

**TO:** The Engineering Faculty  
**FROM:** The Faculty of the Elmore Family School of Electrical and Computer Engineering  
**RE:** Course Modifications to ECE 46100

The Faculty of the Elmore Family School of Electrical and Computer Engineering has approved the following requisite changes to an undergraduate course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

## Course Modification to Course number, pre-requisite, description and learning outcomes

**FROM:**

**ECE 46100** **Software Engineering**, Sem. 1, Class 3, Lab 0, Cr. 3.

Prerequisites: ECE 30862

Introduction to software engineering principles, with special emphasis on the process, methods, and tools needed to develop and test quality software products and systems.

No learning outcomes listed in catalog.

**TO:**

**ECE 30861** **Software Engineering**, Sem. 1, Class 3, Lab 0, Cr. 3.

Prerequisites: ECE 36800

Introduction to the technical and social aspects of software engineering principles, with special emphasis on the process, methods, and tools needed to develop and test quality software products and systems.

Learning Outcomes: i) an ability to conduct object-oriented design and use unified modeling language. [1,3]; ii) an ability to understand different models of software development processes. [1,2]; iii) an ability to analyze requirements and write project specifications. [1,2]; iv) an ability to successfully develop a team software project on time and meet the specifications. [1, 2, 3, 4]

**RATIONALE:**

This course had not ran for nearly 10 years until ECE had the faculty pick it up again around 2 years ago. Since then they have changed to be more of an introduction to software engineering and a 500-level advanced software engineering could be developed. This course introduces students to the vocabulary, process, and mindset of a software engineer or related fields (e.g. embedded systems), and provides a team-based software engineering experience. In addition, skills in this course help prepare students for internships as well as full-time positions as software engineers.

A handwritten signature in black ink, appearing to read "T.S. Mithuna", with a long horizontal stroke extending to the right.

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**Mithuna Thottethodi**

Associate Head of Teaching and Learning

Professor of the Elmore Family School of Electrical and Computer Engineering

Link to Curriculog entry:

<https://purdue.curriculog.com/proposal:32649/form>



## Quick Links

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## Course Information

- **Course number and title:** ECE 30861 Software Engineering
- **Meeting day(s) and time:**
- **Instructional Modality.** Face-to-face, with recordings available for those who cannot attend that day. Some (hopefully most!) lectures will include an activity of some kind – e.g. questions to discuss. I will show these activities on the slide deck. If you are viewing a recording, I encourage you to complete the activity yourself.
- **Course credit hours:** 3
- **Prerequisites (if any)**
  - *Undergraduates:* ECE 368 (Data Structures); or commensurate experience with instructor approval.

- *Graduate students:* Graduate standing and an interest in software engineering. Students will be best equipped for success if they have prior experience developing non-trivial software projects.

## Instructor(s) Contact Information

- **Name of the instructor(s):**
  - Instructor: James C. Davis, Assistant Professor
  - GTA: Paschal Amusuo, PhD student
  - UTA: Joseph Bushagour, CompE junior
- **Office Location:** ECE 334D (Prof. Davis)
- **Office Phone Number:** 765-494-3133 (Prof. Davis), although make an appointment if you want me to answer it.
- **Purdue Email Address:**
  - Instructor: [davisjam@purdue.edu](mailto:davisjam@purdue.edu)
  - GTA: [pamusuo@purdue.edu](mailto:pamusuo@purdue.edu)
  - UTA: [jbushago@purdue.edu](mailto:jbushago@purdue.edu)
- **Office/Consultation hours, times, and location:**

Person	Times	Locations
Prof. Davis	Mondays 2:30-4:00 PM and Thursdays 9:00-10:30 AM	In person (EE 334D) or Zoom (contact in advance)
GTA Amusuo	Tuesdays: 12:00pm to 1:15pm Thursdays: 12:00pm to 1:15pm Fridays: 10:00am to 12:00pm	In person (EE 208 or 209, check the whiteboard) or Zoom (contact in advance)
UTA Bushagour	Tuesdays: 2-4 pm Wednesdays: 3-4pm Thursdays: 3-4pm	In person (EE 208 or 209, check the whiteboard) or Zoom (contact in advance)

- To meet with course staff outside of these office hours, please contact for an appointment.
- If you send me email, the subject should begin “ECE 461: ...” (note the colon). Emails not matching that description may, alas, be lost in my mountain of email. I will endeavor to respond to those emails within 24 hours. Remember, email is an asynchronous mode of communication. If necessary, do not be afraid to send a follow-up email – professional engineers do so all the time.

### About Prof. Davis:

*In 2012 I completed a BS in Computer Science and a BS in Mathematics. I worked at IBM as a software engineer (GPFS), full-time from 2012-2015 and part-time from 2016-2019. I completed my PhD in Computer Science & Applications at Virginia Tech in 2020 and then started as an assistant professor here at Purdue. During my PhD I spent some time at IBM Research (2018) and at Microsoft Research (2019).*

*I believe that computing has already revolutionized human societies, and will continue to do so in the 21<sup>st</sup> century. Software engineering – i.e. getting software right – will be of critical importance. My research interests are in empirically understanding what software engineering looks like in practice (artifacts and processes) and identifying means of improving the quality of*



software (e.g. more correct, more secure). You can find a description of my research on my website: <http://davisjam.github.io>.

*If you are interested in undergraduate (or graduate) research opportunities, see my website for details.*

#### About GTA Amusuo:

*Paschal is a PhD student in ECE. Before beginning his studies at Purdue, he worked as a software engineer with various teams developing and maintaining mobile and web backend solutions. He has worked extensively with the Java and Kotlin languages and has some experience with Python. Paschal did his undergraduate studies in EE at the Federal University of Technology Owerri, a foremost university of technology in Nigeria, and graduated as the best student in the school of Engineering. Paschal loves software engineering because it helps him create interesting solutions that enables people achieve more.*

## Teaching Philosophy

I teach courses about material that I find interesting and societally impactful. I strive to communicate this passion to my students.

There seems to be no end to the knowledge of humankind. I have not mastered it all and do not pretend to have done so. I may know more than my students; we will proceed down the road of learning together.

I keep busywork to a minimum. I will assign meaningful assignments, exams, and projects. In return, I expect students to submit good work.

The relationship between teacher and student is two-way. I will do my part to the best of my ability. But I cannot force you to learn. You will get out of this course what you put into it.

I believe that an interested student can master any material they want to. Of course, a student must invest an appropriate amount of time and follow effective study practices. Those practices can be learned. I can give advice on this if you want.

## Course Description

Human society runs on software. Software – mutable logic – underlies domains as diverse as communication, business management, transportation, commerce, finance, and romance. Software engineering is the study of how to design, implement, evaluate, and maintain the software that society does and will rely on. Like any engineering discipline, software engineering is hard. Software engineers work in diverse teams to create and comprehend complex information, such as: requirements, design, implementation (and rationale), dynamic software behavior, change impact analysis, and team dynamics.

In this class, we will study the principles of software engineering, including both technical and social aspects.

The course should be accessible to students who have passed ECE 368 or have an equivalent level of experience (at my discretion).

## Learning Resources, Technology & Texts

- **Required texts:** (I will assign readings from this book. I expect you to have a copy.)
  - *Software Engineering at Google*. O'Reilly, 2020. An e-edition of this book is available through the Purdue library.
- **Recommended references:** (I may assign readings from these books. I will provide links or PDFs to relevant pages. Each of these is a classic with good reason – see my notes – and will benefit you in industry.)
  - *Software Engineering*. Sommerville, Pearson, 2016. The text has undergone major revisions over the years. I will refer to the 10<sup>th</sup> edition. The 9<sup>th</sup> edition has a similar table of contents and should be comparable. I would not recommend a version earlier than the 9<sup>th</sup> edition.
  - *The Mythical Man-Month: Essays on Software Engineering*. Brooks. Reflections on his decades of engineering (IBM) and research (UNC?) experiences. I think an e-edition is available through the library.
  - *Design Patterns*. Gamma, Holm, Johnson, Vlissides. No need to read this one start-to-finish, but the Introduction and excerpts from the catalog will help shape your design thinking. I think an e-edition is available through the library.
  - *Code Complete 2* (esp. if not taken the ECE course on object-oriented programming: 30862/39595 etc.). McConnell. Good advice from decades of engineering experience (Microsoft).
- **Additional readings:**
  - I will assign readings from online resources and research papers. Links or PDFs will be posted to Brightspace.
- **Software/web resources**
  - Brightspace (for assignments, feedback, and recordings)
  - Piazza (for non-email communication, e.g. course Q&A): [piazza.com/purdue/fall2021/ece461](https://piazza.com/purdue/fall2021/ece461)
  - Software for presentation and for text processing. ([MS Office is free for all students](#))
  - Any tools you like for working with software, e.g. VSCode or Vim. We will discuss additional engineering tools during the course.
  - Exams will use Gradescope.
  - Software projects will be uploaded to GitHub.
- **Hardware requirements (e.g., webcam for exam proctoring)**
  - N/A
- **Tutoring support**
  - N/A
- **Brightspace learning management system**
  - Yes, accessible through the Brightspace Home.

## Learning Outcomes

*A student who successfully fulfills the course requirements will have demonstrated:*

- i. an understanding of common models of the software engineering process, and the contexts in which each might be appropriate to apply.

- ii. the ability to conduct key elements of the software engineering process, including:
  - i. eliciting requirements and writing project specifications.
  - ii. designing, including through object-oriented design and the unified modeling language (UML).
  - iii. implementing.
  - iv. validating, combining manual and automated strategies.
  - v. deploying.
  - vi. maintaining and evolving.
  - vii. re-use.
  - viii. security analysis.
- iii. an understanding of the social aspects of software engineering, including issues and openness in communication, teamwork, culture, and ethics.

## Assignments

The general breakdown of assignments and weights is:

Assignment Type	Total points
Homework & participation	25
Projects	60 (20 for P1, 40 for P2)
Final Exam	15
	<b>Total: 100</b>

Details will be posted on Brightspace, including the due date, points, and grading rubrics.

For questions about late assignments or alternative scheduling, refer to the policy on **Attendance and Deadline Policy** elsewhere in the Syllabus.

## Grading Scale

Your grades in this course are intended to assess how well you have met the learning outcomes for which the course is designed. Your grades reflect the sum of your achievement throughout the semester. You will accumulate points as described in the assignments portion above, with each assignment graded according to a rubric. At the end of the semester, final grades will be calculated by adding the total points earned and translating those numbers (out of 100) into the following letters. Fractions will be rounded up.

- A: 93 - 100
- A-: 90-92
- B+: 87-89
- B: 83-86
- B-: 80-82
- C+: 77-79



C: 73-76  
C-: 70-72  
D: 60-69  
F: Below 60

Your grade may be impacted if you claim credit for work that is not your own. See the policy on **Academic Integrity** elsewhere in the Syllabus.

## Attendance Policy

To succeed in the course, stay engaged.

Your **attendance** (or lack thereof) will not be directly considered in the grade you earn in this course. However, your **timely review of course material** may impact your success, as will your **timely completion of assignments**.

If you feel sick, **please do not come to class**. Instead, contact the Protect Purdue Health Care Center (PPHC) and follow their recommendations including testing, quarantining, or isolation.

The assignments in this course have deadlines. However, I am not so naïve as to believe you have no other demands on your time. This is a senior-level course, and I will treat you as professionals. **If you need an extension or accommodation, contact me and request it.** A professional can manage their time and does not procrastinate on assignments. However, surprises and emergencies of many kinds – including health, finances, and family matters – are all excellent reasons to retroactively request an accommodation. As needed, you or your representative should contact the Office of the Dean of Students via [email](#) or phone at 765-494-1747.

Any extensions are at my discretion. I reserve the right to assess a late penalty on an extension.

If you are confused about this attendance policy, here it is in more officious verbiage: *The University expects that students will attend classes for which they are registered. At times, however, either anticipated or unanticipated absences can occur. The student bears the responsibility of informing the instructor in a timely fashion, when possible. The instructor bears the responsibility of trying to accommodate the student either by excusing the student or allowing the student to make up work, when possible. The University expects both students and their instructors to approach problems with class attendance in a manner that is reasonable.*

## Academic Guidance in the Event a Student is Quarantined/Isolated

If you must quarantine or isolate at any point in time during the semester and feel that this may affect your progress in the course, please reach out to me via email. Work with the Protect Purdue Health Center (PPHC) to get documentation and support, including access to an Academic Case Manager who can provide you with general guidelines/resources around communicating with your instructors, be available for academic support, and offer suggestions for how to be successful when learning remotely. Your Academic Case Manager can be reached at [acmg@purdue.edu](mailto:acmg@purdue.edu). Importantly, if you find yourself too sick to progress in the course, notify your academic case manager and notify me via email or Brightspace. We will make arrangements based on your particular situation.

## Course Schedule



See Brightspace.

For your reference, here is the Purdue [Academic Calendar](#) with key University-wide dates for the Fall 2021 semester.

## Classroom Guidance Regarding Protect Purdue

Any student who has substantial reason to believe that another person is threatening the safety of others by not complying with Protect Purdue protocols is encouraged to report the behavior to and discuss the next steps with their instructor. Students also have the option of reporting the behavior to the [Office of the Student Rights and Responsibilities](#). See also [Purdue University Bill of Student Rights](#) and the Violent Behavior Policy under University Resources in Brightspace.

## Academic Integrity

The course Brightspace has links to the official policies. Those policies apply to this course. I am using this space to add my perspective.

The Purdue Honor Pledge is “As a Boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together – We are Purdue.” Let me clarify what it means to be “honest and true” on the different assignments in this course.

If I find evidence that you have engaged in academic dishonesty, I will contact you to discuss it. If I conclude that there is a preponderance of evidence that you have behaved dishonestly, then at my discretion:

- At a minimum, you will receive a 0 on the assignment and can re-submit it following honest conduct.
- At my discretion, you may receive a failing grade in the course and have your behavior reported to the Office of the Dean of Students.
- At a maximum, based on the Office of the Dean of Students’ analysis of your behavior, further penalties may be considered, including removal from the university.

In each kind of assignment, the primary consideration is that you clearly indicate which parts of your submission are your own work, and which parts are communicating someone else’s work. A failure to make this distinction is commonly called **plagiarism**. However, in the engineering workplace, what academics call “plagiarism” is usually thought of as “benefitting from someone else’s expertise”. Engineering knowledge is communal expertise hard-won over many years. With this in mind, I am open – indeed desirous – to see you learn how to re-use...**thoughtfully**. In your assignments, you must justify your decisions. This includes re-use decisions, e.g. of designs, of components, of tests, etc. The material on Brightspace will explain the details.

### Exam

Any exams will be available online over a 48-hour period. You may refer to books, presentations, notes, the Internet, etc. You may not refer to your classmates. However, keep three things in mind:

- You must include your signature on the Purdue Honor Pledge.
- You must cite any work you reference.
- Citations should justify and inform your thinking, but should not **replace** thought. Persuade me that you have your own thoughts, that you are learning to become a trustworthy engineer in your future workplace.

## Nondiscrimination Statement

I will not tolerate intolerance. I will discriminate against discrimination.  
([https://en.wikipedia.org/wiki/Paradox\\_of\\_tolerance](https://en.wikipedia.org/wiki/Paradox_of_tolerance)).

Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. A hyperlink to Purdue's full Nondiscrimination Policy Statement is included in our course Brightspace under University Policies.

## Accessibility

All course material will be available through Brightspace.

Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: [drc@purdue.edu](mailto:drc@purdue.edu) or by phone: 765-494-1247.

## Mental Health/Wellness Statement

**If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try [WellTrack](#).** Sign in and find information and tools at your fingertips, available to you at any time.

**If you need support and information about options and resources,** please contact or see the [Office of the Dean of Students](#). Call 765-494-1747. Hours of operation are M-F, 8 am- 5 pm.

**If you find yourself struggling to find a healthy balance between academics, social life, stress, etc.** sign up for free one-on-one virtual or in-person sessions with a [Purdue Wellness Coach at RecWell](#). Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign up is completely free and can be done on BoilerConnect. If you have any questions, please contact Purdue Wellness at [evans240@purdue.edu](mailto:evans240@purdue.edu).

**If you're struggling and need mental health services:** Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact [Counseling and Psychological Services \(CAPS\)](#) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS office on the second floor of the Purdue University Student Health Center (PUSH) during business hours.

**If you need additional academic resources:** Consider Purdue's Academic Success Center and CAPS.

## Basic Needs Security



If you face challenges securing your basic needs – physical, mental, and spiritual – know that you are not alone. The Purdue community supports you and wants you to succeed. There are many resources available to you! I urge you to contact the Dean of Students for support. There is no appointment needed. Student Support Services is available to serve students 8 a.m.-5 p.m. Monday through Friday. Considering the significant disruptions caused by the current global crisis as it related to COVID-19, students may submit requests for emergency assistance from the [Critical Needs Fund](#).

Members of the Purdue community also have access to the [ACE Campus Food Pantry](#), the [Center for Advocacy, Response & Education](#), and sundry resources through the [Office of the Dean of Students](#).

## **Emergency Preparation**

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted onto the course website or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your @purdue.edu email on a frequent basis.



