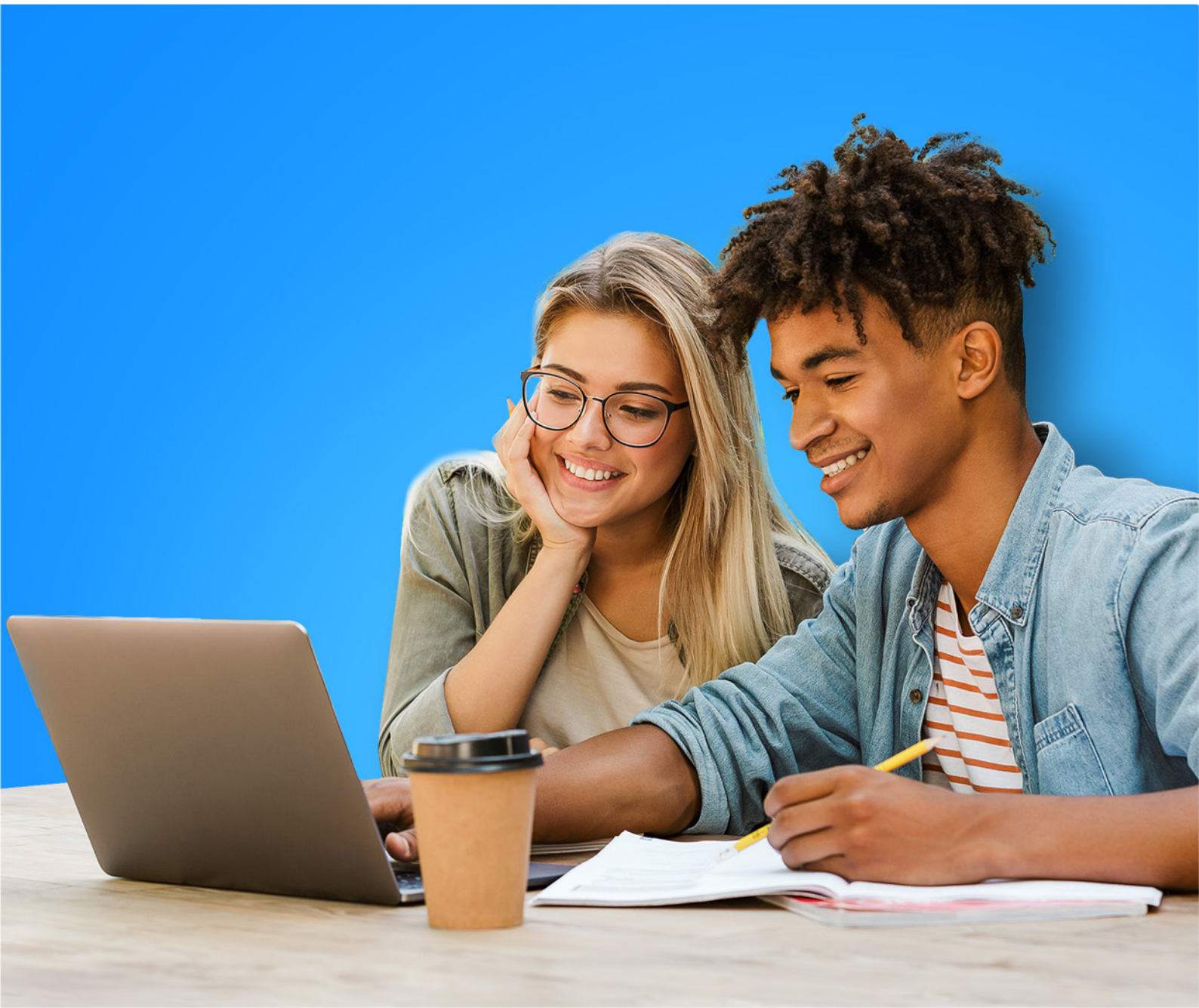
SCALER
ACADEMY

DETAILED
CURRICULUM ▶

A Structured, Flexible & Guided Learning Program

For Tech Professionals to Accelerate Their Career



CURRICULUM BROCHURE

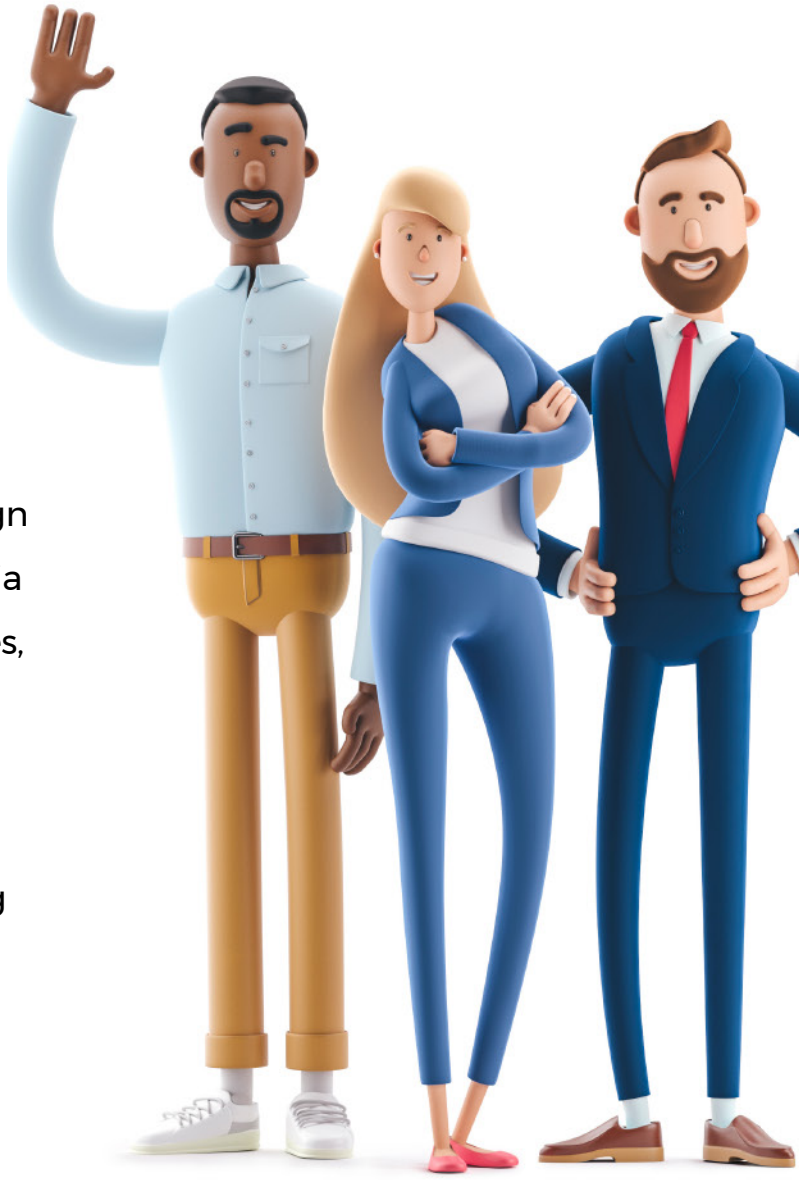
TABLE OF CONTENTS

SCALE UP YOUR SOFTWARE ENGINEERING CAREER

Having the right skills results in immense growth as a software engineer. Many tech professionals try to increase their skills via the vast, and mostly free, resources on the internet. They soon realize that assorted articles and videos lead to incomplete and shallow learning.

This is where **we can help!**

Scaler has reverse engineered its curriculum by analyzing what it takes to be a great software engineer. We have developed a structured program for software engineers like you to learn Programming Constructs, Computer Science Fundamentals, and System Design (high-level design and low-level design) via a thorough curriculum, practical resources, professional mentoring, and hands-on projects. We believe all our learners, regardless of their level of experience, should have the opportunity of becoming great engineers. You will be delivered a hands-on learning experience that will make you job and career ready.



SCALE UP YOUR SOFTWARE ENGINEERING CAREER

To ensure that you learn at a comfortable pace and are working with peers who inspire you to work harder, we place Scaler Academy learners into one of two tracks (Intermediate and Advanced). Enrollment is currently open.

The key difference between the Intermediate and Advanced tracks is eight weeks of additional Programming Constructs for the Intermediate track. Learners graduate with the same level of coding and software engineering proficiency whether they start on the Intermediate or Advanced track.

Program duration

Advanced Track	**36 Weeks**
Intermediate Track	**44 Weeks**

The tuition for both sections is the same. Please read on for further details.

WHO IS THIS PROGRAM FOR?

Professional Background

- Any amount of work experience
- In engineering roles at a software product company or in a development role at service companies

Coding Knowledge

- Comfortable coding in programming languages like C/ Java/ Python
- Comfortable writing if-else and loop-based implementation code and can manipulate basic strings
- Comfortable solving basic coding problems like printing patterns or finding a palindrome in a string
- May or may not be comfortable solving basic questions in Data Structures and Algorithms

The Mindset Needed to Gain Success with This Program

- Commitment to attend classes, solve assignments, work with peers and attend mentor sessions
- Open to learning
- Have a positive attitude, be willing to help, participate, and interact with peers
- Not for someone seeking just a job referral

WHAT DOES THIS CURRICULUM OFFER?

- **Thorough knowledge** of CS fundamentals (including DSA)
- **Specialization** in backend or full-stack and proficiency in System Design (HLD and LLD) to ensure you move to complex development projects within your firm or switch companies (and crack those interviews)
- **Confidence** to the content in-depth
- **Hyper-personalization** by segregating batches to ensure you learn at a comfortable pace
- **Healthy competition** amongst peers (includes weekly contests and assignments)
- Multiple **1:1 system design discussions with experts** (e.g., Senior Engineers at big tech firms)
- **Hands-on learning experience**
- **Real-life Projects** like creating an Uber-like app, an Amazon-like app, a Notes-like app, Facebook Messenger, and Facebook News-Feed-like systems help you implement the concepts taught

BROAD OVERVIEW OF **ADVANCED TRACK**

Advance

ENROLMENT OPEN

Typical learner profile: “I am good at coding. I know basic problem solving and DSA. Can build basic to advanced applications”

Course Flow

Data Structures and Algorithms	21 weeks
Low Level Design	5 weeks
High Level Design	5 weeks
Project (Backend/Full Stack/ Data Engineering)	5 weeks

Learner Onboarding Week

Data Structures and Algorithms

21 Weeks

- Time Complexity, Arrays, Strings, Binary Search, 2 Pointers, Recursion, Hashing, Sorting, Bit Manipulation
- Stacks, Queues, Linked Lists, Trees, Tries, Heap
- Greedy, DP, Graphs
- DB, OS, and Computer Networks

Low Level Design — 5 Weeks

High Level Design — 5 Weeks

Choose your **Specialization**

Backend Specialization
5 Weeks

MVC, REST APIs, ORM, SpringBoot, Views, Database Indexes, Multithreading

OR

Fullstack Specialization
5 Weeks

Building a server, intro to MVC, web architecture, HTML, CSS, Javascript, Node.js, Backend architecture, MongoDB, React / Redux

OR

Data Engineering Specialization
5 Weeks

Building efficient Data Processing Systems, Advanced SQL, Cloud Services - AWS, or GCP, Developing ETL pipelines - Map-Reduce Framework, Big Data, Data Warehousing & Modeling, OLAP, Dashboarding, Workflow Orchestration, Logging, and Monitoring

Choose your **Electives** (Optional)

Advanced DSA - 4 Weeks

- Combinatorics
- Matrix Exponentiation
- Game Theory
- Advanced Dynamic Programming
- Range Queries : Segment Tree, Merge Sort Tree(Range Order Statistics), Segment Tree with Lazy Propagation
- Advanced Trees : Tree Flattening, Binary Lifting + LCA, Articulation Points & Bridges, AVL Tree / Red-Black Tree

Product Management - 4 Weeks

- Introduction to Product Management
- Product Vision and Measurement
- Roadmaps and Prioritization
- The Spring Process and Product Leadership
- Product Development 1
- Product Development 2

BROAD OVERVIEW OF
INTERMEDIATE TRACK

Intermediate

ENROLMENT OPEN

Typical learner profile: "I know coding in one programming language. Can build basic applications"

Course Flow

Programming Constructs	8 weeks
Data Structures and Algorithms	21 weeks
Low Level Design	5 weeks
High Level Design	5 weeks
Project (Backend/Full Stack/ Data Engineering)	5 weeks

Learner Onboarding Week

Programming Constructs

8 Weeks

- Introduction to number system and Bit manipulations
- Time Complexity Analysis
- Arrays Techniques
- Basic Maths for Programming
- Sorting and Hashing Libraries
- Recursion
- OOPS

Data Structures and Algorithms

21 Weeks

- Time Complexity, Arrays, Strings, Binary Search, 2 Pointers, Recursion, Hashing, Sorting, Bit Manipulation
- Stacks, Queues, Linked Lists, Trees, Tries, Heap
- Greedy, DP, Graphs
- DB, OS, and Computer Networks

Low Level Design — 5 Weeks

High Level Design — 5 Weeks

Choose your **Specialization**

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CURRICULUM DEEP DIVE

COURSE MODULE

Programming Constructs - 8 weeks

Introduction to Problem Solving, Bit-Manipulation and Time Complexity	2 weeks
Array Techniques (prefix sum and carry forward)	2 weeks
Maths, Sorting and Hashing	2 weeks
Recursion and Problem Solving	2 weeks

**Programming Constructs is part of the curriculum for the Intermediate Batch and does not apply to learners in the Advanced Batch.*

Data Structures and Algorithms - 21 weeks

Math, Time Complexity, Arrays, Strings, Binary Search, 2 Pointers, Recursion, Hashing, Sorting, Bit Manipulation	8 weeks
Stacks, Queues, Linked Lists, Trees, Tries, Heap	6 weeks
Backtracking, Greedy, Dynamic Programming, Graphs	4 weeks
Databases, Operating Systems, and Computer Networks	3 weeks

USP of our delivery

- **Weekly contests** to gauge your conceptual understanding and problem-solving abilities
- Particular focus on complex topics like Dynamic Programming and Graphs (e.g., traversals, shortest paths, etc.)

CURRICULUM DEEP DIVE

Low Level Design - 5 weeks

OOP, UML, Schema Design	3 lectures
Design Principles, SOLID	1 lecture
Design Patterns (Creational, Structural, Factory, Factory, Singleton)	4 lectures
Case Studies like Movie Ticket Booking System, Expense Sharing Application, Distributed Cache, Parking Lot	7 lectures

USP of our delivery

- Real-world case studies and examples on large scale open source repositories
- Hands-on working code implementation in class for every case study
- TA Driven Code Reviews and Assignments
- Detailed discussions on Schema Designs, Design Principles and Practices

CURRICULUM DEEP DIVE

High Level Design - 5 weeks

Scaling (Horizontal vs Vertical), DNS Lookup/DNS Servers, Load Balancer, Consistent Hashing	1 lecture
Caching and CDN	2 lectures
CAP Theorem, Master-Slave, Multi-Master	2 lectures
SQL vs NoSQL DB	3 lectures
Zookeeper + Kafka, Quad Trees, Monoliths & Microservices	4 lectures
Case Studies on Real-World Systems like Search Typehead like Google, messenger like FB Messenger, Distributed Crawler, Video streaming platform, Railway Ticket booking system	4-5 lectures

USP of our delivery

- Understand the internals of complex systems like Cassandra DB, Distributed File Systems
- Understand high-level view of real-world systems like Quora, FB Messenger, etc.

Specialization Projects (5 weeks)

In this module, you can choose one from these three specializations:

- Backend Development
- Full-stack Development
- Data Engineering

These specializations will be taught in a hands-on manner, where you will not only learn the concepts but will also be able to apply them to real-life projects.

Specialization 1: Backend Development

MVC, REST APIs, ORM, SpringBoot, Views, Database Indexes, Multithreading.	4 weeks
Project Deployment	1 week

Specialization 2: Full-Stack Development

Building a server, Intro to MVC	1 week
Web architecture, HTML, CSS, Javascript	2 weeks
Node.js, Backend Architecture, MongoDB, React/Redux	2 weeks
Project Deployment	1 week

USP of our delivery

- We focus on frameworks and help you become a Javascript expert which will enable you to excel in any role

Specialization 3: Data Engineering

Intro to Data Engineering, Building efficient Data Processing Systems, Advanced SQL, Cloud Services - AWS or GCP	1 week
Developing ETL pipelines - Map-Reduce Framework, Big Data Hadoop, Kafka, Spark	2 weeks
Data Warehousing, Data Modeling, OLAP, Dashboarding	2 weeks
AWS/GCP Deployment, Workflow Orchestration - Apache Airflow, Logging, and Monitoring	1 week

USP of our delivery

- We focus on building foundational skills that will enable you to solve all the major problems pertaining to data storage and management

- Understand the complexities of developing end-to-end pipelines with hands-on experience

Note: We keep updating our curriculum as per the latest skills requirements of the industry.

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