

# GradTech

## Full Stack Web Development Curriculum

Asia's first  
edtech only for  
engineers

### Foundational Track

#### Module 1: Introduction to Computer Programming

##### Introduction to JavaScript Programming

- Getting Started with Programming
- Introduction to JavaScript JavaScript
- Operators

##### JavaScript Foundations

- JavaScript Decision Statements
- JavaScript Loops & Control Statements
- JavaScript Arrays and Strings
- JavaScript Objects and JSON
- Functions in JavaScript - Basics
- Functions in JavaScript - Advanced
- Asynchronous in JavaScript
- Basics of OOPS

##### Modern JavaScript Concepts

- Functional Programming
- ES5 & ES6 Concepts
- RegEx & Debugging in JavaScript

#### Module 2: Design & Analysis of Algorithms

##### Introduction to DSA

- Getting Started with Algorithms
- Arrays & Strings
- Introduction to Pattern Matching
- Advanced Pattern Matching Coding & Analysis

##### Sorting Algorithm & Searching

##### Techniques

- Introduction to Sorting Algorithms
- Advanced Sorting Algorithm
- Introduction to Searching Algorithms
- Advanced Searching Algorithm

##### Recursion & Back Tracking

- Getting Started with Recursion
- Advanced Recursion Coding & Analysis
- Getting Started with Back Tracking & its Analysis

## Module 3: Front-end Development

### Foundations of Web Design

- HTML Basics
- HTML Advanced
- CSS Fundamentals
- Advanced CSS Techniques
- Bootstrap Basics
- Bootstrap Advanced

### Dynamic Web Design

- DOM Basics
- DOM in Depth
- jQuery Basics & AJAX
- Advanced Asynchronous in JavaScript

### Tailwind CSS & Front End Capstone Project

- Introduction to Tailwind CSS
- Advanced Layout Techniques with Tailwind CSS
- Project Management & Deployment

## Module 4: Backend Development

### Database Foundation

- Introduction to Databases, DBMS, and Database Design
- Database Transaction & ER Diagram

### Relational & Non Relational Database Fundamentals

- CRUD Operations with Maria DB
- Writing Queries in Maria DB
- Overview of MongoDB
- CRUD Operations with MongoDB
- Pagination, Indexes & Aggregation in MongoDB

### NodeJS & ExpressJS Foundations

- Intro to WebServices & API
- NodeJS Basics
- NodeJS in Depth
- ExpressJS Basics
- ExpressJS Advanced
- Project Management & Deployment Using Render

## Module 5: Front-end UI/UX Development

### ReactJS Foundations

- Overview of ReactJS & JSX
- Components, State and Props
- Routing and Handling Events in React
- Life Cycle Methods & React Hooks
- Managing State with Redux
- State Management and Optimization
- Error Handling, Debugging and Unit Testing in ReactJS

### NextJS Foundations

- Getting Started with Next JS
- Data Fetching
- Routing
- Layout & Styles
- Optimization
- Working with Database
- Security, Testing & Deployment

### Project Management & Deployment

- Project Workshop
- Project Workshop Contd.

## Module 6: Practical Software Engineering

### Foundations of Practical Software Engineering

- Introduction to Software Engineering
- Common Developer Tools & Advanced GitHub

### Practical Session with Deployment on AWS

- Full Stack Project Overview & Setup
- Full Stack Project development Overview
- AWS Cloud Fundamentals & Deployment

### Design Principles, Best Practices & 3rd Party Tools

- Scalability & Interview Related Topics Prep
- UI/UX Design Principles Foundations
- Best Practices Foundations
- E-Commerce Tools (Payment Gateway, Shopify, Wix, Word press, etc..)
- Federated Login/Register Engagement Tools - Email + Chat + Analytics

# Specialization Track

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## Opt 1: Foundations of Cloud Computing

### Cloud Computing Basics

- Introduction to Cloud Computing
- Getting Started with AWS Cloud
- AWS Global Infrastructure
- Basics of AWS Cloud Architecture
- Advanced AWS Cloud Architecture

### AWS Services

- AWS Compute
- AWS Components
- AWS Storage
- AWS Databases
- AWS Monitoring

### Practical Application of Cloud

- AWS Services Practical - Basic Concepts
- AWS Services Practical - Intermediate Concepts
- AWS Services Practical - Advanced Concepts

## Opt 2: Distributed Systems with HLD

### Scalable System Architecture

- Software Architecture Intuition
- Web Application Intuition
- Application On Scale
- Availability
- Load Balancing

### Database Design

- Foundations of Database Design
- Advanced Database Design Techniques
- Database Types

### Advanced System Design Concepts

- Caching Fundamentals
- Message Queues Fundamentals
- Stream Processing
- Advanced System Design Concepts

## Opt 3: BlockChain Development

### Blockchain Foundations

- Overview of Blockchain How
- Blockchain works, and its types
- Building a Blockchain Bitcoin and
- Cryptocurrency fundamentals
- Blockchain Blocks and Cryptography
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### Building and Deploying Decentralized

#### Applications

- Introduction to Ethereum
- Ethereum Ecosystem and ICOs
- Solidity Programming Basics - Part I
- Solidity Programming Basics - Part II
- ERC Standards and Hardhat Overview
- Building & Testing ERC20 Token using Hardhat
- NFT and Practical Implementation with ERC721
- Advanced Ethereum Topics

### Developing Enterprise-Grade Blockchain

#### Solution

- Decentralized File Storage and Retrieval with IPFS
- Hyperledger Essentials
- Practical Implementation with Hyperledger Fabric

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