

MAHONING COUNTY CAREER & TECHNICAL CENTER

Web Design & Senior Capstone

Syllabus & Curriculum Map · ODE Subject Code 145010

AI Automation & Software Development | Senior Year, Semester 2

2026–2027 · February 1 – June 4, 2027

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CONCEPT What this course is

Six weeks of web fundamentals, then twelve weeks building something real for someone who is not your teacher.

This is the last course in the program. What you make here is what you show an employer, a college, or an internship interviewer. Everything in two years has been preparation for it.

CHECKPOINT College credit

Web Design 145010 is CTAG-eligible for college credit at Ohio public colleges and universities. Credit is triggered by the acknowledgement survey at the end of your WebXam post-test.

Course Overview

Official course description

Students will learn the dynamics of the Web environment while pursuing an in-depth study of both Hypertext Markup Language (HTML) and Cascading Style Sheets (CSS). Web based protocols such as FTP, TCP/IP, and HTTP will be addressed. Students will create a website with tag text elements, special characters, lines, graphics, hypertext links, and graphical tables.

— Ohio Department of Education & Workforce, Information Technology Career Field

The two phases

PHASE	WEEKS	WHAT HAPPENS
Instruction	1–6 · Feb 1 – Mar 12	Concentrated web fundamentals. Semantic HTML, modern CSS, accessibility, scripting, forms, publishing. The last formal instruction of the program.
Capstone	7–18 · Mar 15 – Jun 4	Twelve weeks building and shipping a real project for a real external stakeholder, run through the full DMAIC cycle.

CONCEPT Why six weeks of instruction is enough

You arrive having deployed applications, consumed APIs, built database schemas, run usability studies, and worked in Figma. Those were delivered in 145060, 145065, and 145130.

This block covers what is genuinely new: markup, styling, accessibility, and the browser. The remaining competencies in this course are delivered through the capstone rather than taught discretely, because doing them with a real client teaches them better than a lecture would.

Where this sits

YEAR	SEMESTER 1	SEMESTER 2	FOCUS
Junior	145060 Programming	145065 Object-Oriented Programming	Python → C#
Senior	145130 Applications of AI	145010 Web Design + Capstone	AI → Ship it

Structure

Length	18 weeks. Seniors finish June 4 for graduation activities.
Grading Period 3	February 1 – April 9 · Instruction Weeks 1–6, Capstone Weeks 7–10
Grading Period 4	April 12 – June 4 · Capstone Weeks 11–18
Daily block	Periods 4/5B–7, 10:56–1:32. 149 working minutes.
Period 8	1:34–2:20. Capstone work, credentials, BPA, side quests.

Stack	HTML, CSS, JavaScript. Capstone stack is your choice.
Hosting	Cloudflare Pages for static, Render for full-stack. Both free, neither requires a credit card.
Design	Figma for wireframing and prototyping

Assessments and hard dates

ASSESSMENT	WINDOW
WebXam 145010 Pretest	Administered in January, during 145130, before this course begins
BPA State pre-submission	February 4
BPA State Leadership Conference	February 21–23
Capstone proposal approval	Week 8 — must be signed by a stakeholder to proceed
BPA National Leadership Conference	May 4–9, Colorado
WebXam 145010 Post-test	Week 16 — May 17–21. Post-test window closes May 28.
Final capstone demonstration	Week 18 — June 1–4

WARNING Two scheduling constraints

The WebXam winter pretest window closes January 29, three days before this course begins. The 145010 pretest must be administered in January while students are still finishing 145130.

The post-test window closes May 28 and seniors leave June 4. The post-test is scheduled for Week 16 so it lands inside the window with a week of margin.

BPA alignment

EVENT	SUPPORTED BY
360 HTML and CSS Coding	Instruction Weeks 1–3
365 Website Design and Development Team	Instruction Weeks 1–6 and the capstone
455 User Experience Design Team	Wireframing and usability work
V04 Virtual Web Application Team	The capstone, Full-Stack track

Note that 360 and 365 moved out of the 400s into Digital Technology for 2026–27. Regionals happened in December, so this course supports State and National only.

How Class Runs

Instruction phase, Weeks 1–6

MIN	SEGMENT	WHAT HAPPENS
10	Bell ringer	A question on the board when you walk in.
15	Instruction	One concept, built live in the browser with dev tools open.
50	Build 1	Hands-on.
5	Reset	Stand, walk, reset.
55	Build 2	Hands-on or pair work.
14	Review & close	Someone shows their page. Commit and push.

Capstone phase, Weeks 7–18

MIN	SEGMENT	WHAT HAPPENS
10	Standup	What I finished, what I am on, what is blocking me. Every day.
15	Clinic	A short targeted session on whatever the room needs today. Not a lecture.
110	Build	Sustained work. Instructor conferences with two teams per day.
14	Demo & commit	One team demos progress. Everyone pushes.

Friday during the capstone is stakeholder day: client contact, feedback review, and the weekly written progress update.

TIP The clinic model

During the capstone I am not teaching a scope and sequence. I am running a shop. The 15-minute clinic covers whatever three teams are stuck on, and the rest is build time and conferencing.

If you need something nobody else needs, that is a conference, not a clinic.

Grading

Instruction phase, Weeks 1–6

CATEGORY	WEIGHT	WHAT COUNTS
Projects	35%	Weekly build deliverables and the accessibility rebuild.
Written & Documentation	20%	Code reviews, AI usage logs, decision logs, technical writing.
Lab & Practice	20%	Bell ringers, daily labs, timed reps.
Quiz & Exam	15%	WebXam-aligned quizzes.
BPA / Credential / Capstone	10%	Period 8. Competition, credentials, capstone groundwork.

Capstone phase, Weeks 7–18

DIMENSION	WEIGHT	ASSESSED BY
Process & Documentation	30%	DMAIC phase evidence, decision log, commit history, meeting records, weekly updates
Technical Execution	30%	Five-dimension code review rubric. Does it work, and does it stay working
Stakeholder Outcome	20%	Written acceptance from your external stakeholder against the criteria you agreed
Presentation & Defense	20%	Formal presentation and your ability to answer unscripted questions

Only thirty percent of the capstone grade is the code. A working project with no stakeholder, no documentation, and no defense is a failing capstone.

Policies

- No work is graded that is not in a repository. Every period ends with a commit.
- Every project includes an AI usage log and a licensing statement.
- No personal information, real names, or school data enters any AI tool.
- Capstone scope is approved in Week 8 and cannot be expanded after Week 12.
- A capstone without a named, contactable stakeholder does not proceed.
- The only way to fail outright is to submit work you cannot explain.

Instruction Phase · Weeks 1–6

Six weeks of concentrated web fundamentals. This is the last formal instruction in the program.

WEEK 1 Semantic HTML & the Browser

DATES Feb 1 – Feb 5

NOTE Feb 5 Waiver Day, no classes

Focus: How a document becomes a page. Structure first, appearance later.

Students will:

- Describe the principles of HTML and its functional relationship with web browsers
- Format content using HTML formatting tags including links, tables, and lists
- Create absolute and relative links, anchors within a page, and email and download links
- Explain the difference between static and dynamic sites and the reasons for using each
- Describe ways to present data across responsive web, mobile, desktop, and web applications

Deliverables:

- A semantic document with correct heading hierarchy and zero generic divs where an element exists
- BPA State pre-submission February 4

COMPETENCIES 6.1.1, 6.1.3, 6.1.5, 6.1.6, 6.2.1, 6.2.2, 6.2.3, 2.7.2, 2.7.8

WEEK 2 Modern CSS & Responsive Layout

DATES Feb 8 – Feb 12

NOTE Feb 12 Presidents' Day Break

Focus: Grid, flexbox, and container queries. Layout that adapts instead of breaking.

Students will:

- Integrate styles using inline and external Cascading Style Sheets
- Format website layout across targeted platforms including text, tables, lists, and iframes
- Insert and position images and wrap text using CSS
- Build hover and mouseover effects
- Integrate responsive design into web development

Deliverables:

- A responsive layout built with grid and flexbox, no floats, no tables for layout
- Verified at three viewport widths

COMPETENCIES 6.1.7, 6.2.4, 6.2.5, 6.2.7, 6.5.7, 6.5.8, 6.5.13

WEEK 3 Accessibility & Compliance

DATES Feb 15 – Feb 19

NOTE Feb 15 Presidents' Day, no classes

Focus: Building for people who do not navigate the way you do. This is a legal requirement, not a courtesy.

Students will:

- Plan a web page considering audience, layout, color, links, graphics, and ADA requirements
- Identify how different browsers and devices affect page function including text-to-speech and screen readers
- Develop and execute usability tests checking information accessibility, ease of use, and navigation
- Recognize ways bias may influence how a product serves different users

Deliverables:

- THE ACCESSIBILITY REBUILD: take a supplied inaccessible page and rebuild it to pass an automated check with zero errors
- Keyboard-only navigation demonstrated end to end
- Screen reader walkthrough recorded

COMPETENCIES 6.1.2, 2.7.4, 6.5.10, 1.5.5, 1.5.6, 1.3.2

WEEK 4 Client-Side Scripting

DATES Feb 22 – Feb 26

NOTE Full week

Focus: Making a page respond. Events, the DOM, and the moment a document becomes an application.

Students will:

- Select and apply scripting languages used in web development
- Insert client-side script into a web page and comment it appropriately
- Manipulate page elements in response to user events
- Describe the characteristics and use of browser plug-ins
- Explain the relationship between data transmission volumes, bandwidth, and latency

Deliverables:

- An interactive component built without a framework
- BPA STATE LEADERSHIP CONFERENCE February 21–23

COMPETENCIES 6.3.1, 6.3.2, 6.3.3, 2.7.5, 2.7.6

WEEK 5 Forms & Data

DATES Mar 1 – Mar 5

NOTE Full week

Focus: Collecting input safely and connecting the front end to something behind it.

Students will:

- Design a data entry form from specifications accepting varied input types
- Write HTML for text fields, radio buttons, check boxes, drop-downs, and working buttons
- Explain the concept of a form action
- Format a completed form using fieldset and tabindex
- Code scripting to interact with data sources including databases and web services

Deliverables:

- A working form with client and server-side validation and an accessible error pattern
- Form connected to a live data source

COMPETENCIES 6.4.1, 6.4.2, 6.4.3, 6.4.4, 6.4.5, 6.4.6, 6.4.7, 1.4.6

WEEK 6 Publishing, Standards & Measurement

DATES Mar 8 – Mar 12

NOTE Instruction ends Mar 12

Focus: Getting it live, keeping it valid, and finding out whether anyone uses it.

Students will:

- Implement web programming standards and protocols including W3C and HTML5
- Code for cross-platform and cross-browser compatibility and validation
- Publish a completed website to a web server

- Install and configure a content management system
- Incorporate search engine optimization into webpages
- Monitor customer expectations and determine satisfaction using measurement tools

Deliverables:

- A validated site published live to Cloudflare Pages or Render
- Analytics instrumented and reporting real traffic
- INSTRUCTION PHASE COMPLETE — capstone begins Week 7

COMPETENCIES 6.5.1, 6.5.3, 6.5.4, 6.5.5, 6.5.6, 6.5.11, 6.5.12, 6.5.14, 1.10.5, 1.4.8

Capstone Phase • Weeks 7–18

March 15 through June 4. Twelve weeks. The largest single body of work in the program.

The requirement, regardless of track

- It solves a real problem for a real person outside this classroom
- It is deployed, running, and reachable by someone who is not you
- It has a named external stakeholder who agreed to acceptance criteria in writing
- It is documented: README, decision log, AI usage log, and a user guide
- It runs the full DMAIC cycle with dated evidence at each phase
- It survives thirty days without manual intervention
- It is presented formally, and you can answer questions about anything in it

Three tracks

TRACK	TYPICAL BUILD	BEST FOR
Industrial / HMI	Raspberry Pi with sensors, C# WPF operator panel, alarm handling, data logging, with a web dashboard	Manufacturing-bound students and employer internships
Full-Stack Application	Deployed web application with authentication, database, real users, analytics instrumented	College-bound and web-industry students
AI-Integrated	Local model wrapped as a service, C# or web front end, with a written ethics and licensing analysis	Students targeting BPA V16 and AI-adjacent work

The track sets the technical shape. The problem is always yours, drawn from the Problem Inventory you wrote in the first week of junior year.

The twelve weeks

WEEKS	DATES	PHASE	DELIVERABLE
7–8	Mar 15 – Mar 26	Define	Project concept proposal: scope, purpose, target audience, client needs, expected outcomes, budget, timeline, task breakdown, responsibilities. Presented to stakeholders for approval. Signed agreement required to proceed.
9–10	Mar 29 – Apr 9	Measure & Analyze	Baseline data, requirements specification, conceptual model and design brief, wireframes, architecture, written test plan. GP3 ends April 9.
11–14	Apr 12 – May 7	Improve	Build sprints with weekly demos and weekly written stakeholder updates. Two peer code reviews. BPA Nationals May 4–9.

WEEKS	DATES	PHASE	DELIVERABLE
15–16	May 10 – May 21	Improve → Control	Usability testing with real users. Corrections from test results. Stakeholder acceptance sought against the agreed criteria. WebXam post-test Week 16.
17–18	May 24 – Jun 4	Control	Rollout plan, support and training materials, final review and approval, handoff to stakeholder, formal presentation. Memorial Day May 31.

CONCEPT How the capstone delivers this course's competencies

Outcome 2.9 Project Concept Proposal is delivered entirely by the Define phase. Outcome 2.12 Performance Tests and Acceptance is delivered entirely by Weeks 15 and 16. Outcome 2.13 Rollout and Handoff is delivered entirely by Weeks 17 and 18. Outcome 2.11 Troubleshooting is exercised continuously.

The Strand 1 business competencies — identifying stakeholders, working within a budget, communicating features and benefits, professional correspondence, formal presentation — are delivered through actual client interaction rather than classroom content. That is both more defensible and more real.

WARNING The two ways a capstone fails

Scope. A student picks something they cannot finish and spends twelve weeks at forty percent complete. Scope is killed in Week 8, not Week 14. After Week 12 scope may be reduced but never expanded.

No stakeholder. A capstone with an imaginary user drifts. A named, contactable human is required by the end of Week 7 or the project does not proceed.

Semester Calendar

Grading Period 3 • February 1 – April 9

WK	DATES	PHASE	MILESTONES
1	Feb 1–5	Instruction	Feb 4 BPA State pre-submission. Feb 5 Waiver Day. Semantic HTML.
2	Feb 8–12	Instruction	Feb 12 Presidents' Day Break. Modern CSS and responsive layout.
3	Feb 15–19	Instruction	Feb 15 Presidents' Day. Accessibility rebuild due.
4	Feb 22–26	Instruction	BPA STATE Feb 21–23. Client-side scripting.
5	Mar 1–5	Instruction	Forms and data sources.
6	Mar 8–12	Instruction	Publishing, validation, SEO, analytics. INSTRUCTION ENDS.
7	Mar 15–19	Capstone: Define	Stakeholder identified and confirmed. Proposal drafting.
8	Mar 22–26	Capstone: Define	Mar 26 Spring Break. PROPOSAL APPROVED AND SIGNED.
9	Mar 29 – Apr 2	Capstone: Measure	Mar 29 Spring Break. Requirements and baseline data.
10	Apr 5–9	Capstone: Analyze	Wireframes, architecture, test plan. GP3 ENDS April 9.

Grading Period 4 • April 12 – June 4

WK	DATES	PHASE	MILESTONES
11	Apr 12–16	Capstone: Improve	Sprint 1. Weekly stakeholder update begins.
12	Apr 19–23	Capstone: Improve	Sprint 2. SCOPE LOCKED — no expansion after this week.
13	Apr 26–30	Capstone: Improve	Sprint 3. First peer code review.
14	May 3–7	Capstone: Improve	BPA NATIONALS May 4–9. Sprint 4.
15	May 10–14	Capstone: Control	Usability testing with real users. Corrections.
16	May 17–21	Capstone: Control	WEBXAM 145010 POST-TEST. Stakeholder acceptance sought.
17	May 24–28	Capstone: Control	Rollout plan, training materials, handoff.
18	Jun 1–4	Capstone: Close	May 31 Memorial Day. FINAL PRESENTATIONS. Seniors finish June 4.

NOTE Where the interruptions land

The instruction phase loses three days in February to a waiver day and Presidents' Day Break, and Week 4 loses students to State. Weeks 8 and 9 lose two days to spring break, which falls during the Define and Measure phases where the work is written rather than technical.

That placement is deliberate. Losing build days hurts more than losing planning days.

Competency Coverage

Delivered by the instruction phase

STRAND	NAME	WEEKS
6	Web Development — the entire strand	1–6
2.7	Applications and Architecture	1, 4
1.5	Global Environment	3
1.10	Sales and Marketing	6

Delivered by the capstone

OUTCOME	NAME	PHASE
2.9	Project Concept Proposal	Define, Weeks 7–8
2.11	Troubleshooting	Continuous
2.12	Performance Tests and Acceptance	Control, Weeks 15–16
2.13	Rollout and Handoff	Control, Weeks 17–18
1.1	Employability Skills	Continuous — stakeholder work
1.2	Leadership and Communications	Weekly updates and final presentation
1.3	Business Ethics and Law	Licensing and IP in the build
1.4	Knowledge Management and IT	Documentation and data handling
1.6	Business Literacy	Proposal — opportunity, features, benefits, budget
1.7	Entrepreneurship	IP protection in the proposal
1.9	Financial Management	Budget in the proposal
1.10	Sales and Marketing	Customer needs, satisfaction measurement

CHECKPOINT Program exit

Three courses carrying statewide college credit. At least one industry-recognized credential. Two programming languages. A deployed CRUD application, a working industrial interface, an AI-integrated build, and a twelve-week capstone delivered to a real stakeholder.

Two years of commit history under your own name, and a portfolio that demonstrates shipping rather than coursework.