1. Introduction to the Course

This course aims:

- **to introduce the methods and techniques used in Web-based application development**
- **to develop practical web applications**

Fundamentals of Web

Web engineering is a discipline that focuses on the principles, methodologies, and best practices for designing, developing, and maintaining web applications and websites. It encompasses a wide range of topics and skills, including web development, web design, server-side scripting, client-side scripting, database management, and more. Here are some fundamental aspects of web engineering:

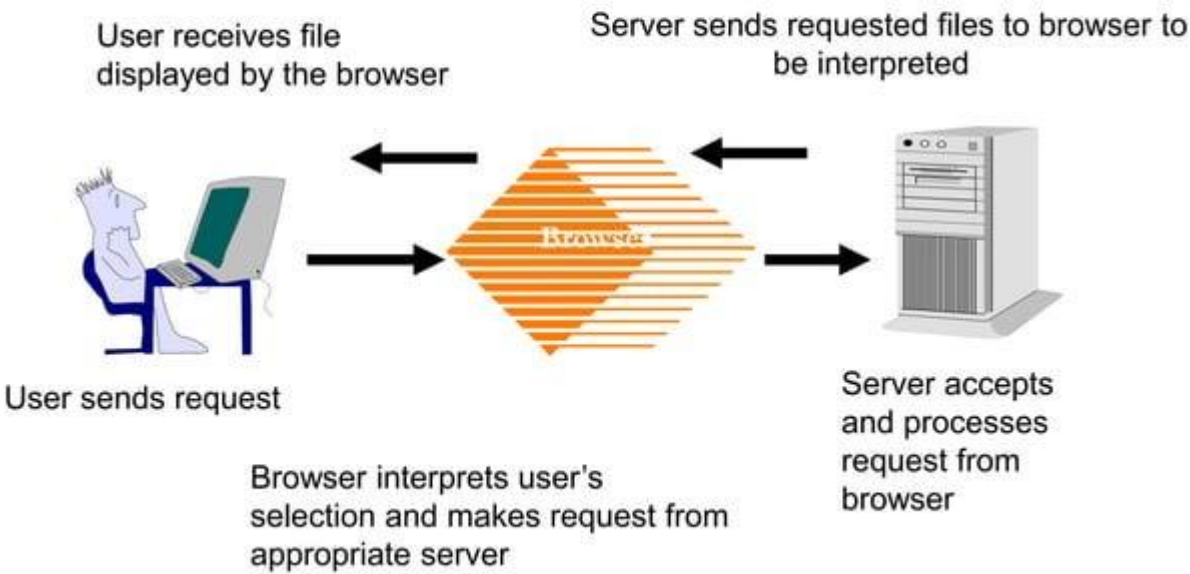
Web Technologies

1. **Client-Side Technologies**:
   - **HTML (Hypertext Markup Language)**: The fundamental markup language for creating the structure and content of web pages.
   - **CSS (Cascading Style Sheets)**: Used for styling and layout of web pages, including fonts, colors, and page layout.
   - **JavaScript**: A versatile programming language used for adding interactivity and functionality to web pages.
2. **Server-Side Technologies**:
   - **Server-Side Scripting**: Technologies like PHP, Python, Ruby, Java, or Node.js are used to build the backend of web applications.
   - **Web Servers**: Understanding how web servers like Apache, Nginx, or Microsoft IIS work is essential.
   - **Databases**: Knowledge of database systems (e.g., MySQL, PostgreSQL, MongoDB) for storing and retrieving data from the server.

Back End

3. **Web Frameworks**:
   - Familiarity with web development frameworks such as Django (Python), Ruby on Rails (Ruby), or Express.js (Node.js) can significantly speed up development.
4. **Web Security**:
   - Understanding common web security issues like Cross-Site Scripting (XSS), Cross-Site Request Forgery (CSRF), and SQL Injection is crucial for protecting web applications.
5. **Responsive Design**:
   - Building web applications that work on various screen sizes and devices (desktop, tablet, mobile) is essential for a great user experience.
6. **Web Performance**:
   - Optimizing web applications for speed and performance, including minimizing loading times and optimizing images and other assets.
7. **Version Control**:
   - Proficiency with version control systems like Git for tracking changes in code and collaborating with others.
8. **User Experience (UX) and User Interface (UI) Design**:
   - Design principles for creating user-friendly, aesthetically pleasing web interfaces that

1.1 Web application development



1.2 Web application development…

- Hyper-text Markup Language (HTML)
- Cascading Style-sheets (CSS)
- Client-side Scripting Language (JavaScript)
- Serve-side Scripting Language (PHP)
- Database Language (MySQL)

2. Web engineering

- **Software engineering** is an engineering discipline that is **concerned** with all aspects of **software production**
- **Software Engineering** is the science and art of **building** significant software systems that are:
  - on time
  - on budget
  - with acceptable performance
  - with correct operation

2. Web engineering…

- **Web engineering** is the study of the process, used to **create** high quality **Web-based applications**
- Web engineering **draws** heavily on the **principles and management** activities found in software engineering processes
- Web engineering **extends** Software Engineering to Web applications

2. Web engineering…

- The application of systematic and quantifiable approaches to cost-effective analysis, design, implementation, testing, operation, and maintenance of high-quality web applications

3. Web applications

- **WWW** has massive and permanent influence on our lives
  - Economy, Industry, education, healthcare, entertainment
- **Why?**
  - global and permanent
  - Comfortable and uniform access

3. Web applications...

- WWW started as an informational medium
- Evolved into application medium
  - Interactive, data intensive services
- Distinguishing factors
  - How it is used?
  - Technologies and standards for development

3. Web applications…

- A Web application is a system that utilizes W3C standards & technologies to deliver web-specific resources to clients (typically) through a browser
- Technology + interaction

5. Categories of web applications

- Document-centric web
- Interactive and transactional web applications
- Workflow-based web applications
- Collaborative and social web applications
- Portal-oriented web applications
- Ubiquitous web applications