

CSCE 331: Foundations of Software Engineering

It is estimated that Windows XP has 50,000,000 lines of code. The average mobile phone has over 10 million lines of code. The average developer writes 10 – 20 useful lines of code per day, so a couple of engineers and 2 friends could break away, start a new company, and create a new “Windows” operating system in only about *1700 years*. That’s not reasonable.

Up until now, most of the programs that you have been asked to write could probably fit in your mind. When you complete the letter, you fold it, seal it up, and mail it off (or hit send). But now it is plain to see that products that you use daily simply could not be recreated by you and 10 of your best friends in an afternoon, weekend, or semester. A 1700-year project is wildly unreasonable. There must be a better way.

In this course, you will learn a better way. You will dive into the world of software engineering and hone your teamwork (and, yes, coding) skills. Effective teamwork is essential, and software design methodologies make development more efficient. This course gives you very practical skills for being an effective member of a development team and producing high-quality, sustainable software. Learning these methods of working together, managing requirements, producing quality software products, and testing, delivering, and maintaining these products is every bit as valuable as coding.

Why This Course is Teach this Course

This course offers you a unique learning experience, and is also exciting for the instructors to teach. Here's why!

- Building software is fun and rewarding
You get many opportunities to “learn by doing”
- There’s more to software than just coding
You get a taste of software engineering
- Working on teams can be messy, but it’s worth it
It is amazing what you can accomplish together, so much more than on your own

Course Information

Course Number: 331

Course Title: Foundations of Software Engineering

Credit Hours: 4 (3 Lecture Hours, 2 Lab Hours)

Lecture: Face-to-Face, MWF, 9:10 am – 10:00 am, [Zachry Engineering Education Complex](#) 350

Lab:

- Section 904: Face-to-Face, MW, 3:00 pm – 3:50 pm, [Zachry Engineering Education Complex](#) 598
- Section 905: Face-to-Face, MW, 4:10 pm – 5:00 pm, [Zachry Engineering Education Complex](#) 598
- Section 906: Face-to-Face, MW, 5:45 pm – 6:35 pm, [Zachry Engineering Education Complex](#) 598

Final Exam Schedule:

- **Sections 904 – 906: Face-to-Face, Monday December 12, 8:00 am – 10:00 am, [Zachry Engineering Education Complex](#) 350**
- Section 904: Face-to-Face, Tuesday December 13, 10:30 am – 12:00 pm, [Zachry Engineering Education Complex](#) 598
- Section 905: Face-to-Face, Monday December 12, 3:30 pm – 5:30 pm, [Zachry Engineering Education Complex](#) 598
- Section 906: Face-to-Face, Friday December 9, 7:30 am – 9:30 am, [Zachry Engineering Education Complex](#) 598

Instructor Details

Instructor: Paul Taele

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Course Description

Intensive programming experience that integrates core concepts in Computer Science and familiarizes with a variety of programming/development tools and techniques; students work on 2 week-long intensive projects each emphasizing a different specialization within Computer Science; focuses on programming techniques to ease code integration, reusability, and clarity.

Course Prerequisites

CSCE 312 and CSCE 314; or CSCE 350/ECEN 350

Corequisite: CSCE 313

Special Course Designation

W (writing intensive course)

As a writing intensive course, you will receive instruction on writing and complete writing assignments so you can master writing related to the major. **You must pass the writing components with a C or better to earn a grade in the course.**

Course Learning Outcomes

This course is intended to be an intensive programming experience that integrates core concepts in Computer Science and familiarizes you with a variety of programming/development tools and techniques. You will primarily work in small teams on projects emphasizing different specializations within computer science. The course focuses on honing good programming techniques to ease code integration, reuse, and clarity. The primary goal for this class is for you to emerge with strong programming skills, able to address both individual and team programming challenges competently. In this course, you will improve your programming skills through significant practice.

After this course you will be able to:

- **Explain** the need for software engineering through industry examples *and personal experience*
- **Exercise** the fundamental concepts of software construction (including managing requirements, design, implementation, testing, and deployment)
- **Design and develop** software that is clearer, more maintainable, and integrates current software technologies – some that are new to you
- **Collaborate and communicate** effectively in small teams
- **Recognize and apply** characteristics of effective technical writing

We will cover many topics including:

- Software system design for portability, performance, and testability
- Coding layout and style considerations
- Programming specifications and documentation
- Use of basic software tools and APIs
- Subject-specific topics related to the team projects (DB, HCI)

Though many topics will overlap, this course is not intended to be as in-depth or comprehensive as a standard software engineering course. For a deeper understanding of software development and project management, take software engineering after completing this class.

Textbook and/or Resource Materials

Required textbooks and reading materials will be provided electronically through Perusall, which is linked in [Canvas](#).

Grading Policy

Grading Components:

Your grade for this course reflects your mastery of course material and is determined by multiple components. As a writing course, **you must pass the writing components with a C or better to earn a grade in the course.** Failure to pass the writing components with a C or better results in an F for the course.

Specific grading practices will be announced when assignments are given through assignment descriptions and assignment rubrics. When a rubric is given, the assignment must meet Minimum Viable Solution requirements before being assessed by the rubric.

Individual Project – 5%: The individual project will be completed prior to the team projects.

Team Projects – 35%: Two major projects, each worth 17.5% of the course grade, for 35% total.

Individual Contribution – 15%: Your individual contribution to the team projects and group assignments will be graded. In any team environment, striving to be a valuable member of your team is critical. Logged code commits, peer evaluation, attendance, participation, and instructor/TA observations will be evaluated for this grade. *Failure to participate in the peer evaluation process (giving evaluations and/or reflecting on evaluations) can negatively impact your individual contribution score.*

Written Elements – 35%: This is a writing intensive course. You are required to pass this component with a C or better to earn a grade in the course. You will have several written assignments within the projects.

Other Course Activities – 10%: The course has several different types of activities to help you better understand concepts and connect with the material. This includes (but is not limited to) reading, in-class activities, and lab activities. These activities bring deeper, longer-term learning as you work, either individually or with other students. You must be present for in-class and lab activities to receive credit. For submitted assignments, grading will be based on the quality of the submitted work. **For group assignments, your full participation is required to receive a grade for that assignment.** This component will be divided as follows: 50% in-class activities (lowest grade dropped), 25% lab activities (lowest grade dropped), 15% reading, and 10% in-class recall practice (lowest two grades dropped).

Grading Scale:

Grades will be assigned according to the following scale:

A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F

These grades represent varying degrees of achievement (see the [university's grading system](#)):

A = excellent, B = good, C = satisfactory, D = passing, F = failing

Stacked Honors Section:

The stacked honors section will explore course concepts more deeply through readings, discussions, reflections, and projects. They will have honors-only lecture sessions on some Fridays during the course.

Submission of Assignments:

All assignments will be turned in electronically through [Canvas](#) (unless otherwise specified) by the due date and time given on the assignment. Email submissions will not be accepted.

Late Work Policy

Assignments turned in after the posted deadline will have a penalty applied of 5% per day late. For team assignments, the late penalty affects the grade for the entire team. If the assignment is individual, the late penalty only affects the grade for that team member.

Course Schedule

The course is listed as a 2-hour per week lecture, and 2-hour per week lab, however it has been intentionally scheduled for 3 hours per week of lecture (along with the lab). We will meet approximately 2/3 of the lecture periods over the course of the semester. After the first week of class and except for a field trip in week 4, the regular sections will only meet on Mondays and Wednesdays with Fridays reserved as workdays, team meetings, and TA office hours. The honors section will meet some Fridays during the course.

Below is the **planned but tentative** schedule of topics and major projects for the course. All assignment and project details will be communicated on [Canvas](#).

Week	Lecture Topics	Lab Topics	Project Deliverables
1	Introductions, Professional Presence*	No Labs	
2	Software Construction and Design	HTML, CSS, Git	
3	Software Development Methodologies, Waterfall, Technical Writing	Javascript	Project 1 Version 1
4	Databases, SQL, Field Trip*	Team Success	Project 1 Version 2
5	Code as Communication, Commenting	Git Branching/Merging, Database Design Diagrams	Project 2 Phase 0

6	Collaborative Development, Style Guides	AWS Database Interaction, Database Population	Project 2 Phase 1, Project 2 Individual Status Update
7	Formal Inspections, Connecting GUI to Database	Project 2 Phase 2 Demos	Project 2 Phase 2
8	Testing/Debugging/Refactoring	Project 2 Phase 3 Demos	Project 2 Phase 3
9	Human-Centered Design, Agile	Project 2 Phase 4 Demos	Project 2 Phase 4, Project 2 Retrospective Reports (Team and Individual)
10	Burn-down Charts, Accessibility	Backlog Estimation, APIs	Project 3 Management Document
11	Auto Generated Documentation, User Studies	Full Stack Development	
12	Integration and Configuration Management, Personal Character	User Study Swap	Project 3 Sprint 1 Materials
13	Team Meetings	Team Meetings	Project 3 User Study 1, Project 3 Individual Status Update
14	Workdays	Workdays	Project 3 Sprint 2 Materials
15	Workdays	Workdays	Project 3 User Study 2
16	Course Wrap-up, Final Presentation Instructions	No Labs	Project 3 Sprint Materials, Project 3 Retrospective Reports (Team and Individual)

Finals	Project 3 Final Presentations		
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*** Friday session**

University Policies

Inclusion Statement

In this class, we are committed to a culture of inclusivity. We reject and condemn all forms of injustice and actively promote diversity and inclusion within our field. As Martin Luther King Jr. said, “Injustice anywhere is a threat to justice everywhere.” If any student wishes to discuss anything regarding inclusivity within the classroom, especially anything contrary to this statement that you have experienced, you are encouraged to contact the instructor or TA.

Course Copyright

The materials used within this course are copyrighted. These materials include, but are not limited to, the syllabus, quizzes, assignments, activity descriptions, online content, course videos, audio and visual recordings of classes, etc. Because these materials are copyrighted, you do not have the right to copy or distribute these materials, unless permission is expressly granted.

Attendance Policy

The university views class attendance and participation as an individual student responsibility. **Students are expected to attend class and to complete all assignments.**

Please refer to [Student Rule 7](#) in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student’s grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to [Student Rule 7](#) in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor” ([Student Rule 7, Section 7.4.1](#)).

“The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence” ([Student Rule 7, Section 7.4.2](#)).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. ([See Student Rule 24](#)). An excused absence does not excuse the work required.

Students requesting an excused absence and makeup work for interviews must make the request 2 weeks prior to the interview.

Students should submit excused absence documentation to the Canvas course (Modules -> Student Resources -> Excused Absence Documentation).

Communication Policy

We will use [Canvas](#) to post assignments, course resources, discussions, and send announcements. **It is your responsibility to check Canvas and pay attention to class emails and announcements.**

Bring your Own Device Policy

BYOD is an initiative in the College of Engineering where **students are required bring their own computing device to lecture and lab**. You need to have a computing device with a headset, microphone, and webcam. You will also need stable internet access outside of lecture and lab. See the [BYOD webpage](#) for information on the program, approved devices, and financial assistance. BYOD devices fulfill the requirements for this class.

Academic Integrity Statement and Policy

“An Aggie does not lie, cheat or steal, or tolerate those who do.”

“Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the

work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" ([Section 20.1.2.3, Student Rule 20](#)).

Texas A&M at College Station

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu.

For this class, certain aspects of the honor code need to be clarified:

1. **External code/software/libraries:** There will be times in this course where you or your team make use of external code/software/libraries. Whenever this is done, you must make sure that you: follow any licensing and/or use restrictions that library/code requires and clearly document what the source of the external code was, and how it was used. *Failure to follow licensing or usage restrictions or neglecting to clearly document usage is an honor code violation.*
2. **Outside assistance:** There may be times in this course where you or your team would like to seek outside assistance related to projects and assignments. Any assistance from any person other than members of your team, the instructor, teaching assistants, or peer teachers **needs prior approval from the instructor** and needs to be clearly documented. This also includes online websites and material. **Do not assume that if you have access to something that it is approved.** *Using unapproved outside assistance of any kind is an honor code violation.*
3. **Working in teams:** You will be working in team environments in this course, and your work as a team will be used to determine grades. As such, it is your responsibility, when asked, to:
 - **Accurately describe the work that you have done on a team project.** *Claiming credit for work that you have not done or that others did instead is an honor code violation.*
 - **Accurately describe (to the best of your knowledge) the performance of other team members.** "Covering" for another team member (claiming they did more work than you know they did, or exaggerating the work they did) or "spiking" them (claiming they did less work than you know they did, or purposefully minimizing the work they did) are *examples of honor code violations*.
 - **Prevent (as best you can) or report (known or suspected) violations of the honor code by your other team members.** You share responsibility when a project is turned in; *if you are aware of a teammate having violated the code in his/her work on the project, and do not report it, you are claiming credit for that violation yourself.*

If there are any questions or concerns about whether an action is appropriate, you should check with the instructor or teaching assistant first. **If in doubt, assume that the action is not appropriate.**

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Resources office on your campus (resources listed below). Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

Disability Resources is located in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu.

Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see [University Rule 08.01.01.M1](#)):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, a person who is subjected to the alleged conduct will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with [Counseling and Psychological Services](#) (CAPS).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's [Title IX webpage](#).

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in healthy self-care by utilizing available resources and services on your campus.

Students who need someone to talk to can contact [Counseling & Psychological Services](#) (CAPS) or call the [TAMU Helpline](#) (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at suicidepreventionlifeline.org.