CSCE 491: Capstone Computer Engineering Project
Spring 2026
Updated 1/12/26

1 Catalog Description

Advanced computer systems engineering. Team projects. Written reports and oral presentations in a technical setting.
Prerequisites: D or better in CSCE 240, CSCE 313, CSCE 611

2 Meeting Times

Time: T Th 10:05 to 11:20
Location: Swearingen 2A31 (lecture) or Swearingen 3D22 (lab)
Location for each class will be announced on Blackboard
3D22 combination: 4-5-2-1-3

3 Electronic Resources

1. Project submission, grade dissemination, up-to-date schedule, downloads, announcements, links to useful information, project descriptions are disseminated via Blackboard.

2. Lecture recordings: https://youtube.com/c/JasonBakos

3. We will use electronic design software installed in the CSE departmental computer labs. The CSE labs are located in Swearingen 1D43 and 3D22. Be sure you can log into the lab computers in 3D22.

4. Urgent course announcements are broadcast on the website and to your university e-mail (@email.sc.edu). Please regularly check (or forward) this e-mail address.

5. Each project group must find their own preferred method for collaborating (e.g. GitHub, Dropbox, etc.).

Contact Ryan Austin (rmaustin@cse.sc.edu) for lab support (e.g. logging in, backup file retrieval, etc.).

4 Textbook

"Integrative Design and Programming of Internet-of-Things and Cyberphysical Platforms (Preliminary Edition)"
https://store.cognella.com/83159-1a-ni-001

5 Course Learning Outcomes:

- Identify, formulate, and solve complex computer engineering problems.

- Apply the techniques, skills, and tools of modern computer engineering practice to design a system consisting of both hardware and software components.

- Design a system that meets specified needs with consideration of multiple constraints.

- Communicate effectively with a range of audiences.

- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

6 Important Dates

Date	Day of Week	Notes
Jan. 13	Tuesday	First class meeting (Swearingen 3A31)
Jan. 20	Tuesday	Last day to change/drop a course without a grade of "W" being recorded
Mar. 10/12	Tuesday/Thursday	Class canceled; spring break
Mar. 30	Monday	Last day to withdraw
Apr. 23	Thursday	Last class
Apr. 23	Tuesday	Project submission cutoff
May 5 (9-11 am)	Tuesday	Final exam

7 Instructors and Teaching Assistants

Instructor:	Jason D. Bakos
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Teaching assistant:	Alex Anderson-McLeod (Ph.D. student)
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Teaching assistant:	Suyash Singh (Ph.D. student)
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8 Grading Structure

Quizzes will be administered through Blackboard.

There will be six lab projects, each requiring students to implement concepts covered in class.

Task	Weight
Lab projects	50%
Midterm exam	15%
Quizzes	15%
Final exam (comprehensive)	20%

9 Approximate Schedule by Topic

Week	Topic
Wks. 1-2	System-Level Interfacing
Wks. 3-4	Hardware Control
Wks. 5-6	ESP32 Peripherals: RMT, LEDC, PCNT
Wks. 7-11	(Project Work)
Wks. 12-13	Control Theory
Wks. 13-14:	Real-time Systems

10 Disability Support

The University of South Carolina is committed to providing access to programs and services for qualified students with disabilities. If you are a student with a disability and require accommodation to participate and complete requirements for this class, notify me immediately and contact the Student Disability Resource Center (http://www.sa.sc.edu/sds, 1705 College Street, Close-Hipp, Suite 102, 803-777-6142, sasds@mailbox.sc.edu) for verification of eligibility and determination of specific accommodations. In addition, please provide me the required accommodation letter from the Student Disability Resource Center. All course materials are available in alternative format upon request.

11 Syllabus Change Policy

This syllabus is a guide for the course and may be subject to change during the semester to best meet the needs of the class. Any changes will be communicated promptly through Blackboard and e-mail.

12 Grading scale

Grade	Criteria
A	$90 \leq score \leq 100\%$
B+	$85 \leq score < 90\%$
B	$80 \leq score < 85\%$
C+	$75 \leq score < 80\%$
C	$70 \leq score < 75\%$
D+	$65 \leq score < 70\%$
D	$60 \leq score < 65\%$
F	$score < 60\%$

13 Academic Honesty Policy

The members of each group are expected to work cooperatively and make nearly equal contributions toward each project. Inter-group collaboration is prohibited and is subject to the university's guidelines, regulations, and policies regarding academic dishonesty.

See the USC Honor Code at bit.ly/USCHonorCode.

Any student caught committing an Honor Code violation will receive a grade of 0 for the corresponding assignment or exam and the instructor will report the violation to the Office of Academic Integrity.

14   Generative AI Policy

You may use generative AI as a development tool, but keep the following in mind: (1) you will be responsible for explaining your project code during project demonstrations, and (2) some aspects of the lab code will be covered by the in-class, written closed book midterm and final exam.

15   Lecture and Lab Attendance Policy

Attendance in lecture and labs is optional but highly encouraged. Lectures will usually appear on Youtube within 24 hours.

Note that the projects will generally require more time than the lab periods allocated to each project. Significant lab work outside of scheduled lab time may be necessary to complete the projects on time. We suggest that students start each project outside of class time to get the most benefit from TA assistance during the latter part of their project work.

16   Group Work Policy

Group sizes of two are preferred, but group sizes of one are also allowed. Project expectations for one-member groups will be the same as for two-member groups. Three-member groups are not allowed.

Choose your group partner wisely. Both members of each group will receive the same grade for all projects.

17   Project Submissions

- Submitted projects must compile (both hardware and software) to receive partial credit.

- Only one member of each project group need submit each project. Project scores are assigned to each member of the group.

- Each project grade is assigned in part or in whole based on a project demonstration by the project group. All group members must be present for the project presentation.

- Students must submit each project on Blackboard by 11:59PM on the due date to receive full credit.

- Late projects are charged a 7.5% grade penalty for each school day after the due date, limited to a maximum of 45%. This way, projects submitted more than six days late are still subject to a 45% late penalty. This penalty is deducted from the raw score of the submission, so a one-day late submission earning a raw score of 80% will have a final score of 80% x 92.5% = 74%.

  Late penalties are based on the date and time at which the project is submitted (uploaded) to Blackboard, NOT the date and time of the project demonstration. This way, students may demonstrate a project at any time after project submission without accruing late penalty. However, students must demonstrate the same version of the project that is submitted, and the project will not receive a grade until after the project is demonstrated.

- At most, each group may only submit one version of any project; no resubmissions are allowed.

- Any projects not submitted and demonstrated by 11:59pm on Apr. 23 will receive a score of 0 without a documented medical excuse.