



## **Database Engineering**

**Course Title : Database Engineering Course Code: : CS324**

**Total Credits : 03+01=04**

### **Unit:I Introduction and Database Modeling using ER Model :**

General introduction to database systems and its advantages & applications, Database System Architecture, Database users and Administrator, Data models, Database management system, Database languages, View of Database, Data Models. ER Model, Entity set, Entity types, attributes, Notations, Relationship sets, Relationship types, Keys- super key, candidate key, primary key, Extended Features of ER Model-Generalization, Specialization and aggregation.

### **Unit:II Data Modeling and SQL :**

Concept of relations, Schema-instance distinction, Referential integrity and foreign keys, Relational algebra, Various types of joins, Tuple relation calculus, Domain relational calculus, Example queries, Introduction to SQL, Data definition statements with constraints, Update behaviors, Nested Queries, Aggregate functions group by and having clauses.

### **Unit:III Database Design :**

Importance of a good schema design, Motivation for normal forms, dependency theory - functional dependencies, Closure of a set of FD's, Definitions of 1NF, 2NF, 3NF and BCNF, Decompositions and desirable properties of them, Multi-valued dependencies and 4NF, Join dependencies and definition of 5NF.

### **Unit:IV Data Storage and Indexes**

File organizations, Primary, Secondary index structures, Various index structures - hash-based, Dynamic hashing techniques, Multi-level indexes, B+ tree indices, Multiple key access.

## **Unit:V Transaction Processing and Concurrency Control**

Concepts of transaction processing, ACID properties, Transaction states, Implementation of atomicity, isolation and durability, Serializability, Testing for serializability.

**Concurrency Control:** Lock-based protocols, Timestamp - based Protocols, Validation - based Protocols, Multiple Granularities, Deadlock handling.

## **Unit: VI Recovery System**

Failure classification, Storage structure, Implementation of stable storage, Recovery and Atomicity, Log based recovery, Checkpoints, Shadow Paging, Buffer management in crash recovery.

### **Text Books :**

1. "Database System Concepts", Abraham Silberschatz, Henry F. Korth and S.Sudarshan, Mc Graw Hill, 2002, 4th Edition.

### **Reference Books :**

1. "Database Management Systems", Raghu Ramakrishnan and Johannes Gehrke, 2002, 3rd Edition.

2. "Fundamentals of Database Systems", Ramez Elmasri and Shamkant Navathe, Benjamin Cummings, 1999, 3rd Edition.

## **Engineering Economics**

### **CS325 Engineering Economics**

#### **Unit I Introduction to Economics**

Economics in Decision Making, Business Economics and Engineering, Supply and Demand Introduction, Demand analysis, Elasticity of Demand, Demand forecasting, Supply analysis, Elasticity of supply, Supply and Demand interaction.

#### **Unit: II Consumer Behavior**

Demand and consumer behavior, Utility approach: Marshall's law: Diminishing utility and equi-marginal utility, Indifference curves, Revealed Preference approach.

#### **Unit: III Production Function**

Cobb-Douglas production function, Economies of scale, Competition and types of Markets, Perfect and Imperfect competition, Monopoly, Monopolistic and oligopoly competition, Mergers & Acquisitions.

## **Unit: IV Money and National Income**

a) Concepts of National Income: GNP, GDP, GNI, Green GNP, GreenGDP, NNP, NNI, PCI.

b) Money: Demand and Supply, Monetary and fiscal policies in India, Public finance.

c) Welfare Economics: Benham, Pareto, Kaldor and Amartya Sen contribution.

d) Resource Economics: Renewable and renewable resources, variation method.

## **Unit: V Inflation**

Price index, Inflation: Meaning, types, causes, measurements and effects, inflation and determination of interest rates, Measures to control (REPO rate C.R.R.) Foreign Exchange Rates: Fixed vs floating, P-P-P theory and current practices to decide exchange rates.

## **Unit: VI International Trade**

Modern Theory: Heckscher- Ohlin's comparative cost doctrine, Leontief paradox, Terms of trade and non trade, trade barriers and WTO, Cost benefit analysis of FDI.

### **Text Books :**

1. "Managerial Economics", D.N. Dwivedi, Vikas Publishing.
2. "Macro Economics", D.N. Dwivedi, Tata McGraw Hill, New Delhi.
3. "Micro Economics", D.M. Mithani.
4. "Macro Economics", D.M. Mithani.

### **Reference Books :**

1. "Modern Micro Economics", Koutsoyiannis.
2. "Fundamentals of Engineering Economics", Park, Prentice Hall.
3. "Economics", Samuelson.
4. "Growth Economics", Sen A.K, Penguin Books, England.

## **Operating System-II**

### **CS322 Operating System-II**

#### **Unit:I Introduction**

General Overview of the UNIX System - History, System Structure, User Perspective, Operating System Services, Assumption about Hardware, Introduction to system concepts, Kernel Data Structure, System Administration.

## **Unit:II The Buffer Cache**

Buffer headers, structure of the buffer pool, scenarios for retrieval of a buffer, reading and writing disk blocks, advantages and disadvantages of cache.

## **Unit:III Internal Representation of Files**

Inodes, structure of the regular file, directories, conversion of a pathname to inode, super block, inode assignment to a new file, allocation of disk blocks, other file types. System calls for the file System : Open, Read, write, File and Record Locking, Adjusting the position of FILE I/O-LSEEK, Close, File Creation, Creation of Special File, Change Directory and Change Root, Change Owner and Change Mode, Stat and Fstat, Pipes, Dup, Mounting and Unmounting file systems, Link, Unlink, File System Abstractions, File System maintenance.

## **Unit:IV The Structure of Process**

Process stages and transitions, layout of system memory, the context of a process, Saving context of a process, manipulation of the process address space.

## **Unit:V Process Control**

Process creation, signals, process termination, awaiting process termination, invoking other programs, the user id of a process, the shell, System Boot and the Init process, Process Scheduling and Time : Process Scheduling, system call for time, clock.

## **Unit:VI Memory Management Policies**

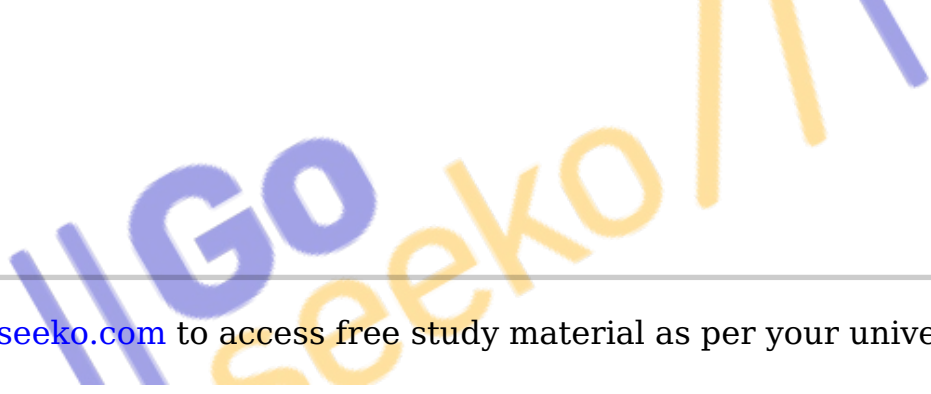
Swapping, Demand passing, hybrid system with demand paging and swapping.

## **Text Books :**

“The Design of Unix Operating System”, Maurice J. Bach, PHI.

## **Reference Books :**

1. “Unix Concepts and Administration”, Sumitabha Das, TMGH, 3rd Edition.
2. “Unix Shell Programming”, Yeshvant Kanetkar, BPB Publications.
3. “Unix Utilities”, Tare, MGM.
4. “Advanced Programming in the UNIX Environment”, Stevens and Rego, Pearson Education, 2nd Edition.



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