ASEN 3300: Getting Started Checklist

- Read the Syllabus (this document)
- Register for the class on Canvas and Gradescope
- Read the Class Schedule on Canvas
- Find two classmates and form a group of 3 students. This group will work together on the lab assignments for the rest of the semester. If you do not have a (complete) group, come to the first lab to complete your team. *See Canvas for details*.
- Complete the *Electronics Hardware Kit Agreement and Honor Code Contract* on Canvas: *see Canvas for details*
- Read Lab 1 Assignment
- Complete Lab 1 prelab on Gradescope (see Deadlines below for the first week)
- Come to the first day of lecture (see Class Schedule)
- Come to the first day of Lab (see Class Schedule)
- Complete the PILOT Tour (on Canvas) → Computer access
- Lab kit / locker combination will be obtained during Lab 01
- **DEADLINES OF THE FIRST WEEK**:
- Prelab 1: due Wednesday, 1/14, 11:59 pm. Submit to Gradescope
- Quiz 1: due Thursday, 1/15, 11:59 pm. Submit to Canvas
- Lab 1: due Friday, 1/16, 11:59 pm. Submit to Gradescope

Syllabus for ASEN 3300:
Aerospace Electronics and Communications

Lecture: AERO 120, Monday and Wednesday, **11:45 am – 12:35 pm**
Lab: AERO 141, Monday and Wednesday, **12:50 – 2:40 pm** or **2:55 am – 4:45 pm**

Instructors

Prof. Zoltan Sternovsky
Office: TBD
Office hours:

Prof. Xinzhao
Office: TBD
Xinzhao.Chu@colorado.edu Office hours: TBD

Teaching and Lab Assistants
TFs/LAs and their office hours are posted on Canvas.

Lab Coordinator
Trudy Schwartz

Class Web Portal

- Canvas site at: **https://canvas.colorado.edu**

Required Texts and Equipment

- Laboratory Notebook
- ASEN 3300 Lab Kit: Provided to each group and stored in PILOT; to be returned at the end of the semester. Students are responsible for replacement of items broken or not returned.
- **Textbook**: Scherz and Monk, *Practical Electronics for Inventors*, 4th edition; ISBN-10: 1259587541. Available online here: https://www.accessengineeringlibrary.com/content/book/9781259587542?implicit-login=true

Suggested Reference Texts

- Horowitz and Hill, *The Art of Electronics*, 3rd edition; ISBN-10: 0521809266
- Wolfson, *Essential University Physics, Volume 2*, 3rd edition; ISBN-10: 0321976428
- Makarov, Ludwig and Bitar, *Practical Electrical Engineering*, Springer, 2016; ISBN 978-3-31921173-2 (available as an eBook)

Course Overview

Modern aerospace vehicles rely on electronics, computers, and communications as essential system components. While these systems are most often designed by Electrical Engineers, to be effective as

system designers, integrators, and analysts, Aerospace Engineers must have a solid understanding of these critical subsystem areas. The aim of this course is to provide an overview of analog electronics, digital electronics, and communication system concepts as they are used in the aerospace industry. **The emphasis is on practical, hands-on experience and important concepts in a select number of key areas**. Throughout the course, students work in teams to design, build, test, and analyze electronic circuits, work with electronic instruments, interface these instruments to a computer, and implement a communications link. It is our goal that students walk away from this class with a basic understanding of instrumentation electronics, computer interfacing, and radio communications. This understanding is derived from experience building and working with real electronics in the lab.

Course Outline

The course is divided into three main sections: i) analog electronics, ii) digital electronics, and iii) communications. A number of the lab experiments in all three sections are designed to utilize the Analog Devices ADXL321 or 326 accelerometers.

1. In the Analog Electronics section of the course, we look at the accelerometer output to study vibrations of a beam. In the process, we build passive circuits to lower the output range of the accelerometer and active circuits to amplify it, conditioning circuits to filter noise in the output, and learn to use multimeters, oscilloscopes, and spectrum analyzers.
2. In the second section of the course on Digital Electronics, we log data from the accelerometer instrument to the lab station computers and discuss relevant issues such as communications protocols, analog-to-digital and digital-to-analog conversions, and sampling.
3. In the final section of the course on Communications, we will use the accelerometer data as a source of telemetry; modulate carrier signals, and compute satellite communications link budgets.

Prerequisites

Physics II, Aerospace Mathematics, and Introduction to Dynamics and Systems. Much of the material covered in this course will build on concepts you have already encountered in these earlier courses. You are expected to draw on this prior knowledge and actively make connections between previously learned material and new topics introduced here.

In ASEN 2001–2004, you were exposed to instrumentation electronics and their use, though the design of these systems was typically handled by others. In Physics II, you studied fundamental circuit theory but did not develop complete, practical systems. This course assumes a working knowledge of the prerequisite material and extends it through deeper theoretical treatment and hands-on laboratory experiments, with an emphasis on the design, implementation, and analysis of real instrumentation systems.

Class Format

The semester is organized into 11 weekly laboratory modules, with other weeks reserved for exams. Except for the first two labs/weeks, each lab module lasts one week beginning with the Monday lecture session. The Monday lecture introduces the concepts and materials to be studied in the lab and provides an overview of the reading materials and the lab activities, including a pre-lab homework assignment, which is **due before 11:30 AM on Monday**. The laboratory session is devoted to group-based work on the

week's assignment. Instructors and teaching assistants are present in the laboratory to answer questions, demonstrate proper use of the equipment, and discuss the material with individual lab groups.

The second lecture period is used to complete the topic of the ongoing laboratory assignment. The Wednesday laboratory session continues the group work, with an emphasis on documenting experimental methods and analyzing results for inclusion in the lab report. The weekly quiz will be **released on Wednesday at 5:00 PM** and must be **completed on Canvas by midnight on Thursday**. **Group lab reports are due by midnight on Friday** and must be submitted as a single PDF via Gradescope. Students should review the Lab Guidelines handout for additional details. We will make every effort to return graded lab reports within about one week.

Assessment / Written and Practical Exams

Assessment of individual student knowledge and proficiency is conducted through **written and practical examinations**. The examination schedule is provided in the course schedule. All written and practical examinations are administered **in person** and **synchronously.** The practical examination requires students to demonstrate competency in skills such as proper use of laboratory equipment, circuit setup, and execution of measurements with adequate accuracy.

Course Grading

The final grade is a combination of individual and group work.

Type	**Description**	**Percentage**
Individual Work	Quizzes (11)	10%
	Exam #1 (midterm)	15%
	Exam #2 (midterm)	15%
	Practical Exam	10%
	Final Exam	20%
	Total for Individual work	**70%**
Group Work	Lab Reports (group) (11)	20%
	Pre-lab assignments (individual) (11)	10%
	Total for Group Work	**30%**
Final Grade	**Individual + Group**	**100%**

Instructor, TF, and Peer Evaluations: Although lab reports are submitted and graded as a group, instructors may alter the lab report grades for individual students based on assessment/feedback from the TAs, and

peer evaluations, in order to reflect each student's level of contribution to the laboratory work. Students are expected to contribute equitably to the lab activities and reports.

Regrade requests: Requests for grade changes are the responsibility of the student. If you feel that a prelab, quiz, lab report, or exam has been graded incorrectly, bring your concerns to the instructor or one of the TFs. Regrade requests will be accepted up to one week after grades have been posted for an assignment.

Rationale for course assignments:

- Homework reinforces the mental processes that help you to become proficient in a subject. The prelab quizzes largely serve as your homework assignments in this class. We also encourage you to work additional problems for practice. Before beginning any assignment, you should read the text and work the examples in the text.
- Experimental laboratory exercises are either more complex than hands-on homework or require special equipment. You will work in groups to collect and analyze the data, as well as write up the experimental laboratory report.
- Exams and quizzes provide a gauge to determine what you have learned individually.
- Lab experiments help you to learn how to synthesize the basic concepts, methods, and tools presented in the course curriculum. The team-oriented lab approach will give you experience in working and cooperating in groups as is typical in industry.

Assignment Submission and Late Policy

1. Prelabs:
    a. Prelab is available at 5 pm on Wednesday along with the lab assignment and submission to Gradescope closes at 11:30 am on Monday no matter which lab section you are in.
    b. Prelabs will not be accepted after Monday 11:30 am, as Prelabs are designed to help you to prepare for labs.
2. Quizzes
    a. Quizzes are conducted on Canvas on Wednesday starting at 5 pm and closing at 11:59 pm on Thursday. You will have 15 minutes to complete the quiz once you start it. Only a single try is allowed.
    b. No makeup quizzes will be provided as quiz solutions are provided shortly after Thursday 11:59 pm.
    c. Your quiz grade will take the best 10 out of 11 quizzes; this policy is designed to accommodate missed quizzes.
3. Lab reports:
    a. Due at 11:59 pm each Friday.
    b. 10% deduction for each day late. An assignment submitted at 12:00 am is considered one-day late, so don't wait to submit.
    c. Labs will not be accepted after midnight one week after the due date.

Exams

This course has four (4) scheduled exams. This includes (a) two mid-term evening exams, (b) one lab practical exam, and (c) and the final exam. All exams are in person and mandatory. If you will miss one of these exams, please contact the faculty immediately to discuss alternative options. Should you miss an exam for any reason you must contact the faculty within 24 hours otherwise you will receive a zero (0) for your exam grade.

Exam and Assignment Regrading

Regrading requests for any assignment must be submitted within 1 week after the graded assignment has been returned. All regrading requests must be coherent and show a clear understanding of the problem. Generic requests for more points will not be considered.

Communications

General topical questions need to be posted on **Canvas Discussions:**

- All/most questions regarding course content (lecture material, prelabs, quizzes, exams, lab assignments) should be posted to the course **Canvas Discussions** or asked during lab, lecture, or office hours.
- If we receive an email with a prelab or lab question that may concern other students, we will direct you to post on the course **Canvas Discussions.**
- The teaching team will make every effort to respond to course related **Canvas Discussions** posts in a timely manner (typically within 1 business day).
- Questions posted 24 hours or less before an assignment deadline may not receive a response before the deadline.

Only questions that pertain to an individual student should be communicated via email (or in person during office hours or lab session)

- Questions specific to your individual lab work should be directed at the TA that was involved with the issue during the lab.
- Questions/concerns on the topic of **individual accommodations** should be directed at TA
- **Personal issues**, **advance notice of late submissions,** or concerns not regarding course content should be communicated to the instructor AND to TA

- Any emails sent to a member of the teaching team should include **ASEN3300: in the subject line**.
- We cannot guarantee that emails and **Canvas Discussions** posts will receive a response outside of regular business hours, i.e. Monday through Friday, 8:00 am – 5:00 pm MST/MDT.
- **We strongly encourage you, the students, to answer each other's questions on Canvas Discussions.** This is a great way to work together to solve problems.
- We reserve the right to make changes to the weekly course schedule based on unexpected events that may come up during the semester. We will give sufficient advance notice through announcements in class and posting on **Canvas**. Changes to this syllabus may be announced at any time during class periods, and an updated syllabus document will be posted on Canvas.

Cheating

Cheating will not be tolerated, and the CU Honor Code will be upheld.

As group work is part of this class (lab experiments and report), it is useful to clarify what is considered cheating. You are expected to perform the lab assignments as a group and divide the workload equally. Communication within the group is encouraged. It is OK to discuss the assignments and reports with fellow students in the class as long as this is done with the intention of learning, i.e., understanding the material. Sharing results or data analyses is permitted only under specific circumstances, when there is no way for you to retake the data or redo the analysis. For example, if you realize after finishing your lab work that your data are erroneous, you may use and analyze the data from a different group. However, in this case, you need to provide a full disclosure and explanation why data sharing was necessary, and give proper credit to the source. You also need to notify the instructor(s) and/or the TFs.

Getting help with the lab work and reports from outside the class is generally not permitted. This includes help from senior students or using lab reports from previous years.

When in doubt about what is considered unethical, you should always exercise caution and ask the instructor(s) if they have any questions or concerns that what they are doing may be a violation of the honor code.

Some Logistics

1. Students are assigned to a team of 3 persons for the duration of the semester.
2. Teams work together to study the lab; design, implement, test, and analyze their circuits; and write the lab reports. Students are encouraged to collaborate in preparing for quizzes, discussing lab questions and results.
3. Each individual student can decide how to organize their own notes, but results should be **clearly transcribed** into the final lab document.
4. Weekly quizzes and all exams are to be completed individually. Any type of collaboration or copying constitutes cheating and will result in a zero grade for all parties involved and will be reported. A repeated instance of cheating will be reported on the student's permanent record and will result in an F for the course. Please see also Honor Code web pages at http://www.colorado.edu/academics/honorcode/.
5. The purpose of the prelab assignment (submitted individually) is to prepare you for the weekly lab. It is important to complete the prelab before the first lab session; otherwise you will have difficulty completing the lab in the allotted lab time. Prelab will be submitted to Gradescope. Prelab submission opens on Wednesday at 5 pm and closes on the following Monday at 11:30 am.
6. Lab exercises are conducted together with your team and a single lab report is submitted via Gradescope. Collaborations with other groups including shared diagrams or extensive discussion of results must be acknowledged in your report. Copying text or answers from another group *with or without their permission* constitutes cheating and will result in a zero grade for the weekly lab module. A repeated instance of cheating will be reported on the student's permanent record and will result in an F for the course. Please see the Honor Code web pages at http://www.colorado.edu/academics/honorcode/. While you receive a group grade for each lab

report, you may be assigned different individual grade for the lab report based on feedback from the faculty, TA and your lab partners to reflect your contributions to the lab.

7. University closure: If an assignment is due and the University is closed due to weather or other circumstance, then the assignment will be due on the next day that the University is open. In the event that a lab or lecture is cancelled due to a University closure, please check the website and Canvas announcements for updated information. All critical communications will be conveyed through Canvas announcements.
8. Please check your schedules as soon as possible to determine if you expect to miss class on any of these days for religious or other reasons. If there is a conflict, it is the student's responsibility to notify the instructors as soon as possible to make alternate arrangements. Make up exams due to illness require a note from a physician. Copying, collaborating, or discussing material in a written or oral exam during the exam period constitutes cheating and will result in an F for the course, and will be reported on the student's permanent record.

Weekly Schedule (except the first two weeks)

Topic	Day	Time Open	Time Due	Type	Submission
Prelab	Submission opens along with lab assignment on Wednesday the week before the lab and closes on Monday	5 pm Wednesday	11:30 am Monday	Individual	Gradescope
Weekly Quiz	Submission opens on Wednesday and closes on Thursday	5 pm Wednesday	11:59 pm Thursday	Individual	Canvas
Lab	Lab reports are due on Friday of the week in which the laboratory is conducted.	5 pm Wednesday	11:59 pm Friday	Group	Gradescope

University Policies – AY 25/26

Artificial Intelligence (AI) policy

You may NOT use AI for any of the assignments in this course. You may use AI for your individual learning of the material and concept. Keep in mind your own and others' privacy implications and security risks when using gen AI tools. Remember that AI can (and will) make mistakes.

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the Honor Code may include but are not limited to: plagiarism (including use of paper writing services or technology [such as essay bots]), cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. Understanding the course's syllabus is a vital part of adhering to the Honor Code.

All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution: StudentConduct@colorado.edu. Students found responsible for violating the Honor Code will be assigned resolution outcomes from Student Conduct & Conflict Resolution and will be subject to academic sanctions from the faculty member. Visit Honor Code for more information on the academic integrity policy.

Accommodation for Disabilities, Temporary Medical Conditions, and Medical Isolation

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the Disability Services website. Contact Disability Services at 303-492-8671 or DSinfo@colorado.edu for further assistance. If you have a temporary medical condition, see Temporary Medical Conditions on the Disability Services website.

If you have a temporary illness, injury or required medical isolation for which you require adjustment, please contact the instructor as soon as possible.

Accommodation for Religious Obligations

Campus policy requires faculty to provide reasonable accommodations for students who, because of religious obligations, have conflicts with scheduled exams, assignments, or required attendance. Please communicate the need for a religious accommodation in a timely manner. In this class, attendance is not required. See the campus policy regarding religious observances for full details.

Preferred Student Names and Pronouns

CU Boulder recognizes that students' legal information does not always align with how they identify. If you wish to have your preferred name (rather than your legal name) and/or your preferred pronouns appear on your instructors' class rosters and in Canvas, visit the Registrar's website for instructions on how to change your personal information in university systems.

Classroom Behavior

Students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote, or online. Failure to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, marital status, political affiliation, or political philosophy.

Additional classroom behavior information

- Student Classroom and Course-Related Behavior Policy.
- Student Code of Conduct.
- Office of Institutional Equity and Compliance.
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Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. University policy prohibits protected-class discrimination and harassment, sexual misconduct (harassment, exploitation, and assault), intimate partner abuse (dating or domestic violence), stalking, and related retaliation by or against members of our community on- and off-campus. The Office of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who have been subjected to misconduct can contact OIEC at 303-492-2127 or email OIEC@colorado.edu. Information

about university policies, reporting options, and OIEC support resources including confidential services can be found on the OIEC website.
Please know that faculty and graduate instructors are required to inform OIEC when they are made aware of incidents related to these concerns regardless of when or where something occurred. This is to ensure the person impacted receives outreach from OIEC about resolution options and support resources. To learn more about reporting and support a variety of concerns, visit the Don't Ignore It page.