**Module I**

Introduction to object oriented programming—Features of Java – Data types, variables and arrays – Operators – Control statements – Classes and Methods – Inheritance.

**Module II**


**Module III**


**Module IV**

JDBC Overview – JDBC implementation – Connection class – Statements- Catching Database Results, handling database Queries. Networking– InetAddress class – URL class- TCP sockets- UDP sockets.

**Module V**


**References**

- Java 6 by Rogers Cadenhead, Laura Lemay, Pearson education

**MCA 302 SOFTWARE ENGINEERING**

**Module 1 The Software Process**


**Module II Modeling and Design**

Understanding Requirements, Requirements Modeling: Scenarios, Information, and Analysis Classes, Requirements Modeling for WebApps, Design Concepts, Software Architecture: Definition, Importance and Styles, User Interface Design
Module III Quality Management

Quality Concepts, Review Techniques, Software Quality Assurance, Software Configuration Management, Product Metrics

Module IV Testing


Module V Project Management

Project Management Concepts, Process and Project Metrics, Estimation for Software Projects, Project Scheduling, Risk Management

References

- Schach, S., Software Engineering, TMH, 7th Ed., 2007
- Humphrey, W.S., Managing the Software Process, Addison Wesley, 1999

MCA 303 System Software

Module I

General concepts- Review of assembly and machine language programming, distinction between system software and application software, Language processors:- Introduction , Language processing activities.
Assemblers:- Elements of Assembly language programming, A simple assembly scheme, Pass structure of assemblers, Design of two pass assemblers

Module II

Macros and macro processors:- Macro definition and call, Macro expansion, Nested macro calls, advanced macro facilities, design of macro pre processor
Linker-Relocation and linking concepts-self relocating programs.
Loader-Types of loaders
Editor-Types of editors-Components of editor-Debug monitor

Module III

Introduction to compiling:- Compilers, Analysis of a source program, the phases of a compiler, Lexical analysis:-The role of the lexical analyzer, Input buffering, specification of tokens Recognition of tokens, Finite automata, Conversion of an NFA to DFA, From a regular expression to an NFA

Module IV

Syntax analysis:- the role of the parser, Context free grammars, writing a grammer, Top down parsing Bottom up parsing, syntax directed translation-syntact directed definition, , Construction of Syntax Tree, L R parsers-LR parsing algorithm, Constructing SLR parsing tables, SLR parsing table
Module V
Intermediate code generation-postfix notation, syntax tree, three-address code, basic blocks and flow graph, the DAG representation of basic blocks, Backpatching,
Code optimization:- The principal sources of optimization, optimization of basic blocks, loops in flow graphs, Peephole optimization
Code Generations:- Issues in the design of a code generator, simple code generator

References

- System Programming and operating Systems- D.M.Dhamdhere Tata McGraw Hill (Modules 1 & 2)
- Compilers Principles, Techniques and Tools- Alfred V Aho, Ravi Sethi, Jeffry D Ullman (Modules 3, 4 & 5)
- Systems programming- John J Donovan
- System Software- Leland L Beck, Addison Wesley Publishing Company

MCA 304 DATABASE MANAGEMENT SYSTEMS

MODULE I

Introduction To Database Systems and E-R Model
Overview, A Historical Perspective, Files System versus DBMS, Advantages of DBMS, Describing and storing data in a DBMS Transaction management, Structure of a DBMS, People who work with Databases, Overview of Database Design, Entities, Attributes and Entity Sets, Relationships and Relationship sets, Additional Features of E-R Model: Key Constraints. Conceptual Design with the E-R Model Overview of Unified Modeling Languages Recommended to use a couple of specific ER-Models (Chen Model, Yourdon Model etc)

MODULE II

Relational Model and Query Languages
Introduction to the Relational Model, Integrity Constraints over Relations: Primary Key, Foreign Key and General Constraints. E-R Model to Relational Model: Entity Sets to Tables, Relationship Sets to Tables, Translating, Relationship Sets with Key Constraints. Translating Relationship Sets with Participation Constraints, Translating Weak Entity Sets, Translating Class Hierarchies. Translating E-R Diagrams with Aggregation, Introduction to Query Languages, Relational Algebra: Selection and Projection Operations. Set Operations, Renaming, Joins, Division

MODULE III

Structured Query Language
Overview of SQL, Basic Queries in SQL, Union, Intersect and Except, Nested Queries, Aggregate Operators, Null Values, Number, String and Date Functions, Using user defined functions inside queries, Complex Integrity Constraints in SQL, Triggers and Views in SQL, Embedded SQL and Cursors

MODULE IV

Relational Database Design
Introduction to Schema Refinement, Functional Dependencies, Properties of Decomposition, Normal Forms: First Normal Form, Second Normal Form, Third Normal Form, Boyce Codd Normal Form, Fourth Normal Form, Fifth Normal Form
MODULE V

Transaction Management, Concurrency Control, Distributed System and Database Administration


How to add users, space management of tablespaces and objects

References

- Concept of Database Management, Pratt, Thomson Learning, 5Edn.

MCA 305 Data Communications

Module I


Module II

Module III
Analog Transmission :- Modulation of Analog signals :- Analog to Analog modulation- Amplitude Modulation, Frequency Modulation, and Phase Modulation. Modulation of Digital Data – Bit Rate and Baud Rate, ASK, FSK, PSK, QAM. Modems.

Multiplexing :- FDM, TDM, statistical TDM, WDM. Channelization:- FDMA, TDMA, CDMA.

Module IV
Transmission mode :- Parallel transmission, Serial transmission, Asynchronous transmission,
synchronous transmission. Line Configurations, full duplex and half duplex transmission.

**Circuit switching:** Telephone networks-local loops, trunks.

**Packet switching:** Datagram, virtual circuit. Effect of packet size on transmission time.
Comparison of circuit switching and packet switching

**Module V**

**High-Speed Digital Access:** DSL Technology-ADSL, xDSL, Spread Spectrum- Concept, Frequency Hopping, Direct Sequence

**Cellular Telephony:** Basic concepts, Frequency–Reuse Principle, Transmitting, Receiving, Handoff, Roaming. First Generation, Second Generation-GSM, Third Generation.

**References**

- Behrouz A Forougan, Data Communications and Networking, 4th ed. McGraw Hill

**MCA 306 Java Programming LAB**

1. Program to illustrate class, objects and constructors
2. Program to implement overloading, overriding, polymorphism etc
3. Program to implement the usage of packages
4. Program to create our own exception
5. Program for handling file operation
6. Implement the concept of thread programming
7. Program to implement Generic class and generic methods
8. Applet program for passing parameters
9. Applet program for running an audio file
10. Program for event-driven paradigm in Java
11. Event driven program for Graphical Drawing Application
12. Program that uses Menu driven Application
13. Program to implement JDBC in GUI and Console Application
14. Web page design using HTML and client side validation using Javascript
15. Programs to implement session Handling and Cookies in Servlets and JSP
16. Socket programming to implement communications
17. Develop a multi-threaded GUI application of your choice.
Installation and configuration of Oracle Database

1. Table Design- Using foreign key and Normalization

2. Practice SQL Data Definition Language (DDL) commands
   a) Table creation and alteration (include integrity constraints such as primary key, referential integrity constraints, check, unique and null constraints both column and table level)
   b) Other database objects such as view, index, cluster, sequence, synonym etc.

3. Practice SQL Data Manipulation Language (DML) commands
   a) Row insertion, deletion and updating
   b) Retrieval of data
      i) Simple select query
      ii) Select with where options (include all relational and logical operators)
      iii) Functions: Numeric, Data, Character, Conversion and Group functions with having clause.
      iv) Set operators
      v) Sorting data
      vi) Sub query (returning single row, multiple rows, more than one column, correlated sub query)
      vii) Joining tables (single join, self join, outer join)
   x Data manipulations using date functions
   xi User defined functions in a query
   xii How to use hints in queries to optimize performance
   xiii Manage ODBC/JDBC connections

4. Practice Transaction Control Language (TCL) commands (Grant, revoke, commit and save point options)

5. Usage of triggers, functions and procedures using PL/SQL constructs

6. Development of sample applications using Oracle as Back End
   Sample applications may include
   i) Payroll Information
   ii) Student Information System
   iii) Bank Transaction
   iv) Library Information System etc.

How to take backup and restore using Oracle

How to conduct query optimization in a database