CSCI 5802 - Software Tools and Practices

Fall 2026 Syllabus, Section 01, CRN 44236,

Credit hours: 3

Instructor

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Public Instructor Information

Instructor Title: Instructor
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Course Description

5802. Software Tools and Practices. A course that focuses on the different tools and techniques that software engineers typically use while developing software. Topics include current software engineering tools and practices, software testing, software architecture, version control systems, build and make systems, debuggers, static analysis tools, dynamic analysis tools, and design patterns. Students gain experience in multiple environments (Windows and a UNIX-based environment). Prereq.: Junior standing and CSIS 3700 or CSCI 6901. 3 s.h.
This course covers the tools and techniques software engineers use while developing software: version control systems, build and make systems, software testing, debuggers, static and dynamic analysis tools, software architecture, and design patterns — practiced in two environments, Windows and UNIX. Instead of toy exercises, every tool is applied to one real production system: the Ohio Counties civic-data application and its ecosystem of 200+ per-county apps. React, TypeScript, Git, GitHub Actions, and public data are the environment in which you practice; the tools and practices are the course.

The course runs as fourteen modules in five units. Each module pairs lecture content and readings from the real OhioCounties source with a hands-on lab. The semester project: each student adopts a county-style civic-data app (or builds a small hub of their own) and, module by module, brings it under professional discipline — versioned, built, tested, analyzed, debugged, documented, and shipped from CI.

Course website (single source of truth for modules, labs, and readings): https://mikecostarella.github.io/MyWebSiteDevelopmentCourse/

Course Readings

Group	Title	Author	ISBN
Required	Pro Git (free online)	Scott Chacon & Ben Straub	
Optional	TypeScript Handbook (free online)	Microsoft	
Optional	The Only GitHub Guide You'll Ever Need (video)	Corbin Brown	
Optional	React documentation (react.dev)	Meta / React team	
Optional	GNU make manual (free online)	Free Software Foundation	
Optional	npm documentation (docs.npmjs.com)	npm / GitHub	
Optional	Vite guide (vite.dev)	Vite team	
Optional	GitHub Actions documentation	GitHub	
Optional	GitHub Codespaces documentation	GitHub	
Optional	Chrome DevTools documentation	Google Chrome team	
Optional	Vitest documentation (vitest.dev)	Vitest team	
Optional	React Testing Library documentation	Testing Library	
Optional	Playwright documentation (playwright.dev)	Microsoft	

Optional	typescript-eslint documentation	typescript-eslint team
Optional	MDN Web Docs	Mozilla

All readings are free online; module pages on the course site cite the specific chapters or sections each lab depends on.

The course readings are subject to change in the event of extenuating circumstances, research developments, current events, and/or to ensure better learning.

Schedule of Topics and Assignments

Week of	Reading(s)	Proposed Topic	Due/To Prepare for Class
8/24	Student Setup Guide (course site)	Module 1 — The engineer's toolbox; the OhioCounties system; three environments	Setup complete; Lab 1
8/31	Pro Git chs. 1–3, 7, 10	Module 2 — Version control: Git as database, workflow, communication medium	Lab 2
9/7	GNU make "Intro to Makefiles"; npm & Vite docs	Module 3 — Build and make systems (no class Mon 9/7 — Labor Day)	
9/14	GitHub Actions & Codespaces docs	Module 3 lab; Module 4 — CI: GitHub Actions	Lab 3
9/21	Chrome DevTools debugger docs	Module 4 lab; Module 5 — Debuggers	Lab 4
9/28	Vitest docs	Module 5 lab; Module 6 — Unit testing	Lab 5
10/5	Vitest mocking & coverage guides	Module 6 lab; Module 7 — Test design	Lab 6
10/12	React Testing Library; Playwright docs	Module 7 lab; Module 8 — Integration & E2E testing	Lab 7
10/19	TS Handbook (narrowing, strictness); typescript-eslint	Module 8 lab; begin Module 9 — Static analysis	Lab 8
10/26	DevTools performance & memory panels	Module 9 lab; Module 10 — Dynamic analysis	Lab 9; Checkpoint 1 due Mon 10/26
11/2	Course site module pages	Module 10 lab; Module 11 — Software architecture	Lab 10
11/9	Course site module pages	Module 11 lab; Module 12 — Design patterns	Lab 11; Checkpoint 2 due Mon 11/9
11/16	Course site module pages	Module 12 lab; Module 13 — Maintenance	Lab 12
11/23		Module 13 lab (no class Wed 11/25 — Thanksgiving)	Lab 13
11/30		Module 14 — Capstone: retrospectives, presentation prep	
12/7		Final presentations	Final project + presentation due

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