

# CPSC 680 Software Engineering Methodologies (SEM) Fall 2025

**Section** 010 Tuesday and Thursday 2:00 - 3:15 Arts & Sciences (CAS) 134

**Instructor:** Dr. Michael L. Collard

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**Office Hours:** Available on the instructor's homepage. Other times are by appointment.

**Course Description** The theoretical basis, analyses, artifacts, and processes of software engineering throughout the phases of requirements, analysis and design, implementation, testing and validation, release, maintenance and evolution.

Successful software engineering is highly dependent on the proper handling of document artifacts throughout the entire software lifetime. Therefore, the course will have a strong focus on the applicability of approaches/artifacts through the evolution of software, i.e., development and maintenance.

The course will include the following (but not limited to or necessarily covered in this order):

- Software Process Models
- Software Evolution
- Software Measurements & Metrics
- Static & Dynamic Analysis
- Empirical Software Engineering
- Version Control & Configuration Management
  
- Modeling Static & Dynamic System Aspects
- Theoretical Basis of Software Testing
- Forward & Reverse Engineering
- Software Transformation
- Software Architecture
- Software Visualization

Most of the material is from the instructor's notes and selected research papers. Due to the breadth of the subject, the textbook is for general background.

**Learning Objectives** Students who complete the course can:

- Demonstrate fundamental knowledge of all software process models
- Understand the role of version control and the evolution of software
- Create artifacts for all phases of software development
- Evaluate analysis and modeling techniques on existing systems
- Understand the benefits and usage of software transformation, traceability, and visualization
- Create a research paper on the subject of software engineering

**Prerequisites:** Graduate Standing. Completion of an undergraduate software engineering course or industrial software development. Strong object-oriented programming skills in C++ or Java is expected. **Credits:** 3

<b>Grading</b>	Exercises	10%	A	≥ 93%	C	≥ 73%
	Projects	20%	A-	≥ 90%	C-	≥ 70%
	Research	20%	B+	≥ 87%	D+	≥ 67%
	Midterm	25%	B	≥ 83%	D	≥ 63%
	Final	25%	B-	≥ 80%	D-	≥ 60%
		100%	C+	≥ 77%	F	

**Exercises** To provide immediate practice of material presented in class, exercises will be assigned periodically throughout the semester and will count for 10% of your overall grade. They may be integrated into the lecture, i.e., assigned and completed during a class period, or be assigned as homework.

**Projects** There will be multiple projects that include the generation and maintenance of artifacts of the software-engineering process, and analysis of existing systems using standard software engineering analysis techniques. Project grades will depend on the correctness, readability, style, quality, and application of the concepts presented in the course. Collectively, the projects are worth 20% of the overall grade, with each project worth an equal amount. Some projects may include controlled collaborative work with other students in the course.

**Research Paper** The course will include a Research Paper that will be presented at the end of the semester, and will count for 20% of the overall grade

**Midterm** The midterm counts for 25% of your overall grade, and will be given after the 8th week of the course . The specific date will be announced at least one week prior.

**Final Exam** The Final Exam is in the regular classroom on Thursday, Dec 11, 2:30 - 4:40 pm and is worth 25% of your overall score.

**Policies** Class instruction uses various forms of presentation, including instructor notes, interactive web pages, and writing on the board. The instructor may enter examples and discuss them during class. Attendance is necessary for a complete understanding of the material.

Any source code created for this course must be committed to a GitHub Classroom Git repository. For credit, the code must appear in the proper repository.

Late assignments require a valid excuse so that work can be graded and returned promptly. It is up to the student to make up any missed material. Make-ups of any work for this class are given only with an excused absence or a documented, valid emergency. I encourage you to contact me if an emergency arises.

Only students whose names are on the University's official 15-day class list can attend class. Consult University information for specific dates and policies regarding course withdrawal.

**Academic Honesty** All submitted work (exercises, projects, and tests) must be your own. Submission of work that is even partly not yours results in a report to the *Office of Student Conduct and Community Standards*.

**AI Policy** AI tools (such as ChatGPT) are powerful tools that can be used to aid in the learning process. Students should look to their instructors for guidance on the fair and ethical use of AI tools for this course. The inappropriate or unethical use of such technologies will violate the Code of Student Conduct as cheating, plagiarism, fabrication, unauthorized collaboration, misrepresentation, and/or gaining an unfair advantage. The Code of Student Conduct is a University rule that provides

the framework for the student conduct process at the University of Akron and defines student misconduct and the process that the University will use to address student misconduct reported to the Department of Student Conduct and Community Standards. Students at the University of Akron are responsible to know and abide by the Code of Student Conduct and all University rules, regulations, and policies.

In this course, students are welcome to use whatever AI tools might help them, however they like, as much as they want. However, students must clearly state what tool was used for which part at which stage. Students must know and abide by The University of Akron Code of Student Conduct.

The use of AI tools in software development is one of the first impactful utilization of this technology. However, these tools' output may often be incomplete, lack the necessary quality, or even fail in some instances. For instance, the code generated may not compile or may use non-existent features. It is the student's responsibility to compile and meticulously test the resulting code. This course emphasizes the process of software development rather than the actual act of writing the code.

**Classroom Environment & Respect** This class, as well as The University of Akron community, prohibits unlawful discrimination and harassment—including sexual harassment—on the basis of race, color, religion, sex/gender, sexual orientation, gender identity or expression, age, national origin, ethnicity, disability, pregnancy, parental or foster parent status, nursing status, military status, genetic information, or veteran status. Protected-class-based harassment is not tolerated and is investigated under university policy. More details can be found at the [EEO/AA Office](#).

**Special Notice** Any student who feels she/he may need an accommodation based on the impact of a disability should contact the Office of Accessibility at 330-972-7928. The office is at 105 Simmons Hall.

The University of Akron is committed to providing an environment free of all forms of discrimination, including sexual violence and sexual harassment. This includes instances of attempted and/or completed sexual assault, domestic and dating violence, gender-based stalking, and sexual harassment. Additional information, resources, support and the University of Akron protocols for responding to sexual violence are available at [uakron.edu/Title-IX](http://uakron.edu/Title-IX).