5925 Integrated Project Design Fall 2024

Draft Syllabus -Subject to change until class begins

Instructional Staff Information

Instructors

Instructor	Dr. Erika Olimpiew	Dr. Melissa Cameron
Office	470 NVC	467 NVC
Office hours	TBD	TBD
E-mail	eolimpie@vt.edu	melissacameron@vt.edu

GTAs

GTAs	Office	Office Hours	E-mail

Communication

- ○ Canvas

- - - Make sure to check the homepage, announcements, files, the tentative schedule and assignments often!
    - You may also receive emails from the instructional staff through Canvas
    - You may contact the instructional staff through Canvas
  - Email
    - You may contact the instructional staff individually at their respective email addresses (see above) but you may get a faster response using the class email address <TBD>
    - Emails sent to the instructional staff will generally be answered within 2 business days
      - *Exceptions* include but are not limited to:
        - Emails, sent to the instructional staff, regarding information that is easily available through the Canvas site (for example the date of the final) or previously distributed to students through email (for example information about optional preparation for the semester) may not receive an answer.
  - Office Hours
    - If you have questions, you may go to the office hours of the instructional staff using the means specified above for each instructional staff member.
    - In order to provide equitable access to the instructional staff, the length of time and/or the number of times (within a specific time period) you may attend office hours may at times be limited.

Where to find information

Being a professional requires being mindful of others' time, therefore before sending an email or attending office hours, try to find the answer to the question yourself. You can use a number of resources available to you:

- If the question is related to class administration, check the syllabus, schedule and announcements on Canvas (including announcements and Piazza).
- If the question is related to recent information, check Canvas (including announcements and Piazza) lecture slides as well as previous emails sent to you.
- If the question is assignment related, check Canvas (including announcements and Piazza) lecture slides and emails sent to you to see if it has already been answered.
- If you have a general question that has not already been addressed on Canvas, in email or from the lecture slides, post your question to the appropriate section of Piazza.
- **Grade-Related Questions:** If you have a question specific to you or your grade, email it to the instructional staff.
- If you have a question that is beyond the scope of an email, consider coming to office hours or scheduling an appointment.

Course Information

Course Description

Provides an introduction to project-driven, team-based, experiential learning fundamentals; study of team management; the professional and ethical implications of proposals; design and implementation of large projects. Software engineering first principles and tools will be applied to the generation of design ideas to solve open-ended societal and/or individual needs. Projects will be fully integrated across CS 5925 and CS 5926, and drive the practical study of team management, professionalism, ethics, and software engineering principles. Discussions of ethics case studies and application of ethical principles throughout project design and implementation.

Prerequisites/Corequisites

Prerequisites: Graduate student in good standing and a graduate-level proficiency in English. CS5040 Intermediate Data Structures and Algorithm Analysis or equivalent.

Course credit will not be awarded for both CS 5925 and CS 5704 Software Engineering. Course credit will not be awarded for both CS 5925 and CS 5024 Ethics and Professionalism.

Knowledge Expectations: Proficiency in a high-level programming language (i.e. Python, Java, C/C++, JavaScript, etc.) for use in your project. Any examples given in class will be in Java.

Learning Outcomes

Having successfully completed this course, the student will be able to:

1. Locate and use sources of background technical information on current ethics topics related to privacy, intellectual property, algorithmic decision making, and other topics.
2. Weigh and apply ethical framing employed by opposing views in current computing technology-related topics such as privacy, intellectual property, algorithmic decision making.
3. Define and defend a position on a computing technology issue.
4. Apply ethical requirements involving conflicts of interest, proper conduct of research, appropriate use of human subjects in research, bias, and diversity.
5. Apply contemporary techniques and tools to the design and testing of large-scale software systems projects and analyze needs relative to all stakeholders.
6. Apply contemporary models to predict project development costs, measure and predict reliability, and measure software complexity.
7. Develop and apply leader/follower, conflict resolution, and management skills in the role of a productive member on a multi-person project development team.

Course Structure/Format

The course will be focused around working in project teams on the creation of a product. It will cover the information taught in Software Engineering and Ethics as well as teamwork and professionalism skills. It will consist of traditional lecture presentations, practical workshop-style learning experiences, and more in-depth theoretical discussions about software engineering, ethics and professionalism topics.

Course Materials

Primary Texts (required)

Roger, S. P., & Bruce, R. M. (2015). Software engineering: a practitioner's approach. You may use either a hardcopy or the electronic version of the book via the McGraw-Hill website.

Burton, E., Goldsmith, J., Mattei, N., Siler, C. & Swiatek, S. (2023). *Computing and Technology Ethics: Engaging through Science Fiction.* The MIT Press.

Rath, T. (2007). *StrengthsFinder 2.0*. Simon and Schuster.

Secondary Readings

Many of the lectures and discussions will require readings from supplemental textbooks and/or research papers. These will be identified prior to the appropriate class. They will be available through the VT Library or they will be provided to you directly through links.

Technology Requirements

Hardware

Virginia Tech provides technology requirements and recommendations for computer hardware. Among other things, this includes a computer with a working camera and microphone.

Software

- GitHub/GitLab
- An Integrated Development Environment (IDE) or Text editor
- AWS or other cloud environment such as Microsoft Azure, Google Cloud, VT Discovery Cluster
- Any languages, programs or software your team deems necessary.

Attendance/Participation

Attendance and active participation is not only expected by the university and the instructional staff, it is a mark of professionalism. As such, a lack of attendance and/or participation may negatively impact your grade (see Grading -> Overall). Additionally, there may be unannounced graded in-class assignments in any class period.

However, **if you are sick or test positive for COVID-19: *DO NOT COME TO CLASS!*** Contact the instructor for prolonged absences or as needed for specific personal issues.

Time and Effort Expectations

The amount of weekly outside work for a graduate CS course is heavy. Consider, it is common for undergraduate STEM courses, including CS, to require 3-4 hours (weekly) outside of class per credit hour. This number is often higher for graduate classes. Keep in mind this course is **6 credit hours, or the equivalent of 2 courses. So, assuming 3-4 hours outside of class per credit hour, you should expect to spend 18-24 hours or more outside of class depending on your experience, efficiency, etc.**

6 credit hours *times*	3-4 hours per credit *equals*	18-24 hours *expected*

Some comparisons:

"STEM classes often require 3-4 hours, per credit hour, of studying to be successful." - UIUC

"Three credit units require students to work on that course for about [3 hours outside class per credit per week] ……Note also that the definition is for a minimum amount of student work per credit ('no less than')." - Cal Poly

"dedicate six hours a week for each credit hour you take — so for a standard three credit class, you can expect to spend 18 hours per week" - ASU (OK, even the instructional staff think this one is a bit high.)

Grading

This course uses a percent-based grading schema for the following categories of deliverables:

Category	Percent
Project	40%
Midterm/Final	15%
SE/Ethics Research Presentation	15%

In-class Workshops	15%
Homeworks	10%
Graduate School Assignments	5%

Overall

Professionalism. Unprofessional electronic communication, unprofessional assignment submissions or unprofessional in-person behavior, including a lack of attendance or participation, may result in a 0 or a negative grade adjustment on the appropriate assignment or even a student's overall grade.

Assignments. Information about assignments may be provided early in the semester even though they will not be assigned until later. This information is provided for planning purposes only. No assignment is binding until it is actually assigned. There may be additional assignments given for which information was not provided early in the semester.

Grading Questions or Re-grading requests. Any questions, concerns, disputes, or requests to review any aspect of how an assignment was graded must be made within 1 calendar week (168 hours) of the assignments return except for assignments returned during the last week of classes or after classes end as these, of necessity, may have shorter deadlines.

Project

Students will be expected to begin work on a 3-semester project over the course of this semester. Project teams of 5 students (as much as class enrollment will allow) will be expected to use software engineering principles and ethics and professionalism skills on their project, with various project milestones and deliverables due throughout the semester. The specific details and rubrics for the project deliverables will be announced later during the class.

Although the expectation is that the project will be continued for 2 additional semesters, nothing in this syllabus or class is binding on any other semester.

Exams

There may be one midterm exam and one final exam in this course for a combined total of 15% of your semester grade. Whether to have both a midterm and a final or to just have one or the other, as well as the decision about the format of the midterm and/or final will be determined by the instructional staff closer to the time for the exams. The exams may cover all course materials (lectures, workshops, homeworks, readings, discussion preparation assignments, etc)

except for the in-class student research paper discussions. Missed exams cannot be made up without an official university excuse and/or instructional staff approval.

Exam Policy and Honor Pledge

Do not work on the exam with anyone else. Do not provide information about the exam to others or receive information from others including from non-approved electronic resources. Collaboration between students is forbidden on the exam. You must work alone.

If you violate the University Code of Conduct during the exam, you will be reported to the Office of Student Conduct and be subject to any penalties dispensed. By submitting the exam, you affirm that you followed the rules of the exam and the honor pledge: *"I have neither given nor received unauthorized aid on this exam."*

In-depth Topic Presentation

Working in presentation groups of 4 (as much as class enrollment will allow), all students will research and present more in-depth information about a software engineering or ethics topic. The presentation groups may not be the same as the project teams. This will give students the chance to dive deeper into a software engineering or ethics concept discussed in the course, learn about conducting research, gain experience with technical presentations, and practice constructively critiquing presentations. The specific details and rubrics for the project deliverables will be announced later during the class.

Workshops

Workshops are in-class activities designed to help students gain practical hands-on experience with topics discussed in class. Workshops not completed in class should be completed by the Sunday following the class in which the workshop was conducted. Each workshop will provide specific submission details.

Homeworks

The homework assignments for the course may provide a mix of technical problems, workshops, readings, critical analysis, lecture review questions, discussion preps, discussion notes, peer reviews and teamwork/professionalism tasks and reflections. They may also be announced or unannounced assignments given in class. All homeworks (other than completely in-class assignments) will be due on Sunday by 11:59 pm on the appropriate week unless otherwise indicated.

Grading Scale

This course uses the following grading scale:

Low	Letter	High
93.0 ≤	A	< 100.0
90.0 ≤	A-	< 93.0
87.0 ≤	B+	< 90.0
83.0 ≤	B	< 87.0
80.0 ≤	B-	< 83.0
77.0 ≤	C+	< 80.0
73.0 ≤	C	< 77.0
70.0 ≤	C-	< 73.0
65.0 ≤	D	< 70.0
0 ≤	F	< 65.0

Course Schedule

A tentative detailed schedule for the semester is available through a link on the Canvas homepage. *Please note* that the course schedule is subject to change at any time.

Course Policies

Late Assignments

No late submissions will be allowed without a valid excuse. Unless otherwise specified, all exercises should be completed on your own.

Student Concerns

You must inform your instructor as soon as possible of anything that may prevent you from completing coursework and exams as well as any other concerns that you may have.

Student Conduct

Students are expected to be respectful of classmates and teaching staff. (*See the Netiquette and University Policies section below*).

Netiquette

Adapted from material from Dr. Chris Brown as well as NC State Netiquette (https://ethics.csc.ncsu.edu/speech/netiquette/)

Netiquette is the term used to describe the special set of rules for online communication. Higher education provides you with a training ground prior to entry into the work environment for your chosen career. You will use many of the following rules of "netiquette" when you are communicating with colleagues, your supervisor, or clients in the working world. Please observe etiquette when communicating with the teaching staff and your peers throughout the duration of this course.

Professionalism

Students are expected to conduct themselves in a respectful and professional manner at all times. Students are expected to act professionally both in person and electronically with all members of the teaching staff and their classmates. Communication, both written and verbal, should be respectful and should never include derogatory comments about yourself or others. All criticism (of yourself, the course, instructor, TAs, fellow students, resources, etc.) should be constructive and provide feedback for improvement. Guidelines for electronic communication are listed in the section below.

Report any unprofessional behavior by a class member to the instructional staff.

Unprofessional electronic communication on course forums may result in suspension from the course forum and possible grade penalties. Unprofessional in-person behavior, including a lack of participation, may result in a conference with the instructional staff and possible grade adjustments for all involved parties. Any unprofessional behavior may also be reported to any appropriate Virginia Tech Departments.

You should have the same tone of professionalism in all of your submitted work (e.g., code documentation, variable names, git commits).

Electronic Communication

We look forward to receiving emails and message board posts about any questions you have about the class, materials, exams, and exercises. Professionalism includes being able to work independently, researching and finding answers to questions, and being mindful of your others' time, therefore before sending an email, try to find the answer to the question by using various references already available to you.

The tone of email or piazza messages should be professional. Re-read your message before you press "Send". If you have several questions or items, please number them for ease of reading. The response will also be easier to understand.

Please spell check and correct spelling/grammatical errors.

University Policies

If any information about University policies provided here is in conflict with the university policies on the Virginia Tech websites, the Virginia Tech websites supersede this information.

Academic Integrity and Honesty

Students are required to comply with the university policy on academic integrity. For additional information about the Honor Code, please visit: https://www.honorsystem.vt.edu/ .

The Undergraduate Honor Code pledge that each member of the university community agrees to abide by states:

"**As a Hokie, I will conduct myself with honor and integrity at all times. I will not lie, cheat, or steal, nor will I accept the actions of those who do.**"

Students enrolled in this course are responsible for abiding by the Honor Code. A student who has doubts about how the Honor Code applies to any assignment is responsible for obtaining specific guidance from the course instructional staff before submitting the assignment for evaluation. Students are strongly discouraged from misusing sites such as Chegg and CourseHero, as well as misusing ChatGPT and other Generative Artificial Intelligence. Review the Additional OpenAI guidelines provided for this course. Students are strongly encouraged to consult their faculty members regarding the use of such outside materials as the misuse of these sources may constitute a violation of the Honor Code. Ignorance of the rules does not exclude any member of the University community from the requirements and expectations of the Honor Code.

All members of the University community, students, faculty and other employees, have the responsibility to report academic misconduct to the appropriate authority.

All work that you turn in for grading must be your own! This means that all work must be an independent and individual creation by you or in the case of paired/team assignments; all work must be an independent and individual creation by you and your assigned partner or assigned teammates. Any attempt to gain an unfair advantage in grading, whether for yourself or another, is a violation of academic integrity. You may only work on an assignment with another student(s) in the class if explicitly stated in the assignment.

All assignments submitted shall be considered "graded work" and all aspects of your coursework are covered by the Honor Code unless specified otherwise. All assignments are to be completed individually unless otherwise specified.

Commission of any of the following acts shall constitute academic misconduct. This listing is not, however, exclusive of other acts that may reasonably be said to constitute

academic misconduct. Clarification is provided for each definition with some examples of prohibited behaviors in the Undergraduate Honor Code Manual located at https://www.honorsystem.vt.edu/

o CHEATING: Cheating includes the intentional use of unauthorized materials, information, notes, study aids or other devices or materials in any academic exercise, or attempts thereof.

o PLAGIARISM: Plagiarism includes the copying of the language, structure, programming, computer code, ideas, and/or thoughts of another and passing off the same as one's own original work, or attempts thereof.

o FALSIFICATION: Falsification includes the statement of any untruth, either verbally or in writing, with respect to any element of one's academic work, or attempts thereof.

o FABRICATION: Fabrication includes making up data and results, and recording or reporting them, or submitting fabricated documents, or attempts thereof.

o MULTIPLE SUBMISSION: Multiple submission involves the submission for credit – without authorization from the instructor receiving the work – of substantial portions of any work (including oral reports) previously submitted for credit at any academic institution or attempts thereof.

o COMPLICITY: Complicity includes intentionally helping another to engage in an act of academic misconduct, or attempts thereof.

o VIOLATION OF UNIVERSITY, COLLEGE, DEPARTMENTAL, PROGRAM, COURSE, OR FACULTY RULES: The violation of any University, College, Departmental, Program, Course, or Faculty Rules relating to academic matters that may lead to an unfair academic advantage by the student violating the rule(s).

Why is Academic Integrity Important?

(Adapted by Dr. Chris Brown from Matt Stallmann, Sarah Heckman, and Mitchell Wand)

Would you want to fly in a plane whose controller software was designed and implemented by a group of people who had never demonstrated the persistence, attention to detail, and ability to deal with negative feedback from compilers, linkers, etc., that it takes to design, implement, and debug a program on their own?

Academic misconduct affects you, your peers, the CS department, the university, all students who have ever graduated from VT with a CS degree, and all users of software products to which you contribute. When you receive a degree from Virginia Tech:

- The degree represents the university's certification that you have demonstrated certain skills and knowledge in your degree program.

- Your grade in a course represents the instructor's certification that you have demonstrated certain skills and knowledge in the specific course.

When an employer sees your degree from Virginia Tech, they expect you to be able to demonstrate certain skills and knowledge. If a student graduates with a CS degree and performs poorly, the value and reputation of a CS degree from VT is negatively affected.

In industry, intellectual property (IP) rights are crucial in software and product development. Rules regarding IP are similar to rules outlining academic integrity. Employees who "cheat" or violate copyrights or other IP rights can cost the employer large sums of money. In addition, even though you will likely work on a team in industry, completion of the CS degree program includes demonstrating skills to work effectively on teams. For example, students should demonstrate well-developed individual skills, integrity to take responsibility for one's own work, and the ability to recognize clear boundaries between one's own contributions and those of others.

What are the Consequences of Academic Misconduct?

"If you have questions or are unclear about what constitutes academic misconduct on an assignment, please speak with the instructional staff. We take the honor code very seriously in the course. The normal sanction we will recommend for a violation of the Honor Code is an F* sanction as your final course grade. The F represents failure in the course. The "*" is intended to identify a student who has failed to uphold the values of academic integrity at Virginia Tech. A student who receives a sanction of F* as their final course grade shall have it documented on their transcript with the notation "FAILURE DUE TO ACADEMIC HONOR CODE VIOLATION." You would be required to complete an education program administered by the Honor System in order to have the "*" and notation "FAILURE DUE TO ACADEMIC HONOR CODE VIOLATION" removed from your transcript. The "F" however would be permanently on your transcript."

All cases of academic misconduct may be reported to the [Office of Student Conduct](#).

Honor Pledge

The Virginia Tech honor code pledge for assignments is as follows:

"**I have neither given nor received unauthorized assistance on this assignment.**"

The pledge is to be written out on all graded assignments at the university and signed by the student. The honor pledge represents both an expression of the student's support of the honor code and a commitment to uphold the academic standards at Virginia Tech.

Non-Discrimination Policy

Virginia Tech provides equality of opportunity in education and employment for all students and employees. Accordingly, Virginia Tech affirms its commitment to maintain a work environment for all employees and an academic environment for all students that is free from all forms of discrimination. Discrimination based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation is a violation of state and federal law and/or Virginia Tech policy and will not be tolerated. Harassment of any person (either in the form of quid pro quo or creation of a hostile environment) based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation also is a violation of state and federal law and/or Virginia Tech policy and will not be tolerated. Retaliation against any person who complains about discrimination is also prohibited. Virginia Tech's policies and regulations covering discrimination, harassment, and retaliation may be accessed at https://policies.vt.edu/assets/1025.pdf. Any person who feels that they have been the subject of prohibited discrimination, harassment, or retaliation should contact the Office for Equity and Accessibility at 540-231-2010.

Supporting Fellow Students in Distress

As members of the Virginia Tech community, we each share a personal responsibility to express concern for one another and to ensure that this classroom and the campus as a whole remains a safe environment for learning. Occasionally, you may come across a fellow classmate whose personal behavior concerns or worries you. When this is the case, you are encouraged to report this behavior to the Virginia Tech Dean of Students Complaints and Concerns website. Although you can report anonymously, it is preferred that you share your contact information so they can follow-up with you personally.

Trans-Inclusive Statement

In an effort to affirm and respect the identities of transgender students in the classroom and beyond, please contact the instructional staff if you wish to be referred to using a name and/or pronouns other than what is listed in the student directory.

Course Evaluations

There may be several opportunities to provide course feedback during the semester including the SPOT survey at the end of course. The information provided will be anonymous. Extra credit may be offered for participation.

Syllabus Modification Statement

This syllabus represents a flexible agreement between the student and instructional staff. It outlines the policies and procedures of the course. Modifications to the syllabus (except for the schedule) will be limited as much as possible and will only occur when; 1) necessitated by unexpected emergencies (including but not limited to school closures, requirements for distance learning etc), negative student behaviors, student's content mastery at a rate different than

expected and other unforeseen issues; 2) mutually agreed upon by instructor and students based on things including, but not limited to, course evaluations or student topic interests. Syllabus changes will be communicated to all students through Canvas or email and will not take effect until after communicated.

Schedule Modification Statement

The schedule is a tentative outline of the course. It generally outlines the topics we plan to cover. The exact topics as well as the order of the topics is subject to change. Whether assignments are assigned as well as the dates for assignments, class activities, due dates, etc on the schedule are tentative and subject to change until actually assigned. After an assignment is given the due date can only be changed to a later date. This may occur based on student mastery and interests, unexpected school closures etc. If there is a conflict between the due date on an assignment and the tentative schedule, the due date on the assignment is the correct date.