THE GEEK INSTITUTE
OF CYBER SECURITY

(Building Futures Through Digital Knowledge and Innovation)

JavaScript (03 Months)

Syllabus

01: Introduction to JavaScript

1.1 What is JavaScript?

- History and evolution from Netscape to ECMAScript.
- Role of JavaScript in modern web development (frontend, backend with Node.js).
- Difference between JavaScript, ECMAScript, and TypeScript.

1.2 Implementing JavaScript in HTML

- Adding JS to HTML via <script> tags (inline, internal, external).
- Best practices: placing scripts at the end of body vs head with defer.
- How browsers read and execute JavaScript.

1.3 First Program

- Output with document.write() and console.log().
- Viewing results using browser Developer Tools.

1.4 JavaScript Comments

- Writing single-line and multi-line comments.
- Importance of commenting code for debugging and collaboration.

02: Variables and Data Types

2.1 Declaring Variables

- Difference between var, let, and const.
- Scope and hoisting explained with examples.

2.2 JavaScript Data Types

- Primitive types: Number, String, Boolean, Null, Undefined, Symbol, BigInt.
- Reference types: Object, Array, Function.
- Type coercion and dynamic typing.

03: Operators and Control Structures

3.1 Operators

- Arithmetic: +, -, *, /, %, **
- Assignment: =, +=, -=, etc.
- Comparison: ==, ===, !=, !==, <, >
- Logical: &&, ||, !
- Ternary: condition ? expr1 : expr2

3.2 Conditional Statements

- if, else, else if, switch-case
- Nested conditions with practical use cases.

3.3 Dialog Boxes

- alert(), confirm(), prompt() with input validation examples.

04: Functions and Scope

4.1 Declaring and Calling Functions

- Syntax and usage.
- Parameters and return values.

4.2 Scope and Lifetime

- Global vs Local scope.
- Shadowing and closures (introduction).

05: Loops and Iteration

5.1 Looping Constructs

- for, while, do...while
- break and continue
- Practical examples: odd/even checker, number summation.

5.2 Nested Loops

- Multiplication table
- Pattern printing with *

06: Arrays

6.1 Introduction to Arrays

- Creating, accessing, and modifying arrays.
- Iterating with loops and forEach().

6.2 Array Methods

- push(), pop(), shift(), unshift()
- concat(), join(), slice(), splice()
- indexOf(), lastIndexOf(), includes()
- map(), filter(), every(), some()
- toString(), valueOf(), fill()

6.3 Multidimensional Arrays

- Accessing elements.
- Nested loops for 2D array processing.

07: Objects and Loops

7.1 Object Basics

- Key-value pairs, dot vs bracket notation.
- Methods and this keyword.

7.2 Looping Through Objects

- for...in, for...of, Object.keys(), Object.values()

7.3 Arrays of Objects

- Practical usage: user data management.

08: Strings

8.1 String Methods

- length(), toLowerCase(), toUpperCase()
- includes(), startsWith(), endsWith()
- search(), match(), replace()
- indexOf(), lastIndexOf()
- trim(), charAt(), charCodeAt(), fromCharCode()
- split(), concat(), repeat()
- slice(), substr(), substring()

09: Numbers, Math, and Date

9.1 Number Methods

- Number(), parseInt(), parseFloat()
- isFinite(), isInteger(), toFixed(), toPrecision()

9.2 Math Object

- ceil(), floor(), round(), trunc()
- max(), min(), sqrt(), cbrt(), pow()
- random(), abs(), PI

9.3 Date Object

- Current date/time
- getDate(), getMonth(), getFullYear(), etc.
- setDate(), setMonth(), setFullYear(), etc.

10: DOM Manipulation

10.1 DOM Overview

- Document structure and tree model.

10.2 Selecting Elements

- getElementById(), getElementsByClassName()
- querySelector(), querySelectorAll()

10.3 Reading/Modifying Content

- innerText, innerHTML, textContent
- getAttribute(), setAttribute()

10.4 Styling and Classes

- .style, .className, .classList methods

10.5 DOM Navigation

- Parents, children, siblings

10.6 Creating and Inserting Elements

- createElement(), appendChild(), insertBefore()
- insertAdjacentHTML(), replaceChild(), removeChild()

11: Events and Event Handling

11.1 Basic Events

- Click, mouseover, mouseout
- addEventListener() and useCapture

11.2 Form Events

- keydown, keyup, input, change, submit, focus, blur

11.3 Clipboard Events

- cut, copy, paste

11.4 Timing Events

- setTimeout(), setInterval(), clearTimeout(), clearInterval()

12: BOM - Browser Object Model

12.1 Window Object

- Dimensions, open/close window

12.2 Screen Object

- Width, height, color depth, pixel depth

12.3 Navigator and Location

- navigator, location.href, history

12.4 LocalStorage and Cookies

- localStorage.setItem(), getItem(), clear()
- document.cookie

13: Advanced JavaScript

13.1 ES6+ Syntax and Features

- let, const vs var
- Template literals
- Arrow functions
- Destructuring
- Rest and Spread operators

13.2 Object Enhancements

- Shorthand properties
- Computed properties

13.3 Classes and Inheritance

- class, constructor, extends, super()

13.4 Modules

- export, import

13.5 Promises and Async/Await

- Chaining, error handling

13.6 Fetch API and AJAX

- Using fetch() for API requests

13.7 Error Handling

- try...catch, finally, throw

13.8 Symbols, Iterators, Strict Mode

- Iterators and next()
- "use strict" mode explained

Capstone Projects

- Build a Calculator
- Todo List with LocalStorage
- Weather App with Fetch API
- User Management Dashboard with CRUD Operations
- Form Validation Project
- Quiz App using JSON & Events