1. **Course number and name:** CMSE 514 Web Technologies and Services
2. **Credits and contact hours, and categorization:** Credits: 3, Contact hours: 3, Engineering Sciences and Design
3. **Course Instructor:** Assoc. Prof. Dr. Duygu Çelik Ertuğrul
4. **Textbook:**
* *Fundamentals of Web Development, By: Randy Connolly; Ricardo Hoar, Publisher: Pearson, Edition: 3rd, Copyright year: 2022.*

**Other supplemental materials:**

* *Introduction to JavaScript Programming The "Nothing but a Browser" Approach, Eric Roberts, ISBN-10: 0135245850 • ISBN-13: 9780135245859©2020 • Pearson Paper, 480 pp, Published 02/01/2019*
* *Marty Hall and Larry Brown “Core Servlets and Java Server pages Vol. 1: Core Technologies”, Pearson*
1. **Specific course information**
2. **Catalog description:** The course discusses: WEB 2.0 technologies. Influence of WEB 2.0 over business and society. Web 3.0 and semantic web concepts and technologies. Web 3.0 applications and management of web data. Web services overview. Service-Oriented Architecture (SOA). Web Services Description Language (WSDL). Universal Description, Discovery & Integration (UDDI). Simple Object Access Protocol (SOAP). XML technologies. Web services interaction protocol and description with J2EE technologies. Web service discovery and composition. Programming stage of this course, students will use different tools as follows: Client Side (e.g., HTML, CSS, JavaScript, Ajax, jQuery and JSON), Server Side (e.g., Servlets, JSP, Java Beans, JAX-RS for RESTful services), Database (e.g., MySQL) and Knowledgebase (e.g., RDF, OWL, etc.). Future trend in web technologies and services. The students will be supported with sufficient knowledge on software engineering design and analysis practices by taking this course that provide successfully initialize a project, develop the project, and finalize a software project successfully.
3. **Prerequisite:** -
4. **Required/elective/selected elective:** Required
5. **Specific goals for the course**
6. **Course outcomes:** On successful completion of the course, students will be able to:
7. Students are able to develop dynamic web pages by the use of java script, HTML, and styling.
8. Students will be able to understand and write a well-formed/valid XML and JSON document.
9. Students will be able to connect a java program to a DBMS and perform insert, update, and delete operations on DBMS table.
10. Students will be able to write a server-side java application called Servlet to catch form data sent from client, process and store it on database.
11. Students will be able to develop JSP applications.
12. Students will be able to understand Web services dynamics and develop with contemporary Web service technologies.
13. Students will be able to understand and use most popular JavaScript frameworks.
14. **Student outcomes listed in Criterion 3**
15. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
16. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
17. an ability to communicate effectively with a range of audiences
18. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
19. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
20. an ability to develop and conduct appropriate experimentation, analyze, and interpret data, and use engineering judgment to draw conclusions
21. **Topics covered**

**CHAPTER 1: THE INTERNET AND WORLD WIDE WEB**

* Introduction to Web Development
* How the Web Works
* Trends of Web Technologies

**CHAPTER 2: HTML BASICS**

* Markup
* HTML history
* Tour of the elements
* Tables and Forms, etc.

**CHAPTER 3: CSS FOR STYLING**

* CSS Syntax
* Applying CSS to a Web Page
* Color Properties
* CSS Comments
* HTML Content
* Fonts and Colors
* Text and List Properties, etc.

**CHAPTER 4: JAVASCRIPT-1**

* JavaScript’s role in web development
* How to add JavaScript code to your web pages
* Language Fundamentals
* Functions, Objects, and Arrays in JavaScript

**CHAPTER 5: DATA FORMATS**

* JSON data format
* XML data format

**CHAPTER 6: JAVASCRIPT-2**

* What is Document Object Model (DOM)
* How to use the DOM to dynamically manipulate the contents of a web page
* How to use the DOM and event handling to validate user input in a form
* What are regular expressions and how to use them in JavaScript.
* Reading Section-Additional Features

**CHAPTER 7: JAVASCRIPT-3**

* Extending JavaScript with jQuery
* Event Handling in jQuery
* DOM Manipulation
* AJAX
* Asynchronous File Transmission
* **CHAPTER 8: WORKING WITH DATABASES**
* Most common commands in SQL
* How to access SQL databases?
* How NoSQL database systems work?
* How to work with NoSQL databases using Node?
* What is GraphQL?

**CHAPTER 9: SERVER-SIDE (SERVLETS)**

* Servlets
* Java Beans in JSP pages
* Http Request & Responses
* Using Cookies & Sessions
* Connecting to a database using JDBC.

**CHAPTER 10: WEB SERVICES OVERVIEW**

* Service-Oriented Architecture (SOA)
* Web Services Description Language (WSDL)
* Universal Description, Discovery & Integration (UDDI)
* Simple Object Access Protocol (SOAP)
* Web service discovery and composition
* Web Services via REST (JAX-RS for RESTful services)

**CHAPTER 11: JAVASCRIPT FRAMEWORKS**

* React.js
* Node.js
* Angular.js
* Vue.js
* Larawel.js

**CHAPTER 12: WEB 3.0**

* Ontology
* XML
* RDF
* OWL