

## Syllabus

**Course Number: CS/AE/ECE/ME/BMED 8750/8751**  
**Course Title: Robotics Research Fundamentals I and II**  
**Credits: 3 for 8750 and 3 for 8751**  
**Class Day(s): Friday**  
**Time: 11:00am-12:55pm**  
**Location: Van Leer C241**

### Instructor Information

Instructor	Email	Office Hours & Location
Dr. Kyriakos Vamvoudakis	kyriakos@gatech.edu	Office: Montgomery Knight Bldg. Room 415B Office Hours: Thursday 02:00PM-03:00PM

### General Information

#### Description

The Multidisciplinary Robotics Research course is a project-oriented course that is designed to introduce students to research in robotics. The objective is for students to work on a “small” research project supervised by 2 faculty members. As part of the course the student should generate (i) a research plan, (ii) a literature review, (iii) a test protocol, and (iv) a paper that documents the results from the project. Oral presentations are made throughout the course to enhance research communication skills. Additionally, peer evaluation is introduced to provide students with practice giving and receiving feedback from peers as is the gold standard in research evaluations across disciplines. Peer evaluations are notionally “anonymous” but practically you can likely guess the author much as in real life.

#### Course Goals and Learning Outcomes

The objective of the course is to introduce students to research in robotics through execution of a small research project. This involves:

1. Generation of a project description including research objectives and/or research questions
2. Conducting a literature survey to understand prior work in the area
3. Designing a method and/or testing protocol for the project
4. Conducting the research
5. Documenting the project in a conference style paper or short technical report
6. Presenting the research to others
7. Evaluating peer research – oral presentations
8. Evaluating peer research – written

Projects are individual efforts, but similar projects or complementary projects are OK if each student conducts the research on an individual basis.

The project is conducted in cooperation with 2 project advisors that will supervise the project. The two project advisors must be academic, research, or clinical faculty from different academic units / schools / research units to ensure that there is good multi-disciplinary coverage within the project.

Upon prior approval from the instructor, one of the project advisors may be from an institution outside

of Georgia Tech. Such requests must be made during the first two weeks of class and be accompanied by a short CV for the proposed project advisor.

### Course Requirements & Grading

Students are responsible for managing the project and providing the required material on time as specified in the schedule. You must demonstrate competency of each of the course goals/learning objectives stated above. See the table below for which assignments map to which objective. Each assignment will be graded as having met the objective or not (roughly equivalent to earning a 75 or better). Grades are assigned according to the number of objectives you demonstrate competency in:

- A → 7 or 8 out of 8 objectives met.
- B → 6 out of 8 objectives met.
- C → 5 out of 8 objectives met.
- D → 4 out of 8 objectives met.
- F → fewer than 4 objectives met.

Assignment	Objective Supported
3-slide presentation [= 5 min max] outlining the objectives of your project	6 (half)
1-page Research project executive summary with signatures from the two project advisors	1
2-page literature survey with at least 8 references to related work + Peer review of 2 other literature surveys	2 8 (half)
2-3 page methodology and planned evaluation	3
Interactive 5-min presentation outlining the objectives, methodology, and preliminary results + Peer review of all other presentations	6 (half) 7
Final report, formatted as a 6-8 page IEEE style conference paper, and signatures from the two project advisors approving the final project deliverables + Peer review of 2 other papers	4, 5 8 (half)

Written deliverables are to be provided in a single-space, 10 to 12-point font, 1" margin format. Using the IEEE style (<https://www.ieee.org/conferences/publishing/templates.html>) from the beginning will make it easiest to integrate all project text for the final paper/report. The report must contain the following sections (or equivalent section titles): Abstract (<300 words), Introduction, Background, Methods, (Results), and Discussion/Conclusions. I suggest giving overleaf.com a try.

- Written deliverables should be in PDF format.**
- Presentation deliverables must be in PPT format.**

**All deliverables should be submitted online using the CANVAS System.**

### Course Expectations & Guidelines

#### Attendance and/or Participation

Attendance is mandatory for all in class / in person presentations. Any absences without a valid excuse will result in an automatic reduction in the weighted score for that assignment. Hence, if a particular in class presentation has 50% weightage and you are absent, your score will be 0% for that in class participation.

## Assignment Turn-In

All assignments must be submitted on CANVAS on the day/time listed. **No hardcopy will be accepted.**

## Collaboration & Group Work

- The students are allowed and encouraged to collaborate with each other during the semester.

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

- Late submission policy:** Late days past the due date are counted in 24-hour periods. Written deliverables will be marked 20% down on an individual assignment each day late. Written deliverables over 1 week late will not be accepted.

## Schedule

Date	How we will spend our time in class	Anything Due?
12-Jan	No class - Please review syllabus	--
19-Jan	Discuss syllabus, purpose of class, and answer questions about advisors and projects. Short discussion about what makes a good research question.	--
26-Jan	<i>Class not scheduled</i>	--
2-Feb	<i>Class not scheduled</i>	--
9-Feb	Project brainstorming and feedback. Discussion of the best use of the 3 slides.	--
16-Feb	Presenting initial project slides.	3-slide presentation (night prior)
23-Feb	<i>Class not scheduled</i>	--
1-Mar	<i>Class not scheduled</i>	Extended abstract for research project + proof of approval
8-Mar	How to write a literature review.	--
15-Mar	<i>Class not scheduled</i>	Annotated bibliography & Literature synthesis
22-Mar	SPRING BREAK	
29-Mar	How to review papers. And, how to write for reviewers.	--
5-Apr	<i>Class not scheduled</i>	Peer review of assigned Annotated bibliographies and literature syntheses & Method section draft
12-Apr	<i>Class not scheduled</i>	--
19-Apr	Presenting project progress thus far.	5-min presentation (night prior)
26-Apr	<i>NOT CLASS, day before</i>	Final report
3-May	<i>NOT CLASS, final exam period</i>	Peer review of final reports due

## **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. 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/>.

## **Accommodations for Individuals 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 to set up a time to discuss your learning needs.

## **Student-Faculty Expectations**

At Georgia Tech we believe that it is important to continually strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See <http://www.catalog.gatech.edu/rules/21/> for an articulation of some basic expectations – that you can have of me, and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech, while in this class.

## **Well-Being**

The School of Aerospace Engineering values the complete well-being of all members of its community, which includes professional, physical, spiritual, emotional, and social dimensions. There are numerous resources to support the health and well-being of all members of our community: <https://gatech.instructure.com/courses/108574>

## **Mental Health Resources**

Emergencies: Can either Call 911 or call Campus Police at 404.894.2500 <http://www.police.gatech.edu/>

Center for Assessment, Referral, & Ed. (CARE): <https://care.gatech.edu/> 404.894.3498 (Counselor On-Call)

Counseling Center: <https://counseling.gatech.edu/> 404.894.2575

Stamps Health Services: <https://health.gatech.edu/> 404.894.1420

Student Life and Dean of Students: <https://studentlife.gatech.edu/content/get-help-now>  
404.894.6367

Victim-Survivor Support (VOICE): <https://wellnesscenter.gatech.edu/voice> 404-385-4464/(or 4451)

National Suicide Prevention Lifeline: 1.800.273.TALK (8255)

Georgia Crisis and Access Line: 1.800.715.4225

## **COVID-19 Safety**

GT Safety Guidelines: <https://health.gatech.edu/tech-moving-forward>

Current guidance is summarized at the site above and please continue to follow the site above and other Institute communications in case changes occur:

## **Social Justice**

The School of Aerospace Engineering values social justice for all members of the Georgia Tech community and the larger society. Social justice means that everyone's human rights are respected and protected. We stand committed in the fight against racism, discrimination, racial bias, and racial injustice. Our shared vision is one of social justice, opportunity, community, and equity. We believe that the diversity and contributions from all our members are essential and make us who we are. We believe that our impact must reach beyond the classroom, research labs, our campus, and the technology we create, but must also improve the human condition where injustice lives. We will continue to work to understand, value, and celebrate all people and create an inclusive educational and work environment that welcomes all.

As a matter of policy, Georgia Tech is committed to equal opportunity, a culture of inclusion, and an environment free from discrimination and harassment in its educational programs and employment. Georgia Tech prohibits discrimination, including discriminatory harassment, based on race, ethnicity, ancestry, color, religion, sex (including pregnancy), sexual orientation, gender identity, national origin, age, disability, genetics, or veteran status in its programs, activities, employment, and admissions.

<http://policylibrary.gatech.edu/equal-opportunity-nondiscrimination-and-anti-harassment-policy>