Software Development Syllabus

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1. Introduction to Software Development

- Overview of software development lifecycle

- Types of software development methodologies (Agile, Waterfall, etc.)

- Tools and technologies in software development

2. Programming Fundamentals

- Understanding programming languages (Python, Java, C++)

- Basic programming concepts: variables, data types, control structures

- Functions and modular programming

- Error handling and debugging techniques

3. Frontend Development

- Introduction to HTML, CSS, and JavaScript

- Responsive design principles (media queries, frameworks like Bootstrap)

- Client-side scripting and DOM manipulation

- Basics of modern frameworks (React, Angular, or Vue)

4. Backend Development

- Introduction to server-side programming (Node.js, Django, or Flask)

- Understanding RESTful APIs and MVC architecture

- Database integration (SQL and NoSQL databases)

- Authentication and authorization

5. Database Management

- Relational databases (MySQL, PostgreSQL)

- Non-relational databases (MongoDB, Firebase)

- Database design and normalization

- Basic CRUD operations

6. Version Control and Collaboration

- Introduction to Git and GitHub

- Branching, merging, and resolving conflicts

- Collaborative workflows (pull requests, code reviews)

- Continuous integration and deployment (CI/CD)

7. Testing and Debugging

- Types of software testing (unit, integration, system)

- Writing and automating test cases

- Debugging tools and strategies

- Test-driven development (TDD)

8. Software Design and Architecture

- Design patterns and best practices

- Microservices architecture

- Scalability and performance optimization

- Code refactoring

9. DevOps and Deployment

- Introduction to DevOps culture

- Containerization using Docker

- Cloud services (AWS, Azure, Google Cloud)

- Deployment strategies

10. Advanced Topics (Optional)

- Mobile app development (React Native, Flutter)

- AI and Machine Learning basics

- Blockchain fundamentals

- Internet of Things (IoT)

11. Capstone Project

- End-to-end software development project

- Emphasis on real-world problem solving

- Documentation and presentation