



## Course Syllabus

### ASE 6111: Sensor Systems: Analysis and Synthesis

Elective course as part of the Master's Degree in Applied Systems Engineering (MASE)

**Delivery:** Online; hybrid (asynchronous lecture, live instructor hours and presentations)

**Dates course will run:** 20 May – 3 Jul, 2026

#### Instructor Information

**Nick Hardman, Ph.D.**  
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(719) 322-4043

**Office Hours:** Weekly office hours Wednesdays, 1900-2000 (7:00-8:00 pm) EST during the course via MS Teams (link provided on Canvas). Attendance is optional but highly encouraged.

#### General Course Information

##### Description

This course is one of the three domain-specific electives in the MASE curriculum. It is an introduction to sensors and sensor systems--the connection between the physical and the cyber world. The course content includes device physics, performance analysis, and signal processing as well as the principles that underlie sensor systems. At the conclusion of this course, you will understand how to select and integrate sensor systems into cyber-physical systems operating in a range of complex environments.

##### Prerequisites

None. This is a technical course that examines sensor systems; however, it does not assume the student has prior engineering or mathematical knowledge beyond that expected of a graduate student.

##### Course Goals and Learning Outcomes

The goal of this course is to prepare students to make value-added contributions to their MASE team, and any design team in the future, as the member possessing sensor systems domain knowledge.

##### Course Learning Outcomes

By the end of the course, students will be able to:

1. Demonstrate an understanding of sensors, transduction, and signal fundamentals
2. Categorize sensors according to their uses and properties
3. Apply a knowledge of modern sensor technologies to specify system requirements



## Course Materials

### Course Text

#### **Sensor Systems: Fundamentals and Applications**

by Clarence W. de Silva, CRC Press, 2017.

Both the PDF and EPUB version are available from the Georgia Tech Library,  
(Ext Link) <http://library.gatech.edu/>

You have to log in to get access to the download.

### Additional Materials/Resources

Additional reading materials will be provided electronically through Canvas.

### Course Website and Classroom Management Tools

Canvas:

<https://gatech.instructure.com/courses/351724>

## Course Requirements, Assignments & Grading

Grades in this course will be based on how well the student demonstrates a mastery of the learning objectives. This will be evaluated using the responses to the homework and presentation details.

### Assignment Distribution and Grading Scale

Assignment	Release Date	Due Date	Weight (Percentage of grade)
Team Project Summary	First day of class	End of Week 1	5%
Homework #1:	First day of class	End of Week 1	4%
Homework #2:	Week 2	End of Week 2	4%
Homework #3:	Week 3	End of Week 3	4%
Homework #4:	Week 5	End of Week 5	4%
Homework #5:	Week 7	End of Week 7	4%
Midterm Presentation		End of Week 4	35%
Final Presentation		End of Course	40%

### Grading Scale

Your final grade will be assigned as a letter grade according to the following scale:

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

## Description of Graded Components

Homework comprises 20% of the total grade (4% for each assignment). It must be individual work, but you may get help from the instructor and peers during office hours. Some questions have a single correct answer, some don't.

Group presentations comprise 80% of the total grade. Presentations are a group effort. ASE 6111 students will have specific graded parts. Team members will be surveyed and individual grades may be adjusted based on individual effort.

## Submitting Assignments

All assignments (homework and presentation slides) must be completed and submitted in Canvas. No other submission means are permitted and will not be accepted for a grade. If there are technical issues, please notify the help desk, as well as the professor immediately.

## Assignment Due Dates

All assignments are due by Friday, 9:00 pm EST, of the week listed above. This includes the presentation slides regardless of the day your team presents. If there is a change to these times, it will be posted on Canvas and an email will be sent to all students in advance.

## Timing Policy

The modules follow a logical sequence that includes knowledge-building and experience-building. Peer assessments must also be completed by the next day in order to give timely feedback.

## Grading and Feedback

Answers to the homework will be posted within a few days of the due date. The assignments will be graded by the next office hours so that students can have the opportunity to discuss any parts that are still unclear.

## Technology Requirements and Skills

### Computer Hardware and Software Requirements

At a minimum, students will need the following:

- High-speed Internet connection
- Laptop or desktop computer with a minimum of a 2 GHz processor and 2 GB of RAM
- Windows for PC computers OR Mac iOS for Apple computers.
- Complete Microsoft Office Suite or comparable and ability to use Adobe PDF software (install, download, open and convert)
- Mozilla Firefox, Chrome and/or Safari browsers

### Technology Skills

Students are expected to have any technology skills normal for modern graduate level academic pursuits. This includes, but is not limited to, logging in and navigating an online LMS and video telecon system, uploading files, and sending and replying to email. It will also include basic skills in MS Office software.



## Canvas

This class will use Canvas to deliver course materials to online students. ALL course materials and activities will take place on Canvas.

### Technology Help Guidelines

- For questions related to technology, contact Digital Learning Support for assistance. You can also reach the Canvas Hotline by phone at 1 (877) 259-8498 or email at [support@instructure.com](mailto:support@instructure.com).
- Include a descriptive title for the subject field that includes 1) the name of course 2) the issue.
- List the steps or describe the circumstance that preceded the technical issue or error. Include the exact wording of the error message.
- When possible, always include a screenshot(s) demonstrating the technical issue or error message.
- Also include what you have already tried to remedy the issue (rebooting, trying a different browser, etc.)

## Course Policies, Expectations & Guidelines

### Communication Policy

- Canvas should be used for all course related communications. Use the course discussion boards unless it is of a personal nature.
- Email and discussion boards will be checked daily and responded to within 24 hours during the work week unless otherwise announced.
- Virtual office hours will be held using Microsoft Teams every Wednesday starting at 7:00 pm EST.

### Online Student Conduct and (N)etiquette

Communicating appropriately in the online classroom can be challenging. In order to minimize this challenge, it is important to remember several points of “internet etiquette” that will smooth communication for both students and instructors:

1. **Read first, Write later.** Read the ENTIRE set of posts/comments on a discussion board before posting your reply, in order to prevent repeating commentary or asking questions that have already been answered.
2. **Avoid language that may come across as strong or offensive.** Language can be easily misinterpreted in written electronic communication. Review email and discussion board posts BEFORE submitting. Humor and sarcasm may be easily misinterpreted by your reader(s). Try to be as matter-of-fact and professional as possible.
3. **Follow the language rules of the Internet.** Do not write using all capital letters, because it will appear as shouting. Also, the use of emoticons can be helpful when used to convey nonverbal feelings. 😊
4. **Consider the privacy of others.** Ask permission prior to giving out a classmate's email address or other information.
5. **Keep attachments small.** If it is necessary to send pictures, change the size to an acceptable 250kb or less (one free, web-based tool to try is [picesize.com](http://picesize.com)).



6. **No inappropriate material.** Do not forward virus warnings, chain letters, jokes, etc. to classmates or instructors. The sharing of pornographic material is forbidden.

**NOTE:** The instructor reserves the right to remove posts that are not collegial in nature and/or do not meet the Online Student Conduct and Etiquette guidelines listed above.

### **University Use of Electronic Email**

A university-assigned student e-mail account is the official university means of communication with all students at Georgia Institute of Technology. Students are responsible for all information sent to them via their university-assigned e-mail account. If a student chooses to forward information in their university e-mail account, he or she is responsible for all information, including attachments, sent to any other e-mail account. To stay current with university information, students are expected to check their official university e-mail account and other electronic communications on a frequent and consistent basis. Recognizing that some communications may be time-critical, the university recommends that electronic communications be checked minimally twice a week.

### **Plagiarism & Academic Integrity**

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. All students enrolled at Georgia Tech, and all its campuses, are to perform their academic work according to standards set by faculty members, departments, schools and colleges of the university; and cheating and plagiarism constitute fraudulent misrepresentation for which no credit can be given and for which appropriate sanctions are warranted and will be applied. For information on Georgia Tech's Academic Honor Code, please visit <http://www.catalog.gatech.edu/policies/honor-code/> or <http://www.catalog.gatech.edu/rules/18/>.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

### **Copyright**

The materials used in this course are copyrighted and sole property of the Georgia Institute of Technology, Dr. Nicholas Hardman, or as otherwise annotated. Authorization is given to students enrolled in the course to reproduce this material exclusively for their own personal use. Note: copyright protection is not contingent on including a copyright notice on your Course Materials. The materials are protected as soon as they are created. However, including a notice reminds students of faculty ownership and copyrights and of students' obligations to respect those rights.

### **Accommodations for Students with Disabilities**

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404)894-2563 or <http://disabilityservices.gatech.edu/>, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

### **Attendance and/or Participation**

Attendance will not be taken in this course except for the required live presentations.

### **Collaboration & Group Work**

This course involves significant group work. The grading criteria for each assignment clearly delineate what portion of the grade will be assigned to the collaborative product and what will be assessed on the individual. Individual portions must be product of the student enrolled in this course. All outside resources are permitted as long as they are reference in nature (not used in lieu of the student's effort) and fully documented. This includes any artificial intelligence product such as ChatGPT.

### **Extensions, Late Assignments, & Re-Scheduled/Missed Exams**

Given the condensed nature of this course, there will be no extensions or re-scheduling. However, consideration will be made for emergencies and extenuating circumstances on a case-by-case basis in accordance with GIT policies.

### **Student-Faculty Expectations Agreement**

At Georgia Tech we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See <http://www.catalog.gatech.edu/rules/22/> for an articulation of some basic expectations of faculty and students. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek.