












**Creative Inquiry:
Automotive Security and
Privacy (Fall 2023)**
CPSC 1990/3990

Instructor Info —

-  Mert D. Pesé
-  Office Hours: On Request
-  215 McAdams Hall
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Course Info —

-  Prereq: None for CPSC 1990, Junior Standing for CPSC 3990
-  Contact GRA
-  Contact GRA
-  112A McAdams Hall

Course Description

With the rapid advancement of automotive technologies, modern vehicles have evolved into complex systems that rely heavily on software, communication networks, and various interconnected components. This Creative Inquiry (CI) course delves into the critical realm of automotive security and privacy, equipping students with the knowledge and skills required to understand, assess, and address the cybersecurity challenges that arise in today's connected and autonomous vehicles. This CI course is designed to introduce students to the field of automotive security and privacy, and teach students to conduct cutting-edge research on this novel research topic. Furthermore, this course will also prepare students to understand security and privacy challenges in vehicles in general, as well as open new career opportunities in automotive and security companies and academic research. The CI team will identify new vulnerabilities, learn how to write technical reports and responsible disclosures, as well as write peer-reviewed academic papers. Participation in a security workshop or conference is particularly encouraged.

(Tentative) Grading Scheme for CPSC 1990

- 50% CI Project: Please refer to "detailed description" for the scope of this semester's focus.
- 40% CI Forum Poster: Annual Focus on Creative Inquiry (FoCI) event
- 10% Meeting Attendance: Weekly meetings to learn new material, discuss progress and next steps.

(Tentative) Grading Scheme for CPSC 3990

- 50% CI Project: Please refer to "detailed description" for the scope of this semester's focus.
- 20% CI Forum Poster: Annual Focus on Creative Inquiry (FoCI) event
- 20% Paper Writing: Contribution to academic conference paper writing.
- 10% Meeting Attendance: Weekly meetings to learn new material, discuss progress and next steps.

Required Materials

There is no official textbook for the class. Teaching material such as slides, video tutorials, research papers, etc. will be provided.

Learning Objectives

- Gain an in-depth understanding of the architecture and components of modern vehicles, including embedded systems, communication protocols, infotainment systems, and advanced driver assistance systems (ADAS)
- Explore the evolving threat landscape specific to the automotive industry, including potential cyberattacks, privacy breaches, and implications for driver and passenger safety
- Learn techniques for identifying vulnerabilities in automotive systems, including reverse engineering, penetration testing, and analysis of potential attack vectors
- Investigate privacy concerns related to vehicle data collection, storage, and sharing. Learn techniques to enhance user privacy while maintaining essential functionalities
- Learn to summarize their findings by writing a technical report and/or responsible disclosure
- Engage in hands-on group projects that involve analyzing, designing, and implementing security measures for automotive systems, fostering teamwork and practical problem-solving skills

Grading Policies

Letter grades are assigned according to the standard 10-point scale:

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

The final score will be rounded up, e.g., if you receive a 89.5, it will be rounded up to 90 and you will still receive an A. There will be no extra credit opportunities throughout the semester. Curving is at the discretion of the professor.

Absences

You are expected to attend every meeting unless classes have been officially canceled by the University. Attendance will be recorded at every meeting and it is used in grade calculation (see Grading Policy). Students who miss class meetings (without an official excuse, e.g. doctor's note etc.) will be dropped from the course.

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.

See the Undergraduate Academic Integrity Policy website for additional information and the current catalogue for the policy. For graduate students, see the current Graduate School Handbook for all policies and procedures.

Accessibility

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 this 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, by emailing studentaccess@lists.clemson.edu, or by visiting Suite 239 in the Academic Success Center building. Appointments are strongly encouraged – drop-ins will be seen, if at all possible, but there could be a significant wait due to scheduled appointments. Students who have accommodations are strongly encouraged to request, obtain and send these to their instructors through the AIM portal 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 at the Student Accessibility website. Other information is at the university's Accessibility Portal.

The Clemson University Title IX Statement Regarding Non-Discrimination

The Clemson University Title IX statement: Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran's status, genetic information or protected activity in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972. This Title IX policy is located on the Campus Life website. Ms. Alesia Smith is the Clemson University Title IX

Clemson University aspires to create a diverse community that welcomes people of different races, cultures, ages, genders, sexual orientation, religions, socioeconomic levels, political perspectives, abilities, opinions, values and experiences.

Emergency Preparation

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 University Police Department. Visit [here](#) for information about safety.

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:

1. Ensure you are signed up for emergency alerts
2. Download the Rave Guardian app to your phone
3. Learn what you can do to prepare yourself in the event of an active threat

Changes to Syllabus

Lecture topics and assignments are subject to change. The course syllabus is a general plan for the course; deviations to the class may be necessary and will be announced to class by the instructor.

Ethics and Law

To defend a system, you need to be able to think like an attacker, and that includes understanding techniques that can be used to compromise security. However, using those techniques in the real world may violate the law or the university's rules, and it may be unethical. Under some circumstances, even probing for weaknesses may result in severe penalties, up to and including expulsion, civil fines, and jail time. Our policy in this course is that you must respect the privacy and property rights of others at all times, or else you will fail the course.

Acting lawfully and ethically is your responsibility. Carefully read the Computer Fraud and Abuse Act (CFAA), a federal statute that broadly criminalizes computer intrusion. This is one of several laws that govern "hacking." Understand what the law prohibits. The EFF provides helpful advice on vulnerability reporting and other legal matters.