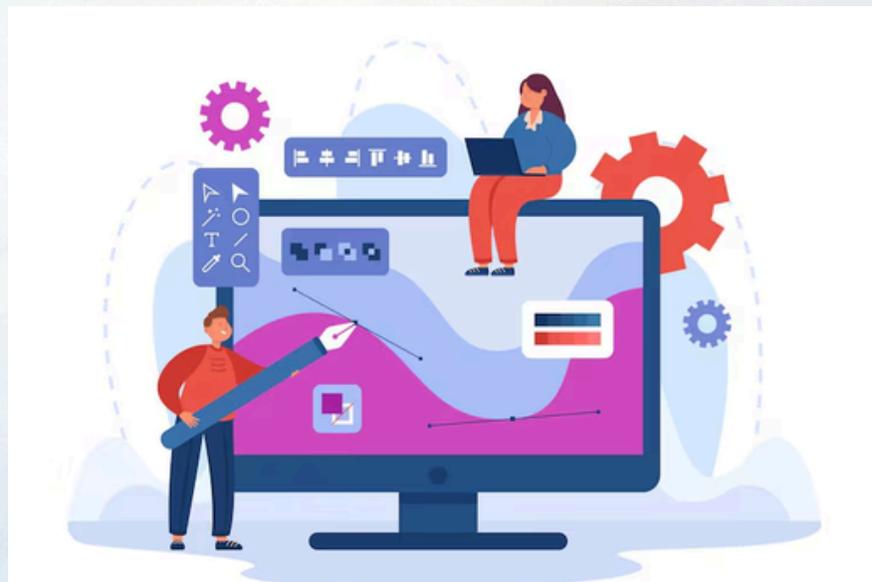




# System Design



# System Design course content

## Module-1 : Introduction to System Design

- 1) What is System Design
- 2) Why System Design is Important
- 3) Evolution of System Design

## Module-2 : Networking & Communication

- 1) Role of Networking in System Design
- 2) Networking Fundamentals
- 3) IP Addresses
- 4) How DNS Works
- 5) Client-Server Model
- 6) Forward Proxy vs Reverse Proxy
- 7) Load Balancers
- 8) API Gateway
- 9) Content Delivery Networks (CDN)

## Module-3 : Protocols

- 1) Protocols Introduction
- 2) TCP vs UDP
- 3) HTTP & HTTPS
- 4) API Design Principles
- 5) Communication Protocols
- 6) Modern API Protocols

## Module-4 : Architectural Patterns

- 1) Introduction to Architecture
- 2) Design Patterns & Architectural Styles
- 3) Multi Tier Architecture
- 4) Microservices Architecture
- 5) Event Driven Architecture

## **Module-5 : Web Concepts in System Design**

- 1) Introduction
- 2) Stateless vs Statefull
- 3) Managing state
- 4) Data Exchange & Storage
- 5) Cross-Origin Resource Sharing (CORS)
- 6) Web Security Basics

## **Module-6 : Scalability in System Design**

- 1) Introduction to scalability
- 2) Scaling Strategies
- 3) Types of Load Balancers
- 4) Load Balancing Algorithms
- 5) Auto Scaling

## **Module-7 : Storage – Databases**

- 1) Introduction to Storage Systems
- 2) CAP Theorem
- 3) SQL Vs NOSQL
- 4) Sharding
- 5) Replication
- 6) Polyglot Persistence
- 7) Object Storage
- 8) File Systems
- 9) Big Data Fundamentals
- 10) Choosing Right Storage Solution

## **Module-8 : Performance Optimization**

- 1) System Performance Metrics
  - 2) Caching for speed Optimization
  - 3) Messaging Queues
  - 4) Concurrency
  - 5) Parallelism
  - 6) Query Optimization Techniques
-

## **Module-9 : Reliability & Availability**

- 1) System Reliability Introduction
- 2) High Availability
- 3) Fault Tolerance
- 4) Backup & Recovery
- 5) Disaster Recovery

## **Module-10 : Security Principles**

- 1) Security Introduction
- 2) Authentication & Authorization
- 3) Data Protection
- 4) Secure Communication
- 5) Network Security
- 6) Infrastructure Security

## **Module-11 : System Design Blueprint**

- 1) Understanding Problem
- 2) Defining Scope
- 3) Estimating Scale
- 4) Identify Bottlenecks
- 5) High Level Design
- 6) Technology Decisions
- 7) Infrastructure Decisions

## **Module-12 : Practical Case Studies**

- 1) URL Shortner App Design (Bitly)
- 2) Ticketing System(BookMyShow)
- 3) News Feed (Twitter)
- 4) Chat Application (WhatsApp)

## **Module 13: System Design Interview Preparation**

- 1) What Interviewers Expect in System Design Rounds
- 2) How to Approach a System Design Question
- 3) Requirement Gathering & Clarification Techniques
- 4) Capacity Estimation (Users, Traffic, Storage, Bandwidth)
- 5) Defining APIs & Data Models
- 6) Designing High-Level Architecture Diagrams
- 7) Identifying Trade-offs & Bottlenecks
- 8) Handling Follow-up Questions Effectively

## **Module 14: Mock Interviews & Case Practice**

- 1) Step-by-Step Solution Framework for Interviews
- 2) Common System Design Interview Questions
- 3) LLD vs HLD in Interviews
- 4) Whiteboard & Diagramming Practice
- 5) Time Management in Interviews
- 6) Common Mistakes in System Design Interviews
- 7) Mock Interview Sessions (Real-time)
- 8) Resume Project Mapping to System Design Concepts

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