

# CS 4991 Capstone Technical Report Syllabus

January 17–May 19, 2024

Rosanne Vrugtman (zwj6ua), Technical Writing Instructor

Briana Morrison (wxt4gm), Technical Advisor

## I. INTRODUCTION

CS4991 is a mandatory, 0-credit, Pass/Fail course. No textbook and no class meetings, though the instructor may set periodic office hours and is also available for student consultation via email or Zoom.

## II. PURPOSE OF THE COURSE

Capstone projects are part of all SEAS programs at UVA. The CS4991 course goal is production of a well-crafted, publish-ready 3-4 page paper in a formal technical report format documenting the student's scholarship and achievement. The Capstone provides students with a document they can share with prospective employers and serves at least two other unique purposes:

### A. Technical: The Capstone:

1. demonstrates the ability to synthesize technical knowledge gained in the CS program across courses, applications, and experiences;
2. caps off students' undergraduate education by demonstrating what they have learned;
3. applies internship, development and related experiences to the workplace or other arenas;
4. allows students to propose new approaches or solutions based on their knowledge; and/or
5. provides a technical record showing a student's workplace readiness.

### B. Writing: The Capstone:

1. codifies the student's experience as a CS intern, employee, team member or innovator;
2. makes student-produced "new knowledge" available within the larger CS arena;
3. provides a structure for publishing work in an ACM journal, producing conference presentations, or delivering information for other formal technical media;
4. teaches the proper format for preparing a publish-ready technical report; and
5. supports the UVA library archives for business people, researchers or others interested in exploring CS solutions to problems or needs.

## III. FIT OF COURSE INTO PROGRAM

The Capstone is a mandatory component of the Thesis Portfolio required by the Undergraduate Curriculum Committee for all 4<sup>th</sup>-year BSCS students. CS4991 is part of the CS 4xxx elective option in the 4th-year CS thesis track. Consult a technical advisor for clarification. Students should take this course if they are 4th-year, and not taking CS4980 or a CS 3xxx/4xxx independent study. The course requires STS 4500 as a pre- or co-requisite.

Prof. Briana Morrison explains the connections between the Capstone Technical Report, the Prospectus and STS paper:

The CS4991 Capstone is the "Technical Report"; the paper you write in STS 4600 is the "STS paper." The topic of the STS 4600 paper may relate closely, loosely or not at all to the Capstone technical report, but is meant to focus on the interplay between technology and society. The Prospectus is the abstract from your Technical Report plus the "ethics side," which answers the question: How does this affect society? Students may choose how closely (or not) they wish to connect these deliverables.

## IV. COURSE FORMAT

The Capstone is to be formatted like this syllabus—single-spaced throughout with a centered title/heading and two full-justified columns for all text thereafter (see *CS4991 Writing Guide* for more details). Please use the "CS4991 Sample Report Format" file in Canvas as your report template aid.

## V. CAPSTONE TOPIC OPTIONS

Students have two broad options for project topics:

### Option 1--Experiential

Describe an experiential learning event that 1) was an element or outgrowth of your UVA program—internship, development project, non-profit volunteer effort, etc.; and 2) offered value to a specific organization, group or community-at-large.

Option 1 reports should discuss the internship or other project, including significance, techniques/tools used, skills gained, results or potential, and future work needed.

### **Option 2--Proposal**

Propose an innovative CS-related solution to a problem or need, utilizing a unique approach or one that enhances current technology applications.

Option 2 report topics might: 1) explain how a given problem can be solved or a given need met utilizing a new, different or enhanced CS-related approach; 2) provide a meta-study review on a CS-related topic; or 3) develop recommendations for enhancing the value of the UVA CS program or given courses through redesign or enhancement. See the *CS4991 Writing Guide* for more ideas and details.

**Alternatives:** Other topics or approaches may be utilized with instructor approval. Creative, out-of-the-box thinking is welcome and encouraged.

## **VI. DELIVERABLES/DEADLINES**

The full report should be complete within 4 pages maximum. Assignments will follow a standardized technical report format and references should utilize the standard ACM or APA style. Submit as DOCX files. **Do NOT submit assignments as PDFs!**

### **Assignment 1—Due Fri., February 2** **Title/Subtitle, Header, Abstract**

- **Title, Subtitle,\* Header Info:** Center info at top of page, following standard technical report format. Titles, typically 15 wds max., should indicate the contents of the report and/or CS approach used. A subtitle is typical but optional.
- **Abstract:** Utilize standard two-column report format from this point in the project. Abstracts are unnumbered. Typically a single paragraph (6-8 sentences), this is NOT an introduction; it is a concise summary of the FULL report. Do NOT number Abstract section.

### **Assignment 2—Due Fri., February 23** **Introduction, Background, Related Works**

- **1. Introduction, Background\*:** Begin the numbering of the sections with 1. Introduction. Background is optional and may be combined with the Introduction or omitted. If included, number sequentially as 2. Background.

- **2. Related Works:** Number this section sequentially from previous section. Provide a brief literature review, citing seminal, developmental and/or recent work in the topic area. Sources may include studies, papers, online sites, articles, conference proceedings, textbooks, training materials or other sources.

### **Assignment 3—Due Fri., March 22** **Process Design, Results**

- **3. Process Design/Proposal Design:** This section represents the major student work done on the Capstone topic project or proposal. If divided into subsections, include a number and brief introduction for each one. Add numbered and captioned figures, slides, graphs, charts, screen shots, equations or other images as needed to illustrate.
- **4. Results/Anticipated Outcomes:** Share project results and implications, or anticipated outcomes if project is proposed or incomplete.

### **Assignment 4—Due Fri., April 12** **Conclusion, Future Work, Acknowledgments, References**

- **5. Conclusion:** Brief but strong statement summarizing importance of the project.
- **6. Future Work:** Brief discussion of any unfinished work, next steps, enhancements, potential new or alternative applications, etc.
- **Acknowledgments\*:** Recognize team members, coworkers, colleagues, professors, advisors, instructors, coaches, or others.
- **References:** Include citations from Related Works section and any other sources cited anywhere in the report, utilizing ACM or APA styles. Do NOT number References section.

### **Assignment 5—Due Fri., May 3** **Capstone Technical Report—FINAL**

- **Capstone (Final):** 3-4 pages; should include all sections and improvements made to any section during the term. Instructor will assign a Pass/Fail grade at the end of the course.  
**A PASS is REQUIRED for graduation!**

*\* Sections marked with an asterisk are optional.*

## VII. CAPSTONE REPORT ARCHIVES

UVA permanently archives Capstone reports. For proprietary projects, students may arrange for the report to remain publicly inaccessible for a given timeframe. Contact UVA Librarian Maggie Nunley with questions or to make arrangements. Contact her via the Canvas site, by email at [mn3fa@virginia.edu](mailto:mn3fa@virginia.edu) or phone at 434-924-1343.

## VI. HONOR POLICY

Every student in this course is trusted to fully comply with all of the provisions of the University's Honor Code. By enrolling in this course, students agree to abide by and uphold the university's Honor System, as well as policies specific to this course. It is NOT necessary to include an honor policy notice with your CS4991 report.

## VIII. ADDITIONAL COURSE NOTES

A. Assume the Capstone reader is a non-computing/ non-technical professional.

B. To help me organize and find a given student's assignment, please title your submissions files as: **[LAST NAME] [First Name] Assignment #.docx**.

EX: **EAST Chris Assignment 1.docx**

OR: **EAST Chris Assignment 2.docx**

C. ACM formatting info (MS Word or LaTeX) at: [ACM Word and LaTeX Templates](https://www.acm.org/publications/taps/word-template-workflow)  
<https://www.acm.org/publications/taps/word-template-workflow>

D. Section titles—especially sections 3 and 4 of Option 2 reports—may vary depending on the topic chosen and the nature of the project.

The complete *CS4991 Writing Guide* reference will be emailed to students with this syllabus and will also be available in the Resources area of Canvas. Additional guidance will be emailed as requested or needed. Individual Zoom conferences may be scheduled as needed and office hours will be announced as arranged.

**Students are urged to consult the *CS4991 Writing Guide* prior to submitting assignments.** It contains detailed instructions for each section of the Capstone. The *Guide* will answer many questions, providing clarity and saving time and effort for all.

**PLEASE KNOW:** The instructor will read **every word** of every student project and will provide thorough and specific feedback on Assignments 1-4. Students should utilize this feedback to revise and resubmit any portion of assignments until the final version of the Capstone report is submitted as Assignment 5. Students are also free to disagree with instructor guidance or provide alternative perspectives at any time. Feedback will be provided on Assignment 1-4. Only Assignment 5 will be graded.

Discussion is encouraged and welcome! Please direct any questions or concerns to the writing instructor or technical advisor via email at any time.

---

## STUDENT ASSISTANCE POLICIES

### I. Students with Disabilities/Learning Needs

It is UVA's goal to create a learning experience that is as accessible as possible. If you anticipate any issues related to the format, materials, or requirements of this course, please contact the instructor so we can explore potential options. Students with disabilities may also wish to work with the Student Disability Access Center (SDAC) to discuss a range of options to removing barriers in this course, including official accommodations. We are fortunate to have an SDAC advisor, Courtney MacMasters, [cmacmasters@virginia.edu](mailto:cmacmasters@virginia.edu), physically located in Engineering. Email her to schedule an appointment.

For general questions please visit the [SDAC website](https://sdac.studenthealth.virginia.edu): [sdac.studenthealth.virginia.edu](https://sdac.studenthealth.virginia.edu). If you have already been approved for accommodations through SDAC, please send her your accommodation letter and meet with her so you can develop an implementation plan together.

### II. Religious Accommodations

It is the University's long-standing policy and practice to reasonably accommodate students so that they do not experience an adverse academic consequence when sincerely held religious beliefs or observances conflict with academic requirements.

Students who wish to request academic accommodation for a religious observance should submit their request by email as far in advance as possible. Students who have questions or concerns about academic accommodations for religious observance or religious beliefs may contact the [University's Office for Equal Opportunity and Civil Rights](#) (EOCR) at [UVAEOCR@virginia.edu](mailto:UVAEOCR@virginia.edu) or 434-924-3200.

### III. Support for Career Development

Engaging in your career development is an important part of your student experience. For example, presenting at a research conference, attending an interview for a job or internship, or participating in an extern/shadowing experience are not only necessary steps on your path but are also invaluable lessons in and of themselves. We encourage and support activities related to your career development.

### IV. Student Support Team

You have many resources available to you if you experience academic or personal stresses. In addition to your professor, the School of Engineering and Applied Science has staff members located in Thornton Hall you can contact to help manage academic or personal challenges.

### V. Learning

[Lisa Lampe](#), Director of Undergraduate Education  
[Blake Calhoun](#), Director of Undergraduate Success  
Courtney MacMasters, Accessibility Specialist,  
[cmacmasters@virginia.edu](mailto:cmacmasters@virginia.edu)  
[Free tutoring](#) is available for most classes.

### VI. Health and Well-being

[Assistant Dean of Students](#), Student Safety and Support  
[Elizabeth Ramirez-Weaver](#), CAPS counselor  
[Katie Fowler](#), CAPS counselor

You may schedule time with the CAPS counselors through [Student Health](#) (<https://www.studenthealth.virginia.edu/getting-started-caps>). When scheduling, be sure to specify that you are an Engineering student. You are also urged to use [TimelyCare](#) for either scheduled or on-demand 24/7 mental health care.

### VII. Community and Identity

The [Center for Diversity in Engineering](#) (CDE) is a student space dedicated to advocating for underrepresented groups in STEM. It exists to connect students with the academic, financial, health, and community resources they need to thrive both at UVA and in the world. The CDE includes an open study area, event space, and staff members on site. Through this space, we affirm and empower equitable participation toward intercultural fluency and provide the resources necessary for students to be successful during their academic journey and future careers.

### VIII. Harassment, Discrimination, and Interpersonal Violence

The University of Virginia is dedicated to providing a safe and equitable learning environment for all students. If you or someone you know has been affected by power-based personal violence, more information can be found on the [UVA Sexual Violence website](#) that describes reporting options and resources available:

[www.virginia.edu/sexualviolence](http://www.virginia.edu/sexualviolence)

The same resources and options for individuals who experience sexual misconduct are available for discrimination, harassment, and retaliation. [UVA prohibits discrimination and harassment](#) based on age, color, disability, family medical or genetic information, gender identity or expression, marital status, military status, national or ethnic origin, political affiliation, pregnancy (including childbirth and related conditions), race, religion, sex, sexual orientation, veteran status. [UVA policy](#) also prohibits retaliation for reporting such behavior.

If you witness or are aware of someone who has experienced prohibited conduct, you are encouraged to submit a report to [Just Report It](#) ([justreportit.virginia.edu](http://justreportit.virginia.edu)) or [contact EOCR](#), the office of Equal Opportunity and Civil Rights.

If you prefer to disclose such conduct to a confidential resource where what you share is not reported to the University, you can turn to [Counseling & Psychological Services](#) (“CAPS”) and [Women's Center Counseling Staff and Confidential Advocates](#) (for students of all genders)

