. **Assessment Methods and Grading:**

- a. Lab Reports 60%
- b. Attendance 5%
- c. Exams 15%
- d. Design Project 20%

If a student thinks there is an error in the grading, it should be brought to the attention of the instructor within two weeks after the graded material is handed back. Scores will not be reconsidered beyond the two week period.

Lab Reports will follow the AIAA Technical Note format. Lab experiments and corresponding reports will be done in teams of 3 students.

There will be a midterm exam given during the lecture portion of the course (50 min exam).

A major design project will be due the last day of class. For the design project students will work in teams of 3. An aerospace component (ex. Airfoil section) will be designed and fabricated. Students will plan and execute experimental testing of the component.

12. Grading Scale:

93 – 100: A	87 – 89.9: B+	77 – 79.9: C+	67 – 69.9: D+	0 – 59.9: E
90 – 92.9: A-	83 – 86.9: B	73 – 76.9: C	63 – 66.9: D	
	80 – 82.9: B-	70 – 72.9: C-	60 – 62.9: D-	

See the current undergraduate catalog for information on how grade points are assigned: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>.

13. Class Attendance and Make-up Policy: Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

Attendance is mandatory. Excused absences will be given for documented reasons listed in the university attendance policy referenced above.

Late assignments and makeup exams are not normally allowed. Arrangements for late assignments or makeup exams will be made on a case by case basis for excused absences.

14. Class Demeanor Expectations: During class, cell phones must be turned off or set to silent ringer mode.

15. Accommodation for Students with Disabilities: Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

16. Online Course Evaluations: Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.

17. Honesty Policy: UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that

facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

18. **UF Counseling Services:** Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
- UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
 - Career Resource Center, Reitz Union, 392-1601, career and job search services.