Selected Topics in SWE – Spring 2025

E-commerce Website

Building a **full-fledged e-commerce website** requires a well-structured approach that integrates both frontend and backend development.

Overview:
The project involves creating a fully functional e-commerce platform that allows users to browse products, add items to their cart, and complete purchases securely. The website will integrate both frontend and backend components, ensuring a seamless user experience while maintaining robust functionality for managing products, users, and transactions.
The platform should feature product management, user authentication, cart functionality, and order processing.

Objective:
1) Technical Objectives

- **Responsive Design:** Ensure the website is accessible and functional across various devices (desktops, tablets, smartphones).
- **Authentication and Security:** Implement secure user authentication and protect sensitive data (e.g., passwords, payment information).
- **Payment Gateway Integration:** how to integrate third-party services like Stripe or PayPal for handling online transactions.
- **Performance Optimization:** Optimize the website for faster loading times and better user experience.

2) Functional Objectives

- **User-Friendly Interface:** Create a clean, intuitive interface that allows users to easily navigate, search for products, and complete purchases.
- **Shopping Cart and Checkout:** Enable users to add/remove items from their cart and proceed to check-out with ease.
- **Admin Panel:** Provide administrators with tools to manage products, orders, and users efficiently.
- **Search and Filters:** Allow users to search for products and apply filters (e.g., price range, category).

Formula for Building an E-Commerce Website:

Important:
"Ensure the design is intuitive and easy to navigate. Advanced CSS and UI Design"

1. **Scope and Requirements**

   - Identify the features needed (e.g., product catalog, shopping cart, user authentication, payment gateway).

   - Decide on the tech stack (frontend: HTML/CSS/JavaScript frameworks; backend: Node.js, Python, PHP, etc.).

2. **Frontend Development**

   - Build the user interface (UI) using HTML, CSS, and JavaScript.
     HTML: Create semantic structure for pages (home, product listing, product details, cart, checkout).
     CSS: Style the website using frameworks like Bootstrap or Tailwind CSS for responsive design.
     JavaScript: Add interactivity (e.g., dropdown menus, sliders, form validation).

   - Use a frontend framework/library like React, Vue.js, or Angular for dynamic interactions.

   - Ensure responsiveness and accessibility.

3. **Backend Development**

   - Set up a server using a backend framework (e.g., Express.js For Node.js, Django or Flask For PYTHON, For PHP: Use Laravel).

   - Design and implement APIs for communication between the frontend and backend.

   - Connect to a database (e.g., MySQL, Xampp, MongoDB) for storing data.

4. **Database Design**

   - Create tables/collections for users, products, orders, and other entities.

   - Define relationships (e.g., one-to-many, many-to-many).

5. **Integrate Payment Gateway**

   - Use services like Stripe, PayPal, or Razorpay for secure transactions.

6. **Testing and Deployment**

- Test the website for functionality, performance, and security.

- Write unit tests for critical functions.

- Use tools like Postman to test APIS.

7. **Deploying the Backend**

- Use platforms like Heroku, AWS, Netlify or DigitalOcean to deploy the server.

- Set up environment variables for sensitive data (e.g., database credentials, API keys).

Key Features of an E-Commerce Website

1. **User Authentication**

- Login, registration, and password reset functionality.

2. **Product Catalog**

- Display products with filters (e.g., price, category).

3. **Shopping Cart**

- Allow users to add/remove items and view the total cost.

4. **Checkout Process**

- Collect shipping details and process payments.

5. **Admin Panel**

- Manage products, orders, and users.

6. **Search and Filters**

- Enable users to search for products and apply filters.

7. **Responsive Design**

- Ensure the website works seamlessly on mobile and desktop.

- **Project is out of 20.**
- **Project Team members consist of 3 members (at least) and 5 members (at most).**
- **Each team must commit to the idea after responding by confirming it. If they reject it or continue to support the idea after rejecting it, you will not get the grade.**
- **Each team must commit to its own project idea and Design but with the requirements shown.**
- **The submission and Discussion will be on Monday 12/5, Tuesday 13/5 and Thursday 15/5.**
- **If the team members are from different sections, the delivery time will be Monday or Tuesday only. Thursdays are not allowed.**