Computer Science Curriculum for Front-End Development

Year 1

Semester 1

- **Programming Fundamentals with JavaScript**
- **Web Development Basics** (HTML5, CSS3)
- **Computer Architecture Fundamentals**
- **Discrete Mathematics for Front-End** (Logic, Sets, Functions)
- **UI/UX Design Principles**

Semester 2

- **Object-Oriented Programming with JavaScript**
- **Data Structures for Front-End** (Arrays, Objects, Maps, Sets)
- **Responsive Web Design**
- **Computer Networking Basics**
- **Technical Writing and Documentation**

Year 2

Semester 1

- **Algorithm Analysis for Front-End** (Time/Space Complexity, Browser Rendering)
- **Front-End Framework I** (React.js)
- **Database Concepts for Front-End** (Client-Side Storage)
- **Version Control Systems** (Git, GitHub)
- **Web Accessibility Standards**

Semester 2

- **Front-End State Management** (Redux, Context API)
- **JavaScript Testing** (Jest, React Testing Library)
- **Web Security Fundamentals**
- **API Integration and REST Principles**
- **Front-End Build Tools** (Webpack, Babel)

Year 3

Semester 1

- **Advanced JavaScript Concepts** (Closures, Promises, Async)
- **Front-End Framework II** (Vue.js or Angular)
- **Cross-Browser Compatibility**
- **TypeScript Fundamentals**
- **Web Performance Optimization**

Semester 2

- **Progressive Web Applications**
- **CI/CD for Front-End Development**
- **Mobile-First Development**
- **Advanced CSS and Animations**
- **Software Engineering Practices**

Year 4

Semester 1

- **Cross-Platform Development** (React Native)
- **Web Components and Micro-Frontends**
- **Data Visualization for the Web**
- **Front-End Architecture Patterns**
- **Capstone Project I**

Semester 2

- **WebAssembly Fundamentals**
- **Front-End Career Preparation**
- **Emerging Front-End Technologies**
- **Ethics in Software Development**
- **Capstone Project II**

Electives

- GraphQL and Apollo

- JAMstack Architecture

- UI Animation and Motion Design

- Internationalization and Localization

- Serverless for Front-End Developers

- Web3 and Blockchain UI Development

- Accessibility Engineering

- Design Systems