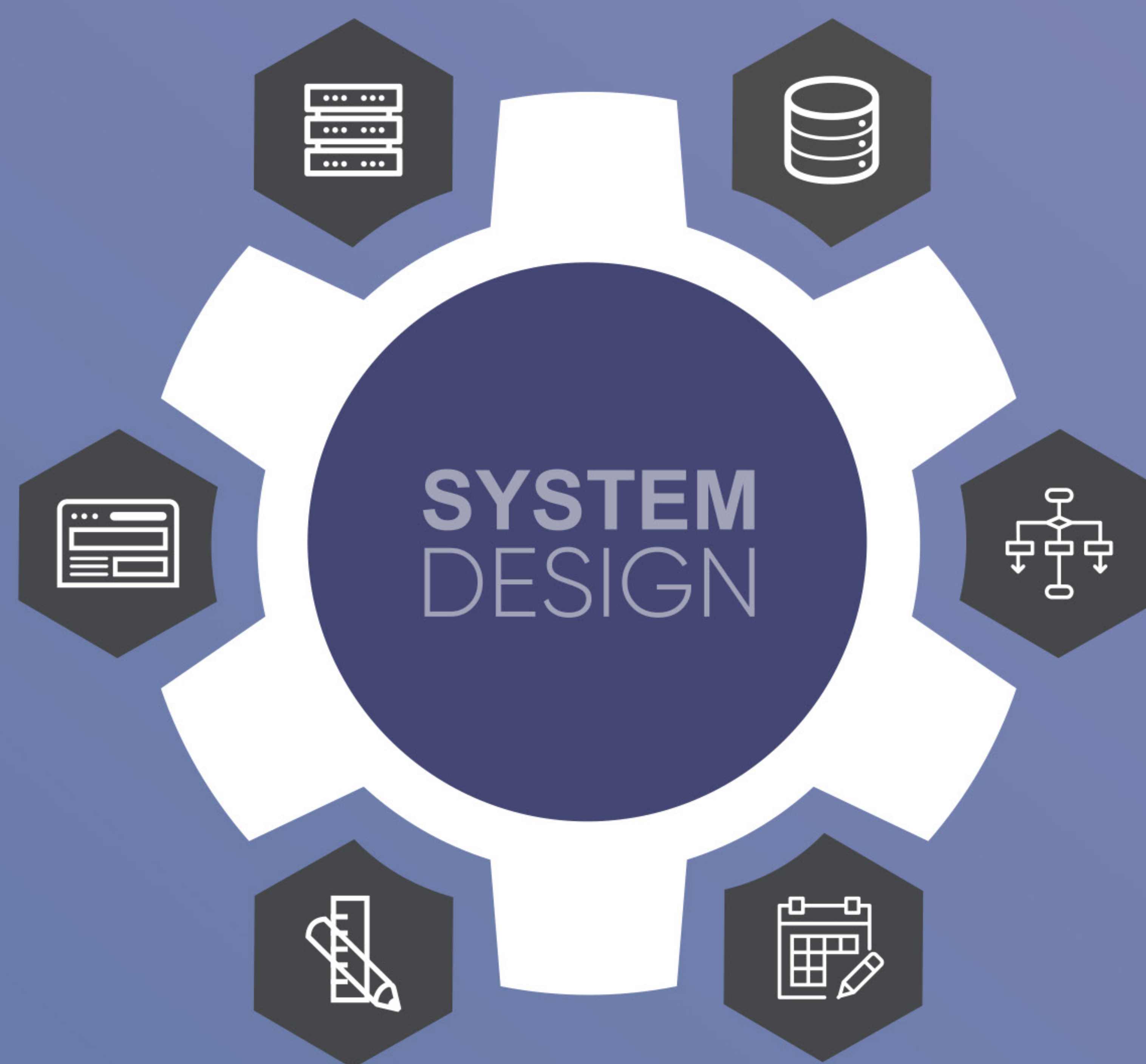


Mastering **SYSTEM DESIGN**

From Low-Level to High-Level Solutions



Detailed
Course Syllabus

CONTENTS

Basics of Low Level Design

- Introduction to Object-Oriented Programming
 - Class & Objects, Encapsulation, Inheritance, Abstraction, Polymorphism
 - Operator overloading, Association, Aggregation, and Composition
 - Class diagram as a Visual Tool
 - Procedural vs OO Programming

Understanding Constructors

- Default and Parameterized Constructor
- Copy Constructor
- this Keyword and Operations

What are UML Diagrams & Types

- Introduction to UML & Object Diagram
- Activity Diagram, Sequence Diagram
- State Diagram

Learning Core Design Principle

- SOLID & GRASP
- DRY & KISS

Advance LLD & Use Cases

- What are SOLID principles?
 - Single Responsibility & Open/Closed Principle
 - Liskov Substitution & Interface Segregation Principle
 - Dependency Inversion

Understanding various Design Patterns

- Strategy Pattern
- Observer Pattern
- Factory Pattern
- Abstract Factory Pattern
- Singleton Pattern
- Command Pattern
- Proxy Pattern
- Bridge Pattern
- Template method Pattern
- Composite Pattern
- Iterator Pattern

CONTENTS

Case Studies & Contests

- Movie Ticket Booking System
- Airline Booking System

High Level Design - Basics

- Introduction to System Design
- System Design Basics
- Zero to Infinity Intro
- Client Server Architecture

System Design Components - Domain Name System

- Introduction to DNS
- Request Routing
- DNS Cache
- DNS in Action: Route53

System Design Components - Load Balancer

- Introduction and Types of Load Balancers
- Scaling Load Balancers
- Load Balancing Algorithms

System Design Components - Scaling

- Introduction to Scaling
- Types of Scaling

Exploring Database Architecture

- Use of Databases
 - High level introduction to databases
 - Relational Databases
 - Non Relational Databases
 - Comparing Relational and Non Relational Databases

Database Replication

- Introduction to Database Replication
- Types of Replication
- Multi Leader Replication Topology
- Leaderless Replication Topology

CONTENTS

Database Sharding

- Introduction - Database Sharding
- Sharding Strategies
- Rebalancing
- Consistent Hashing
- Production Implementations

Database Indexing

- Introduction and Types of Indexes
- Advantages
- B+ Tree
- Internal working of B tree
- Explain Plan

Advance High Level Design

- Queueing Systems
 - Introduction to Queueing Systems
 - Issues and Types of Message Brokers
 - Message Brokers in Action: SQS + SNS

Caching

- Introduction- Caching
- Cache types
- Cache Invalidation
- Cache Eviction Policy

System Design Framework

- System Design Framework
- Framework and Requirement Gathering
- High Level Design
- Back of the envelope estimates
- Detail Design and Wrap Up

Design Problems

- Design a Rate Limiter
- Designing Object Store
- Designing twitter
- Design a tiny URL generator