

COURSE OUTLINE – ECE 8920, Hybrid Rigid-Continuum Robots

Spring 2022

I.D. Walker, EIB 320

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Room: None

Time: By appointment

Text: None

Office Hours: By appointment

Prerequisites: ECE 8680, Architectural Robotics

Description: Recent research in soft continuum robot structures offers new and alternative ways to endow conventional rigid-link robot structures with compliance. This course will cover the state of the art in soft continuum and hybrid robot structures, emphasizing novel open research directions.

Topical Outline:

- Survey of research literature on continuum robots
- Review of techniques for endowing rigid-link robots with compliance
- Analysis of advantages/disadvantages of existing approaches
- Synthesis of new/novel hybrid rigid-continuum robot design strategies
- Prototyping/implementation of designs in robot hardware
- Final project report

Organization

Written final project, suitable for submission to refereed conference, required. Students will give an in-class presentation of their project results.

Course Objectives and Learning Outcomes

By the completion of this course, students will develop an understanding of how soft continuum robot subsystems can be designed and integrated and analyzed to improve the performance of rigid-link robot systems. They will demonstrate the ability to apply the approach to design and demonstration of robot hardware.

Assessment of Student Performance and Grading Policies

Students will receive a grade in response to the work presented and documented, weighted as follows:

(50%) in class project presentation, (50%) written final report.

Grading scale: 90-100 A; 80-89 B; 70-79 C; 60-69 D; Below 60 F

Attendance and Course Cancellation Policy

Students are responsible for all material covered in class. If instructor is more than 15 minutes late for class, students can assume no class that day.

Accessibility Statement

Clemson University values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources. Students who experience a barrier to full access to a class should let the instructor know and make an appointment to meet with a staff member in Student Accessibility Services as soon as possible. You can make an appointment by calling 864-656-6848 or by emailing studentaccess@lists.clemson.edu. Students who receive Academic Access Letters are strongly encouraged to request, obtain, and present these to their instructors as early in the semester as possible so that accommodations can be made in a timely manner. It is the student's responsibility to follow this process each semester. You can access further information here: <http://www.clemson.edu/campus-life/campus-services/sds/>.

Title IX Statement

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Safe Campus

Clemson University is committed to providing a safe campus environment for students, faculty, staff, and visitors. As members of the community, we encourage you to take the following actions to be better prepared in case of an emergency:

- a. Ensure you are signed up for emergency alerts
(<https://www.getrave.com/login/clemson>)
- b. Download the Rave Guardian app to your phone
(<https://www.clemson.edu/cusafety/cupd/rave-guardian/>)
- c. Learn what you can do to prepare yourself in the event of an active threat
(<http://www.clemson.edu/cusafety/EmergencyManagement/>)

Academic Integrity

As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a 'high seminary of learning.' Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic

dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form. In instances where academic standards may have been compromised, Clemson University has a responsibility to respond appropriately to charges of violations of academic integrity. Further information on Academic Integrity can be found in the [Undergraduate Announcements](#) and in the [Graduate School Policy Handbook](#).

Copyright Statement

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Emergency Preparedness Statement

Emergency procedures have been posted in all buildings and on all elevators. Students should be reminded to review these procedures for their own safety. All students and employees should be familiar with guidelines from the Clemson Police Department. [Visit here for information about safety.](#)

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2. Download the [Rave Guardian app](#) to your phone (<https://www.clemson.edu/cusafety/cupd/rave-guardian/>)
3. Learn what you can do to [prepare yourself](#) in the event of an active threat (<http://www.clemson.edu/cusafety/EmergencyManagement/>)

Modification Statement

The instructor reserves the right to modify any aspect of the syllabus at any time during the semester for reasons including but not limited to COVID-related situations.

1/10/2022