



Pilot Course Curriculum and Intervention Plan for Fundamentals of Web Development (BMU)

**“Improving the quality and sustainability of
learning using early intervention methods based
on learning analytics”**

Project No. 2023-1-FI01-KA220-HED-000159757



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1 General course information

Course name	Fundamentals of Web Development
Institution	Belgrade Metropolitan University (BMU)
Course level	Undergraduate
Teaching model	Hybrid – face to face teaching with online resources and assignments
Course learning objectives	<ul style="list-style-type: none"> • Understand the basics of web technologies • Differentiate between client-side and server-side programming • Apply HTML elements for structuring web pages • Use CSS for styling and layout positioning • Develop interactive web pages using JavaScript • Implement object-oriented concepts in JavaScript • Work with JSON and jQuery • Apply SEO optimization techniques

2 Motivation and purpose (Why)

Goal of the inquiry	
What do you want to learn about the teaching and learning process?	<ul style="list-style-type: none"> • Gain insights into student engagement and progress in mastering web development concepts and techniques. • Improve student engagement in the course and their learning. • Investigate the evolution of students’ self-regulation throughout the course?

3 Defining more precisely what to explore (What)

Specific questions of interest	
Key inquiry questions	<ul style="list-style-type: none">• Which activities students find engaging?• How student engagement correlates with learning outcomes?• How students progress through assignments and projects?• How much students engage in course activities?• What is the evolution of students’ self-regulation throughout the course?
Data sources	<ul style="list-style-type: none">• Engagement with the lectures• Exercise/assignment submission and grades• SRL weekly survey• Discord conversation data

4 Data collection strategy (How)

Data sources		<ul style="list-style-type: none"> • Learning Management System (LMS) • Quizzes and assignments • Discord student discussions • SRL surveys 	
Data aggregation		Data will be collected in xAPI format and integrated into Learning Locker either directly from the LMS plugin or through the csv2xAPI tool developed within the ISILA project	
Detailed methods for data collection			
Week#	Topic	Learning activities and materials	Data source(s) and collection method(s)
1	Fundamentals of web technologies	<ul style="list-style-type: none"> • Slides and teaching materials for the topics: <ul style="list-style-type: none"> ◦ Internet and WWW ◦ URI, URL, URN ◦ HTTP ◦ Web technologies: HTML, CSS, Javascript ◦ Client-side programming ◦ Server-side programming ◦ Responsive design • Self-assessment quizzes • Exercises for understanding request/response method of HTTP • Homework assignment 1 	<ul style="list-style-type: none"> • Interaction with teaching materials in the course LMS • Filling out SRL survey • Assignment submissions • Assignment grades
2	Basic HTML elements	<ul style="list-style-type: none"> • Slides and teaching materials for the topics: <ul style="list-style-type: none"> ◦ Steps in Website Development ◦ HTML Document Structure ◦ HTML Elements 	<ul style="list-style-type: none"> • Interaction with teaching materials in the course LMS • Filling out SRL survey • Assignment submissions • Assignment grades

		<ul style="list-style-type: none"> o HTML Attributes o HTML Headings o HTML Paragraphs o HTML Styles o HTML Formatting o HTML Comments o HTML Colors o HTML Links o HTML Head • Self-assessment quizzes • Exercises for HTML web development • Homework assignment 2 • Discord discussion about assignment 2 	<ul style="list-style-type: none"> • Discord student discussion
3	Structuring web pages with HTML	<ul style="list-style-type: none"> • Slides and teaching materials for the topics: <ul style="list-style-type: none"> o HTML Images – Map, Background, Favicon o HTML Tables o HTML Lists o HTML Layout o HTML Forms o HTML Symbols • Self-assessment quizzes • Exercises for HTML web development • Homework assignment 3 • Discord discussion about assignment 3 	<ul style="list-style-type: none"> • Interaction with teaching materials in the course LMS • Filling out SRL survey • Assignment submissions • Assignment grades • Discord student discussion
4	HTML classes and identifiers	<ul style="list-style-type: none"> • Slides and teaching materials for the topics: <ul style="list-style-type: none"> o HTML block/inline o HTML class o HTML id o HTML iframes o HTML responsive • Self-assessment quizzes • Exercises for HTML web development • Homework assignment 4 • Discord discussion about assignment 4 	<ul style="list-style-type: none"> • Interaction with teaching materials in the course LMS • Filling out SRL survey • Assignment submissions • Assignment grades • Discord student discussion

5	HTML and CSS	<ul style="list-style-type: none"> • Slides and teaching materials for the topics: <ul style="list-style-type: none"> ◦ User interface design ◦ Why use CSS? ◦ HTML and CSS ◦ CSS document structure ◦ CSS syntax ◦ CSS colors ◦ CSS text formatting (Text, Font, Icons, Lists) • Self-assessment quizzes • Exercises for CSS development • Homework assignment 5 • Discord discussion about assignment 5 	<ul style="list-style-type: none"> • Interaction with teaching materials in the course LMS • Filling out SRL survey • Assignment submissions • Assignment grades • Discord student discussion
6	CSS	<ul style="list-style-type: none"> • Slides and teaching materials for the topics: <ul style="list-style-type: none"> ◦ CSS padding ◦ CSS border ◦ CSS margins ◦ CSS box model ◦ CSS table formatting • Self-assessment quizzes • Exercises for CSS development • Homework assignment 6 • Discord discussion about assignment 6 	<ul style="list-style-type: none"> • Interaction with teaching materials in the course LMS • Filling out SRL survey • Assignment submissions • Assignment grades • Discord student discussion
7	CSS: Elements positioning	<ul style="list-style-type: none"> • Slides and teaching materials for the topics: <ul style="list-style-type: none"> ◦ CSS Positioning ◦ CSS Layout • Self-assessment quizzes • Exercises for CSS development • Homework assignment 7 • Discord discussion about assignment 7 	<ul style="list-style-type: none"> • Interaction with teaching materials in the course LMS • Filling out SRL survey • Assignment submissions • Assignment grades • Discord student discussion
8	Advanced CSS	<ul style="list-style-type: none"> • Slides and teaching materials for the topics: 	<ul style="list-style-type: none"> • Interaction with teaching materials in the course LMS • Filling out SRL survey

		<ul style="list-style-type: none"> o CSS transformation (2D, 3D) o Responsive CSS o Bootstrap • Self-assessment quizzes • Exercises for CSS development • Homework assignment 8 • Discord discussion about assignment 8 	<ul style="list-style-type: none"> • Assignment submissions • Assignment grades • Discord student discussion
9	Introduction to JavaScript	<ul style="list-style-type: none"> • Slides and teaching materials for the topics: <ul style="list-style-type: none"> o What is JavaScript o Adding JavaScript to an HTML page o Syntax rules o Statements o Variables o Data types o Operators o Conditional statements o Loops o Functions • Self-assessment quizzes • Exercises for HTML web development • Homework assignment 9 • Discord discussion about assignment 9 	<ul style="list-style-type: none"> • Interaction with teaching materials in the course LMS • Filling out SRL survey • Assignment submissions • Assignment grades • Discord student discussion
10	JavaScript objects and arrays	<ul style="list-style-type: none"> • Slides and teaching materials for the topics: <ul style="list-style-type: none"> o Arrays o Objects • Self-assessment quizzes • Exercises for HTML web development • Homework assignment 10 • Discord discussion about assignment 10 	<ul style="list-style-type: none"> • Interaction with teaching materials in the course LMS • Filling out SRL survey • Assignment submissions • Assignment grades • Discord student discussion
11	JavaScript OOP	<ul style="list-style-type: none"> • Slides and teaching materials for the topics: <ul style="list-style-type: none"> o Methods o Classes 	<ul style="list-style-type: none"> • Interaction with teaching materials in the course LMS • Filling out SRL survey

		<ul style="list-style-type: none"> o Objects o Constructors o Encapsulation o Polymorphism o Inheritance • Self-assessment quizzes • Exercises for HTML web development • Homework assignment 11 • Discord discussion about assignment 11 	<ul style="list-style-type: none"> • Assignment submissions • Assignment grades • Discord student discussion
12	DOM manipulation and events	<ul style="list-style-type: none"> • Slides and teaching materials for the topics: <ul style="list-style-type: none"> o Document Structure o Finding Elements o Creating Nodes o Positioning o Events o Form Validation • Self-assessment quizzes • Exercises for HTML web development • Homework assignment 12 • Discord discussion about assignment 12 	<ul style="list-style-type: none"> • Interaction with teaching materials in the course LMS • Filling out SRL survey • Assignment submissions • Assignment grades • Discord student discussion
13	JS JSON	<ul style="list-style-type: none"> • Slides and teaching materials for the topic: <ul style="list-style-type: none"> o JS JSON • Self-assessment quizzes • Exercises for HTML web development • Homework assignment 13 • Discord discussion about assignment 13 	<ul style="list-style-type: none"> • Interaction with teaching materials in the course LMS • Filling out SRL survey • Assignment submissions • Assignment grades • Discord student discussion
14	JQuery	<ul style="list-style-type: none"> • Slides and teaching materials for the topic: <ul style="list-style-type: none"> o JQuery • Self-assessment quizzes • Exercises for HTML web development • Homework assignment 14 	<ul style="list-style-type: none"> • Interaction with teaching materials in the course LMS • Filling out SRL survey • Assignment submissions • Assignment grades • Project grades

		<ul style="list-style-type: none"> • Discord discussion about assignment 14 	<ul style="list-style-type: none"> • Discord student discussion
15	SEO optimization	<ul style="list-style-type: none"> • Slides and teaching materials for the topic: <ul style="list-style-type: none"> ◦ SEO optimization • Self-assessment quizzes • Exercises for HTML web development • Homework assignment 15 • Course project assignment • Discord discussion about the project 	<ul style="list-style-type: none"> • Interaction with teaching materials in the course LMS • Filling out SRL survey • Assignment submissions • Assignment grades • Project grades • Discord student discussion

5 Data analysis and interpretation (So What)

<p>Sense making and interpretation context</p>	<p>Use dashboards to visualize engagement levels.</p> <p>Analyze correlations between activities and outcomes.</p> <p>Identify students that are in the bottom quartile of activity and self-regulation.</p> <p>Compare results with course goals and prior expectations.</p>
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6 Interventions plan (Now What)

<p>Potential interventions</p>	<p>Face-to-face interventions:</p> <ul style="list-style-type: none"> - devote more time to the topic/assignment, - arrange additional learning activities, - address challenges, - extend deadlines if students are struggling. <p>Internet-based interventions:</p> <ul style="list-style-type: none"> - email class-wide reminders, - recommendations, - personalized email offering 1-to-1 tutorial or additional support, - share additional resources on Discord. <p>Content adjustments:</p> <ul style="list-style-type: none"> - revise content or format for topics with low engagement (e.g., simplify lecture slides, add examples).
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