CIS4930: Enterprise Software Engineering Practices

Class Periods: MWF Period 10 (5:10 pm - 6:00 pm) & UF Online (Asynchronous)
Location: Virtual - Zoom
Academic Term: Spring 2024

Instructor:
David Wright
dh.wright@ufl.edu
Office Hours: By appointment

Teaching Assistants:
Nanjie (Jimmy) Rao
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Graders:
TBD

Course Description

This course will introduce students to modern software engineering practices used to build software in large enterprises. Students will learn about frameworks and tools that help organizations with hundreds or even thousands of engineers collaborating to deliver software. Students will expand upon their knowledge of the Software Development Life Cycle to better understand how to contribute code to existing codebases, automate testing and deployment activities, and proactively monitor and support their software. Students will learn how to evaluate requirements from a business and customer perspective, ensuring that they contribute software that is impactful. These real-world skills will help students stand out as they pursue full-time software engineering opportunities and hit the ground running in their first industry jobs.

The course will be delivered virtually.

Recommended Course Prerequisites
CEN 3031 Intro to Software Engineering
Students without this prereq course should be familiar with git, how to make open source contributions, agile/scrum methodologies, and developing software as part of a team.

Course Objectives
By the end of the semester students will:
- Understand how large enterprises manage software projects across dozens of engineering teams
- Understand the operations and responsibilities of different functional teams within a large technology organization
- Learn about different types of enterprise architecture and associated design patterns
- Expand upon the standard software development life cycle, from understanding the business need to deployment and ultimately decommissioning or replacement of software
- Be prepared to hit the ground running in their first industry software engineering job, increasing their hireability and time to productivity.

Instructor Bios

This course will be taught by UF alumni who are members of the CISE Industry Advisory Board, as well as additional industry guest lecturers.

David Wright graduated from the University of Florida in 1987 with a B.S. in Computer Engineering. Dave worked at United Technologies achieving the position of Associate Technical Fellow. He then worked at Nielsen achieving the position of Senior Vice President. Dave has 58 granted patents and contributed to winning two Emmy Awards for Technology and Engineering. He is an enthusiastic developer of talent, coach and mentor.

Sarvenaz Myslicki graduated from the University of Florida in 2013 with a B.S. in Computer Science. Currently, she is Vice President of Technology at American Express, where she leads a team of 375+ software engineers responsible for the americanexpress.com website, Loyalty Experiences, and Site Reliability Engineering. She is a non-profit leader within the Society of Women Engineers, a passionate mentor and career coach, and a published author.

Michael Adrian graduated from the University of Florida in 2009 with an M.S. in Information Systems and Operations Management. He's spent his career since then with ExxonMobil, where he started slinging code for technical applications (which he still loves), and now acts as the Enterprise Architect driving architecture patterns and enablement for how over 7,000 applications are built, delivered, and supported. He is a lead in ExxonMobil's Software Development and Applications Enablement job families, and is passionate about helping people meet their dreams.

Joseph Cutrono graduated from the University of Florida in 2007 with a B.S. and M.S. in Computer Science. He currently works as Chief Technology Officer at iSolved. Prior to that, Joseph worked for UKG as a Sr. Director of Engineering for their Developer Experience Platform team. In this role he provided tooling for CI/CD, Quality, and Observability services for their engineering teams. He is currently the Chair of the University of Florida CISE Industry Advisory Board and passionate about contributing toward the UF CISE curriculum.

Kevin Griffin graduated from the University of California, Davis with a Ph.D. in Computer Science and is a Senior Developer Technology Engineer at NVIDIA Corporation, Santa Clara, CA. He splits his time across the advanced rendering and visualization space supporting scientific visualization tools like VisIt and ParaView and internal platforms like NVIDIA Omniverse. Kevin also works with researchers to accelerate their codes in the computation and AI/ML space using NVIDIA hardware, parallel programming APIs and profilers. In addition to being a member of the CISE Industry Advisory Board, Kevin is also a member of the Khronos ANARI Working Group whose mission is to create the industry's first open-standard, cross-platform 3D rendering engine API.

Eric Davis graduated from the University of Illinois in 2011 with a Ph.D. in Computer Science. He currently works as a Principal Scientist in Artificial Intelligence at Galois. Prior to that, Eric worked as a professor of Computer Science at Iowa State University. In his role Eric leads and executes on federally funded research grants from the Defense Advanced Research Projects Agency (DARPA), the Air Force Research Laboratory (AFRL), and the Office of Naval Research (ONR) focusing on Artificial Intelligence, Machine Learning, Human-Machine Teaming, and Cognitive Science. He is a founding member of the American Statistical Association's Justice, Equity, Diversity, and Inclusion (JEDI) outreach group and is passionate about expanding participation in federally funded scientific research and development.

Usha Suryadevara graduated from the University of Florida in 2001 with an MS in Computer Science. She currently works as Head of Engineering for Drizly, an Uber Company where she oversees Retailer technologies and Infrastructure organizations. In this role she is responsible for building a secure, reliable and scalable alcohol marketplace. She has over two decades of building and scaling software platforms driving business growth. She is a non-profit leader with a passion to advance women in the tech industry and an adjunct professor at UF.

Jess Bodzo graduated from the University of Florida in 2015 with a B.S. in Computer Science. He has had the privilege to work in a variety of engineering roles in the corporate world, as a consultant, and in early stage startups. He is currently a senior software engineer at Ditto where he works primarily in Rust on the cloud platform for an edge sync database platform.

Ben Schwaller graduated from the University of Florida in 2016 with a B.S. in Electrical Engineering and from the University of Pittsburgh in 2018 with an M.S. in Electrical/Computer Engineering. Ben is a Senior Computer Science R&D Staff at Sandia National Laboratories and focuses on monitoring technologies and advanced analysis techniques to improve supercomputer productivity. He leads several university and multi-lab research projects, acts as a data science consultant for network cybersecurity analysis at Sandia, and guest lecturers at colleges on high-performance computing to develop the next-generation of researchers.

TA Bio's
Shaghayegh "Shae" Esmaeili is a Ph.D. candidate majoring in Human-Centered Computing at the Department of Computer & Information Science & Engineering, University of Florida. She received her bachelor's degree in Computer Engineering from Sharif University of Technology, Iran, in 2016. Her research interests include human-computer interaction, visual analytics, data visualization, and VR and 3D interactions.

Required Textbooks and Software
- N/A - Course notes are developed by the instructors

Course Schedule

Week	Dates	Topics	Due
0	Jan 8 - Jan 12	- Course Introduction - Measuring Success, Org Structures, & Large-Scale Agile Frameworks - Career Prep: Resumes & Public Portfolios	Review Syllabus **Participation (2.5 pt)**: Complete Welcome Survey **Assignments 1 & 2 (6 pt):** Resume & LinkedIn
1	Jan 15 - Jan 19	- Code Collaboration: Git in Large Enterprises - Career Prep: Technical Interviews, Offers, & Benefits	**Assignment 3 (6 pt)**: Git Branching Strategies **Partner Activity 1 (10 pt)**: Mock Technical Interview
2	Jan 22 - Jan 26	- Career Prep: Personal Branding & Networking - Code Review & Communication - Refactoring & Debugging	
3	Jan 29 - Feb 2	- Code Readability & Documentation	**Assignment 4 (6 pt)**:

		- Developer Experience Tools & Linting - Kubernetes	Project Management & Communicating Up
4	Feb 5 - Feb 9	- Open Source, Dependency Management, & Licensing - Introduction to Enterprise Architecture - Service-Oriented Architecture	**Assignment 5 (6 pt)**: Open Source Part 1
5	Feb 12 - Feb 16	- Message Broker & Event-Based Architecture - AI/ML Real World Applications - REST APIs & Open API Specification	**Partner Activity 2 (5 pt)**: Open Source Code Review
6	Feb 19 - Feb 23	- Augmented & Virtual Reality - Software Audits, Regulatory Impacts, and Data Governance - Build Engineering	**Assignment 6 (6 pt)**: REST API Design
7	Feb 26 - Mar 1	- User Experience & Design - High Performance Computing - Web Development Frameworks	**Assignment 7 (6 pt)**: React Application
8	Mar 4 - Mar 8	- Front-End & Back-End Web Development - Web Development Special Topics: Performance & Accessibility - Mobile App Development (Part 1)	**Assignment 8 (6 pt)**: Mobile Experience Building
9	Mar 11 - Mar 15	Spring Break	
10	Mar 18 - Mar 22	- Mobile App Development (Part 2) - Big Data & Analytics - Public vs Private Cloud Containerization & Orchestration	**Partner Activity 3 (5 pt):** Mobile UX Feedback
11	Mar 25 - Mar 29	- Serverless Computing, PaaS, & IaaS - Software Modernization & Innovation in Large Enterprises - Software Quality Overview	**Assignment 9 (6 pt)**: Event-Driven Architecture
12	Apr 1 - Apr 5	- DevOps & Site Reliability Engineering - Test Driven Development & Automated Unit Tests - Release Management, Change Management, & CI/CD	**Assignment 10 (6 pt)**: Automated Unit Testing
13	Apr 8 - Apr 12	- Production Support - InfoSec: Risk & Vulnerability Management - InfoSec: Access Control (ID, AuthN, AuthZ)	**Assignment 11 (6 pt)**: Static Code Analysis
14	Apr 15 - Apr 19	- FinOps - Decommissioning & Legacy Ecosystems - PaaS, Iaas, & Certifications	**Assignment 12 (6 pt)**: Observability
15	Apr 22 - Apr 24	- 1st 90 Days in the Workforce - Recent Grad Panel	**Participation (2.5 pt)**: Complete Closing

			Survey
16		No Final Exam	Complete Course Eval

Attendance Policy, Class Expectations, and Make-Up Policy

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies:
https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Assignments (12)	66	69%
Partner Activities (3)	20	21%
Feedback Surveys (2)	5	5%
Attendance*	5	5%
		100%

*Note: Attendance for UF Online sections will be determined through discussion topics instead of live zoom attendance.

Grading Policy

Percent	Grade	Grade Points
94.0 - 100	A	4.00
90.0 - 93.9	A-	3.67
87.0 - 89.9	B+	3.33
84.0 - 86.9	B	3.00
80.0 - 83.9	B-	2.67
77.0 - 79.9	C+	2.33
74.0 - 76.9	C	2.00
70.0 - 73.9	C-	1.67
67.0 - 69.9	D+	1.33
64.0 - 66.9	D	1.00
61.0 - 63.9	D-	0.67
0 - 60.9	E	0.00

More information on UF grading policy may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their

Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session. Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Conduct Code (https://sccr.dso.ufl.edu/process/student-conduct-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:
• Your academic advisor or Graduate Program Coordinator
• Jennifer Nappo, Director of Human Resources, 352-392-0904, jpennacc@ufl.edu
• Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
• Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy
There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: https://registrar.ufl.edu/ferpa.html

Campus Resources:

<u>Health and Wellness</u>

U Matter, We Care:
Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: https://counseling.ufl.edu, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence
If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

COVID-19
- You are expected to wear approved face coverings at all times during class and within buildings even if you are vaccinated.
- If you are sick, stay home and self-quarantine. Please visit the UF Health Screen, Test & Protect website about next steps, retake the questionnaire and schedule your test for no sooner than 24 hours after your symptoms began. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 (or email covid@shcc.ufl.edu) to be evaluated for testing and to receive further instructions about returning to campus.
- If you are withheld from campus by the Department of Health through Screen, Test & Protect, you are not permitted to use any on campus facilities. Students attempting to attend campus activities when withheld from campus will be referred to the Dean of Students Office.
- UF Health Screen, Test & Protect offers guidance when you are sick, have been exposed to someone who has tested positive or have tested positive yourself. Visit the UF Health Screen, Test & Protect website for more information.
- Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators.

<u>Academic Resources</u>

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling; https://career.ufl.edu.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus*:* https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/;https://care.dso.ufl.edu.

On-Line Students Complaints*:* http://www.distance.ufl.edu/student-complaint-process.