

# FSD - Curriculum

Course	Module	Topics	Instructor led training - TC hours	Live hands on and doubt solving - TA hours	Total	Recorded videos, coding practice and take home assignments - Async hours
Basics of Java	Java, Java & Compiler Installation, Github and GitHub Command	Intro to Java, Application of Java, Java & Compiler Installation, Github and GitHub Command, Variables, Data Types				
	Variables & Datatypes	<ul style="list-style-type: none"> <li>- Operators Types</li> <li>-- User Inputs, Strings, Characters, Arrays</li> <li>-- Logical Operators</li> <li>-- Comments, Errors and Debugging</li> </ul>				
	Conditionals, Loops	<ul style="list-style-type: none"> <li>-- Conditionals Statements</li> <li>-- If-else, Switch,</li> <li>-- While loops</li> <li>-- For Loop, Do While Loops</li> </ul>				
	Continue statements and functions	<ul style="list-style-type: none"> <li>-- Pattern Programs</li> <li>-- continue statements,</li> <li>-- Functions, Pass By Value, Inbuilt Functions</li> <li>-- Reading from file, Exceptions, Writing to a file</li> </ul>				
	Abstraction	<ul style="list-style-type: none"> <li>-- Classes and Objects intro</li> <li>-- Multiple objects in class</li> <li>-- Constructors</li> <li>-- Static and final keywords -- continue statements,</li> <li>-- Functions, Pass By Value, Inbuilt Functions</li> <li>-- Reading from file, Exceptions, Writing to a file</li> <li>-- Abstraction</li> </ul>	8	4	12	25
	OOPS - Inheritance and Encapsulation	<ul style="list-style-type: none"> <li>-- Private Access Modifiers</li> <li>-- Getter and Setters</li> <li>-- Constructors</li> <li>-- Private Methods</li> <li>-- Inheritance</li> <li>-- Encapsulation</li> <li>-- Inheritance</li> <li>-- Inheriting from subclasses</li> <li>-- Protect Access Modifier</li> </ul>				
	OOPS- Polymorphism	<ul style="list-style-type: none"> <li>-- Method Overriding</li> <li>-- Method Overloading</li> <li>-- Dynamic Polymorphism</li> <li>-- Abstract Classes</li> <li>-- Interfaces</li> </ul>	14	6	20	
	Arrays	<ul style="list-style-type: none"> <li>-- Arrays in Java</li> <li>-- ArrayLists</li> <li>-- ArrayList Operations</li> </ul>				
	LinkedList	<ul style="list-style-type: none"> <li>-- LinkedLists</li> <li>-- ListIterators</li> <li>-- Performance of Lists</li> </ul>				
	OOPs Assignment Discussion	-- OOPs Assignment Discussion (Doubt Resolution)	4	2	6	20
Object Oriented Programming	Algorithm Analysis	<ul style="list-style-type: none"> <li>-- Run-Time Analysis of simple algos</li> <li>-- constant, linear, quadratic, log, factorial</li> <li>-- Space Complexity</li> </ul>	4	4		10
	Searching	<ul style="list-style-type: none"> <li>-- Linear Search</li> <li>-- Binary Search</li> <li>-- Time Complexity for both</li> <li>-- Intro to Sorting with Bubble Sort</li> <li>-- TC for each</li> </ul>				
	Sorting	-- Selection Sort, Insertion Sort, Merge Sort, Quick Sort	8	4		20

		-- Introduction to Dynamic Programming -- Revision -- Coin Exchange Problem -- Using The Dynamic Programming Approach -- Tabulation -- Backtracking -- Java Code For the Coin Exchange Problem -- Space Optimisation -- Recap -- Revisiting The Fibonacci Sequence -- 0-1 Knapsack Problem -- Applying Dynamic Programming -- Tabulation -- Backtracking -- Longest Common Subsequence -- Applying Dynamic Programming -- Writing The Code -- Backtracking and Space Reduction -- Edit Distance Problem -- Solving The Edit Distance Problem -- Coding The Solution -- Introduction To Spellchecker -- Applying Edit Distance To Spellchecker -- Coding A Spellchecker -- Longest Increasing Subsequence	4	6	10
	Algorithm Analysis	-- Greedy Algorithm Explained -- Greedy Algorithm Advantages and Disadvantages -- Scheduling Problem -- Correct Greedy Approach to the Scheduling Problem - Implementing the Greedy Algorithm to solve the Scheduling Problem - Proof of correctness to the Scheduling code - The Depth Problem - Depth problem pseudocode and implementation - Depth Problem proof of correctness - Midway Recap - Knapsack problems - Fractional Knapsack problems - Fractional Knapsack Implementation - Fractional Knapsack Proof	4	6	5
	Assignment Discussion	Discussion on Assignment - Searching & Sorting Algorithms -- Stacks intro -- Recursion intro -- Prev/Next Greater Element, -- Largest Rectangular Area in a Histogram	4	6	
	Stacks	-- Queues Intro -- Recursion recall -- Implementing a Stack using a Queue -- LRU Cache	6	4	15
	Queues	-- Hashing Intro -- Collision in Hash Tables -- HashMaps Intro -- HashSet Intro -- Zero Sum Subarray -- Finding Largest Subarray With Equal 0s and 1s	6	2	6.5
	Hashing	-- Non-linear Data Structure -- In/Pre/Post Order Traversals -- BST Intro -- Search, Insert, Delete in BST -- DFS, BFS in BSTs -- Spiral Traversal	6	6	10
	Trees				

		-- Introduction to Dynamic Programming -- Coin Exchange Problem -- Using The Dynamic Programming -- Introduction to Revision				
	Priority Queues	-- Introduction: Priority Queues & Heaps -- Priority Queue ADT -- List Implementation of Priority Queue -- List Java Implementation of Priority Queue -- Introduction to Heaps -- Insertion and Removal of Heap Elements -- Implementation of a Complete Binary Tree -- Implementation of Heaps -- Heap Sort -- Merge K sorted Linked list -- Median of a stream of integers	4	2		
Data Structures	Graphs	-- Adjacency Matrix in Graphs -- Adjacency List in Graphs -- BFS and DFS traversals in graphs	6	6	7.5 7.5	
	Assignment	-- Discuss Assignment - HTML Intro, basic attributes - HTML5 Forms - HTML5 Web Storage - CSS intro, basic properties - CSS transforms - CSS Media Queries -- CSS Flexbox intro - Questions on CSS Flexbox	6	8	10	10.5
	HTML and CSS	-- Basic JS. (variable declaration, objects, arrays, loops), ES6 -- DOM manipulation using JS -- Pass By Value/Pass By Reference -- Function Prototype -- Scope, Lexical, and Lifetime Scope -- Closures, Hoisting, -- Intro to ES6	6	6		
	Basics of JavaScript	-- Arrow Functions (ES6) -- map, filter, reduce methods -- Template Literals, -- Import/Export modules -- Async JS -- Callbacks & Promises --resolve & reject --async & awaits	10	12		17
Foundations of Web Development	Advanced JavaScript - I	-- AJAX calls, -- HTTP requests and Response Codes -- Securing AJAX calls -- Authorization and Access Token -- Session Storage				
	Advanced JavaScript - II	-- Project Walkthrough	4	2	8 5	
	Backend Integration					
	Project Walkthrough					
	React - I	-- SPA vs MPA -- JSX vs HTML -- React Components -- How do you render elements in React -- Dynamically Render elements in React -- Props --Event Handling -- State -- Smart vs Dumb Components -- Routing	6	8		11
	React - II	-- React Hooks -- useState(), useEffect -- Forms and Routing -- Material UI -- Different examples of Hooks -- Material UI -- Different examples of Hooks -- Redux, -- Custom Hooks -- Testing in React	6	8		8
Advanced Frontend Using React	Project Walkthrough	-- Project Walkthrough	0	2		12.5

Server Side Development and Advanced Java	Advanced Java - I	Introduction to Collection framework List, Set, Queue, Map Basic operations on collections Introduction to JDBC API CRUD operations using JDBC Writing a small application using JDBC Servlet lifecycle Types of Servlets HttpServletRequest and HttpServletResponse Developing a small application using Servlets JSP lifecycle Types of tags in JSP Implicit objects in JSP	10	5		0
	Advanced Java - II	Developing a web application using JSP and Servlet Implementing CRUD operations with a database Understanding HttpServletRequest, HttpServletResponse, and Session in web applications Introduction to MVC MVC architecture components Developing a CRUD application using MVC Creating a web application with MVC Storing and retrieving images, Word, and PDF files from a database Introduction to Hibernate and its components (Session, SessionFactory, Configuration) Understanding the state of an object in Hibernate Spring API Spring Boot (Spring Platform, Spring Bean, Spring Inversion Of Control, Dependency injection)	15	5		0
	SQL, and MongoDB	-- Relational vs Non-Relational -- Basic SQL Commands -- Inbuilt and Aggregator Commands -- Nested Queries -- Intro to MongoDB -- Basic Commands in MongoDB -- Venn Diagrams, Outer and Inner Joins -- Cross Join -- Views with Join -- Intersect, Minus, Union and Union All -- CRUD in MongoDB -- Aggregation in MongoDB -- Data Modelling in MongoDB -- Modelling Relationships -- Indexing in MongoDB -- Getting Basic Data in MongoDB	10	4		18
	Backend with Node	REPL I/O Model module and require keyword module.exports and alternatives Initializing a Project as Node Package Nodemon: Third-Party Package Types of Modules/Packages fs: Core Module events: Core Module Introduction to Express.js Installing Express.js Components of Express.js Middleware Routing in Express.js Request and Response Objects The Router Object Express Generator Understanding Cookies Understanding Sessions Error Handling in Express.js Database Integrations Process Managers Multer Multiple File Upload Serving Static Files Template Engines	4	4		24
	Walkthrough of Capstone Project	Walkthrough of Capstone Project	0	4		12.5