

Syllabus for Bachelor of Computer Application (BCA) Programme
(Effective for Students Admitted in Academic Session 2018-2019)

Detailed Syllabus

Semester IV

Paper: Database Management System

Code : BCAN-401

Contacts Hours / Week : 4L+1CE

Credits : 4

1. Module I: Introducing to Data and Data Management (4L)

Introduction, Data and Information, Database and Data Base Management System, Components of Database System, Basics of Database Management System, File-based System and Database Management System, Advantages of using Database over File based system, Data Dictionary and Metadata, ANSI-SPARC Architecture, Database Users, Role of Database Administrator (DBA) and Data Administrator(DA), Database Environment, Need for a Database, Characteristics, or Features, or Advantages of Database Systems, Limitations of Database

2. Module II: Data Models and Architecture of DBMS (6L)

Schemas and Instances, DBMS Architecture, Three Level Architecture of Database (ANSI SPARC architecture), Evolution of Data Models, Hierarchical Data Model, Network Data Model, Relational Data Model Object-oriented Data Model, Object-relational Data Model, Data and Structural Independence, Database Languages DDL, DML, DCL, TCL, Database Access, Database Structure

3. Module III: Data Modeling using ER Modeling (6L)

Basic Terminology related to ER Model, Relational Model – Introduction, Advantages and Disadvantages, Identifying Entities, and Relationships, Types of Relationships, Relationship Participation, Notations in ER Model, Strong and Weak entity sets Composite entity, Managing Many-to-many, Relationship, Example of E-R Model, Types of Integrity Constraints, Extended E-R Model, Translating the ER Model into Relational Model, Object Modeling, Subclass and Super class, Specialization, Generalization and Aggregation, Class Diagram

4. Module IV: Relational Model and Relational Database Management System (6L)

Introduction, RDBMS Terminology, Various Types of Keys, Relational Integrity Rules Entity integrity Rule, referential integrity rule, Functional Dependency, Armstrong Axioms, Relational Set Operators, Retrieval Operators, CODD's Twelve Rules of Relational Database, ACID properties, Views and their purpose, Database Life Cycle, Data Dictionary, Relational Algebra and relational calculus, exercise on Relational calculus and relational algebra, Comparisons of relational algebra and calculus Tuple Relational Calculus, Domain Relational Calculus, Introduction to SQL

5. Module V: Normalization (6L)

Introduction, Need for Normalization, Types of Dependencies - Functional Partial functional and Transitive, Multi-valued Dependency, Join Dependency, Lossless and Lossy Decompositions, Normalizing Tables, First Normal Form, Second Normal Form, Third Normal Form, Boyce-Codd Normal Form, Examples on Normalization, Determining, Candidate Key and further decomposition, Closure of a set and FD's and MVD's, Armstrong's AXIOMS, Minimal or canonical cover of FD's, Lossless Decomposition

6. Module VI: Managing Data Using Structured Query Language (SQL) (6L)

Introduction, Features of SQL, Database Languages - data definition and Data manipulation languages, Data Definition Commands, Data Manipulation Commands, (SELECT Statement and different Clauses, SQL Functions - Aggregate, Date and Time Functions, String Functions, Conversion Functions, Mathematical Functions, Special Operators), Types of Constraints, Different types of Join and Set Operators, Group by and having clauses, Sub-query, Views, Advances SQL Roll-up, Commit and Save point, Create user grant revoke, Introduction to PL/SQL – conditional

Syllabus for Bachelor of Computer Application (BCA) Programme
(Effective for Students Admitted in Academic Session 2018-2019)

statements, loop, variable binding, Embedded SQL

7. Module VII: Transaction and Query Processing (5L)

Transaction Processing States, ACID Properties of Transaction, read and write operations in transaction, concurrency problems and reasons for recovery, System log, Steps of Query Processing, Query Optimization

8. Module VIII: Indexing and Hashing (1L)

Introduction, Overview, Primary Secondary Multi level, Dense and Space Index

Suggested Readings:

1. Korth, Silberschatz, Sudarshan – Database System Concepts; Tata Mc. Graw Hill
2. Ramez Elmasri, Shamkant B Navathe - Fundamentals of Database Systems; Pearson
3. C.J. Date - An Introduction to Database Systems, 8e, Pearson Education
4. Rajiv Chopra - Database Management Systems ; S CHAND
5. Atul Kahate - Introduction to Database Management Systems , Pearson
6. P.S. Deshpande - SQL and PL/SQL for Oracle 10g Black Book; Wiley Dreamtech

Syllabus for Bachelor of Computer Application (BCA) Programme
(Effective for Students Admitted in Academic Session 2018-2019)

Paper: Programming with Java

Code : BCAN-402

Contacts Hours / Week : 4L+1CE

Credits : 4

1. Module I: OOps Concept (4L) Object, Class, Data abstraction, Data encapsulation, Inheritance, Polymorphism, Dynamic binding
2. Module II: An overview of Java (2L) Java features, JVM, Comparison between Java and C++, Idea of any Java Development Kit (JDK), learn to run java program through command line and with any JDK
3. Module III: Data Concept (2L) Data Types, variables and constants Tokens in Java (Identifiers, Literals, Keywords, Operator)
4. Module IV: Control Statements (2L) Simple if statement, if...else statement, Nesting of if-else statement, switch statement
5. Module V: Iteration Statement (2L) For loop, While loop, Do-While loop
6. Module VI: Arrays and Vector (2L) 1D and 2D array, vector concepts
7. Module VII: Classes and Objects (3L) Creating main() in a separate class, Methods with parameters, Methods with a return type, Method overloading, Passing Objects as Parameters, Passing Values to methods and Constructor, Abstract classes
8. Module VIII: Inheritance (2L) Basic concepts, types of inheritance, use of super keyword, overriding methods.
9. Module IX: String and String Buffer (2L) Use of different functions
10. Module X: Packages, Interfaces (3L) User defined package, import package, Class path, How to create interface, use and extend interface
11. Module XI: Exception Handling (2L) Overview, What is Exceptions and handling exception?, Compile time errors Run time errors, try...catch, Using Multiple catch Blocks, finally Block, Throwing an Exception, Using the throw and throws Statement.
12. Module XII: Stream (3L) Byte Streams, Input Stream, Output Stream Character Streams (Reader, Writer), How Files and Streams Work, Working with Reader classes (InputStreamReader, BufferedReader)
13. Module XIII: Multithreaded Programming (3L) Overview, Thread Lifecycle, Advantages of multithreading over multi-tasking Thread Creation and simple programs, Synchronized threads, Synchronized Methods
14. Module XIV: Applets (4L) Applet vs. Application, Applet class, Advantages of Applet, Applet Lifecycle My First Applet, Applet tag, How to run applet
15. Module XV: Abstract Window Toolkit (4L) GUI Components, Interface and Classes of AWT Package, Labels, Buttons, Check Boxes, Radio button, Text Area, Text Field, Scrollbar, Panels, Layout managers, Simple event driven programming with Text Field and Button

Suggested Readings:

1. Let Us JAVA 2 Edition, Yashavant Kanetkar BPB Publications
2. Programming with JAVA 5th Edition, E Balagurusamy, TMH

Syllabus for Bachelor of Computer Application (BCA) Programme
(Effective for Students Admitted in Academic Session 2018-2019)

Paper: ComputerNetworking

Code : BCAN-403

Contacts Hours / Week : 4L+1CE

Credits : 3

1. Module I: (8L)

Data Communication, Analog-Digital Signals. TCP/IP and OSI Model, Client, Server and Peers, Client/Server architecture, Wired & Wireless transmission, Guided-Unguided Media, Bus, Star, Ring, Mesh, Hybrid, LAN, MAN, WAN, Simplex, Half duplex and Full duplex, Asynchronous and Synchronous Transmission, Parallel and Serial Transmission, Base band and Broadband transmission.

2. Module II: (14L)

Different networking devices, IEEE 802.3, IEEE 802.4, IEEE 802.5, FDDI, DQDEB, ATM, Physical Addressing, Logical Addressing, Port Addresses, IPV4, IPV6, Classfull-Classless Addressing, Subnetting and Masking, NAT, DHCP, BOOTP, ARP, RARP, ICMP

3. Module III: (10L)

Different Encoding Techniques, FDM, TDM, Circuit Switching, Packet Switching, Message Switching. Routing, Routing Protocols: Distance Vector, Link State, Congestion Control: Leaky Bucket and Token Bucket Algorithm, ISDN

4. Module IV: (8L)

TCP, UDP, Firewalls, Proxy Router, DNS, FTP, TFTP, SMTP, TELNET, NFS, WWW, E-mail, HTTPS, Cable Network, Telephone Network

Suggested Readings:

1. **B. Fourauzan, "Data Communications and Networking", 4th Edition, Tata McGraw-Hill**
2. **Tanenbaum, Computer Networks, 3rd Edition, PHI, New Delhi**
3. **D. Comer, "Computer Networks and Internet", 2nd Edition, Pearson Education**

Syllabus for Bachelor of Computer Application (BCA) Programme
(Effective for Students Admitted in Academic Session 2018-2019)

Paper: Numerical Analysis

Code : BMN-401

Contacts Hours / Week : 4L+1CE

Credits : 3

1. Module I: (20L)

Numerical errors and their computations, Truncation and rounding-off errors
Calculus of differences: Forward, Backward, Shift, Average, Central, Differential and Divided difference operators, Relation between the operators, Problems on missing terms
Interpolation: Newton's forward and backward interpolation, Lagrange's interpolation, Newton's divided difference Numerical Integration: General quadrature formula, Trapezoidal rule, Simpson's 1/3rd rule, Expression for corresponding error terms

2. Module II: (20L)

Solutions of Nonlinear Equations: Bisection method, Regula-Falsi method, Method of Iteration , Newton Raphson method Numerical solution of a system of linear equation Gauss elimination method, LU factorisation method, Gauss Seidel method Numerical solution of ordinary differential equation: Euler's method, Modified Euler's method, Runge-Kutta method, Predictor-Corrector method

Suggested Readings:

- 1. Introductory Methods of Numerical Analysis, S.S.Sastry, PHI**
- 2. Numerical Methods, Jain, Iyenger & Jain, New Age International Publishers.**
- 3. Numerical Analysis and Computational Procedure, S.A.Mollah, Books & Allied Pvt. Ltd**