



GULBARGA UNIVERSITY, KALABURAGI

**DEPARTMENT OF COMPUTER SCIENCE
SYLLABUS FOR MASTER OF SCIENCE (M.Sc.)
IN
COMPUTER SCIENCE
(CBCS SCHEME)**

(REVISED SYLLABUS WITH EFFECT FROM ACADEMIC YEAR 2017-18 AND ONWARDS)

Approved by the BOS vide Resolution No. 4 dated 05-03-2017.

MASTER OF SCIENCE (M.Sc.) IN COMPUTER SCIENCE SYLLABUS

(CBCS Scheme)

(With effect from the academic year 2017-18 and onwards)

**SCHEME OF STUDY AND EXAMINATION FOR MASTRER OF SCIENCE IN COMPUTER SCIENCE UNDER
CBCS SCHEME W.E.F. ACADEMIC YEAR 2017-2018 AND ONWARDS**

Second Semester HARD CORE									
HCT 2.1	Data Structures using C++	80	20	100	03	4	0	0	4
HCT 2.2	Relational Database Management System	80	20	100	03	4	0	0	4
SOFT CORE [ANY ONE]									
SCT 2.1	Data Communications & Networks	80	20	100	03	4	0	0	4
SCT 2.2	Android Applications	80	20	100	03	4	0	0	4
OPEN ELECTIVE [ANY ONE]									
OET 2.1	Libre Office	80	20	100	03	5	1	0	6
OET 2.2	Computer Fundamentals	80	20	100	03	5	1	0	6
PRACTICAL									
HCP 2.1	Practical – I : Data Structures Lab.	40	10	50	1.1/2	0	0	4	2
HCP 2.2	Practical – II : RDBMS Lab.	40	10	50	1.1/2	0	0	4	2
SOFT CORE [ANY ONE]									
SCP 2.1	Practical – III (a) : Networks Lab.	40	10	50	1.1/2	0	0	4	2
SCP 2.2	Practical – III (b) :Android Lab.	40	10	50	1.1/2	0	0	4	2
TOTAL FOR SECOND SEMESTER		440	110	550					24

MASTER OF SCIENCE (M.Sc.) in COMPUTER SCIENCE SYLLABUS (CBCS) Scheme)

(With effect from the academic year 2017-2018 and onwards)

II Semester: (With effect from the academic year 2017-2018 and onwards)

Hard Core

HCT 2.1 : Data Structures using C++

HCT 2.2 : Relational Database Management System

Soft Core (Any One)

SCT 2.1 : Data Communications & Networks

SCT 2.2 : Android Applications

Open Elective (Any One)

OET 2.1 : Libre Office

OET 2.2 : Computer Fundamentals

Practical Hard Core

HCP 2.1 : Practical – I : Data Structures Lab.

HCP 2.2 : Practical – II: RDBMS Lab.

Practical Soft Core (Any One)

SCP 2.1 : Practical – III (a) : Networks Lab.

SCP 2.2 : Practical – III (b) : Android Lab.

Note: Each Practical consists of two hours of Deskwork for program development and Documentation and two hours of Computer work for implementation.

M.Sc. II SEMESTER
HARD CORE
HCT 2.1: DATA STRUCTURES USING C++

Teaching: 4 Hrs./ Week

Credits: 04

Max Marks: 80, Cont. Assessments: 20

Total Teaching Hrs: 64

Preamble:

- To explain the fundamentals of data structures and their applications essential for programming/problem solving.
- To Analyze and Evaluate the concept of recursion , sorting and searching algorithms.
- To study and analyze the operations on Stack, Queues, Lists, Trees and Graphs.

Unit I

16 Hrs

Introduction to Data Structures: Definition of Data structure, overview of data structures, Arrays, Array representation, operation on arrays, Searching techniques: Linear search , Binary search. Sorting:, Insertion sort, Selection sort, Bubble sort, Quick sort, Merge Sort and Heap sort (Complexity, Advantages, Disadvantages, Implementation).

Unit II

16 Hrs

Introduction to Linked list: Linked List concepts, Single linked list , Representation of single linked list, Operations on linked list-insertion into a linked list, deletion of a linked list, Circular linked list, Double linked list, Linked list applications.

Unit III

16Hrs

Stack: definition and examples, Stack operations–PUSH, POP, STATUS, Representation of stacks on Arrays and Linked list, Applications of Stacks, definition of Expression (Infix, postfix, prefix), Conversion of Expression, Evaluation of Expression. Recursion: Definition of recursion and its examples, Designing recursive algorithms, Implementation of Factorial function, Implementation of Fibonacci sequence and Towers of Hanoi Problem. Queues: Definition of queue, Operations of queues, Types of queues, Representation of queues, Applications of queues.

Unit IV

16 Hrs

Trees: Basic Terminology, Binary tree, Operations of Binary trees (Insertion, Deletion, Traversal, Merging), Binary Tree Traversal (Inorder, postorder, preorder), Expression trees, Applications of binary tree. Graph: Terminology, Operations on graphs, graph traversal (BFS, DFS) , Applications of graphs, Search trees in BST, AVL trees.

References:

1. Samanta. D., Classic Data Structures, PHI.
2. R. F. Gilberg and B. A. Forouzan, Data Structures-A Pseudocode Approach with C++, Thomson Learning.
3. Mark A. Weiss, Data Structures and Algorithm Analysis in C++, 2/e, Pearson Education.
4. Paul S. Wang, Standard C++ with Object Oriented Programming, Thomson Learning.
5. B. A. Forouzan, R. F. Gilberge, Computer Science: A Structured Approach Using C++, Thomson Learning.
6. Herbert Schildt, C++-The Complete Reference, TMH.
7. Langsam Yedidyah, Augenstein Moshe J., Tenenbaum Aaron M., Data Structures Using C C++, 2/e, PHI/Pearson Education.

HCT 2.2: RELATIONAL DATABASE MANAGEMENT SYSTEM

Teaching: 4 Hrs./ Week

Credits: 04

Max Marks: 80, Cont. Assessments: 20

Total Teaching Hrs: 64

Preamble:

- To understand the basic concepts and the applications of database systems.
- To learn the basics of SQL and construct queries using SQL.
- To understand the relational database design principles.
- To become familiar with the basic concepts of Relational Database Management System, Relational Database design, System Implementation Techniques and Client-Server communication.

UNIT I

16Hrs

Database, Characteristics of Database approach, Database users, Advantages of Database systems, Database system Concepts and Architecture, Data models, Schemas and Instances, the 3-schema Architecture, Data Independence, DBMS languages and Interfaces, DBMS component modules and Database system utilities. Overview of Relational Data Base Management System, Data modelling using Entity-Relationship Model, Relational Data Model.

UNIT II

16Hrs

Relational Model Concepts, Relational Constraints and Relational Database Schemas, Update operations dealing with constraint violations, Relational algebra, Relational calculus, and Relational database design by ER to relational mapping, Relational Database Manipulation in SQL, Data Definition in SQL, Basic Data retrieval, Condition Specification, Arithmetic and Aggregate operators, SQL join, set, manipulation, categorization, updates, views and updates.

UNIT III

16Hrs

Relational Database Design, Anomalies in a database-a consequence of bad design, Functional dependences, Normal forms based on primary keys, General definitions of Second and Third Normal Forms, Boyce Codd Normal Form, Multivalued dependencies and Fourth Normal Form, join dependencies and Fifth Normal Form, other dependencies, Database design and implementation process, query processing and optimization, Transaction processing concepts, concurrency control techniques, Database recovery techniques, Database security and authorization.

UNIT IV

16Hrs

Advanced Database concepts, Concept of Object oriented database systems, Relational database systems, Distributed database concepts, Types of Distributed database systems, and an Overview of client-server architecture. Client and server communication, SQL, Data Definition Language(DDL)-creating, altering and dropping tables, Data Manipulation Language(DML)-select insert, update, delete commands, Transaction control using SQL-Commit, Rollback, savepoint command, Error handling built in PL/SQL Exceptions, User defined exceptions.

References:

1. Elmasri and Navathe, Fundamentals of Database Systems, Pearson Education.
2. Bipin C Desai, An Introduction to Database systems, Galgotia Publication.
3. Kroenke David M, Database Processing: Fundamentals, Design and Implementation, PHI.
4. Henry F Korth, Database System Concepts, Pearson Education.

SOFT CORE (ANY ONE)

SCT 2.1: DATA COMMUNICATIONS AND NETWORKS

Teaching: 4 Hrs./ Week

Credits: 04

Max Marks: 80, Cont. Assessments: 20

Total Teaching Hrs: 64

Preamble:

- To learn the transmission technique of digital data between two or more computers.
- To understand the basics of data communication and various types of computer networks
- To analyse and Compare various Network architectures.
- To study details about ISO/OSI model layer, its functions, type of data transmission and speed of data transmission.

UNIT I

16Hrs

Data Communications: Components, Direction of data flow, Networks, Components and Categories, Types of connections, Topologies-protocols and standards, ISO/OSI model, Transmission media, Coaxial cable, Fiber optics, Line coding, Modems.

UNIT II

16Hrs

Data Link Layer: Error detection and correction, Parity, LRC, CRC, Hamming code, low control and error control, stop and wait, go back-N ARQ, selective repeat ARQ-sliding window, HDLC, LAN.

UNIT III

16Hrs

Network Layer: Internetworks, Packet Switching and Datagram approach, IP addressing methods, Subnetting, Routing, Distance Vector Routing, Link State Routing.

UNIT IV

16Hrs

Transport Layer: Duties of Transport layer, Multiplexing, Demultiplexing, Sockets, User Datagram Protocol(UDP), Transmission Control Protocol(TCP), Congestion Control, Quality of services(QOS), Integrated Services. Application Layer: Domain Name Space(DNS), SMTP FTP, HTTP-WWW.

References:

1. Behrouz A Forouzan, Data Communications and Networking, Tata McGraw Hill.
2. William A Shay, Understanding Communications and Networks, Thomson Learning.
3. William Stallings, Data and Computer Communications, 7/e, Pearson Education.
4. Stevens et Al, Unix Network Programming-The sockets and networking API, Vol.1/3/e, PHI.
5. Stevens et Al, Unix Network Programming-Interprocess Communication, Vol.2,2/e, PHI.
6. Ames Chellis Charles Perkins, Matthew Strebe, Networking Essentials: Study Guide MCSE, Second Edition.

SCT 2.2: ANDROID APPLICATIONS

Teaching: 4 Hrs./ Week

Credits: 04

Max Marks: 80, Cont. Assessments: 20

Total Teaching Hrs: 64

Preamble:

- To learn the basic concepts of Android Programming.
- To study the history of Android and anatomy of Android Application.
- To understand and implement Android Applications like working with Notifications, working with Services, and to manage User account and synchronization of data.

Unit I

16Hrs

Introducing Android, History of Mobile Software Development, The Open Handset Alliance, Android Platform Differences, The Android Platform, Setting Up Android Development Environment, Configuring Development Environment, Exploring the Android SDK. Writing sample Android Application, Testing Development Environment and Building the Android Application.

Unit II

16Hrs

Understanding the Anatomy of an Android Application, Defining the Application Using the Android Manifest File, Managing Application Resources: What Are Resources? Setting Simple Resource Values Using Eclipse and Working with Resources.

Unit III

16Hrs

Exploring User Interface Screen Elements, Designing User Interfaces with Layouts, Drawing and Working with Animation.

Unit IV

16Hrs

Using Android Data and Storage APIs, Sharing Data between Applications with Content Providers, Android Application Design Principles: Working with Notifications, Working with Services, Managing User Accounts and Synchronizing User Data.

References:

1. Lauren Darcey and Shane Conder, “Android Wireless Application Development”, Pearson Education, 2nd Edition, 2011.
2. W. Frank Ableson, Robi Sen, Chris King, “Android in Action”, 2nd Edition, Manning Publications, 2011.
3. Chris Haseman, “Android Essentials”, Apress Publications, 2008

OPEN ELECTIVE (ANY ONE)

OET 2.1: LIBRE OFFICE

Teaching: 4 Hrs./ Week

Credits: 04

Max Marks: 80, Cont. Assessments: 20

Total Teaching Hrs: 64

Preamble :

- To understand the principles of Office Automation Techniques.
- To explore the concept of Open Source Software's.

Unit I

16Hrs

Introducing Writer, Setting up Writer, Working with Text, Formatting Pages, Digital signing of documents. Introducing to Styles, Working with Styles, Working with Graphics, Working with Tables, Working with Templates, Using mail Merge, Tables of Contents Indexes, Working with Master Documents, Working with Fields.

Unit II

16Hrs

Introducing to Calc, Entering Editing & Formatting Data, Creating Charts and Graphs, Using Styles and Templates in Calc, Using Graphics in Calc, Using Formulas and functions.

Unit III

16Hrs

Using Pivot Tables, Data Analysis, linking calc data, Sharing and reviewing documents, Calc macros, Calc as simple database, Setting up and customizing Calc.

Unit IV

16Hrs

Introducing to Impress, Using Slide Masters, Styles and Templates, Adding and Formatting Text, Adding and Formatting Pictures, Managing Graphic Object. Formatting Graphic Objects, Including Spreadsheets Charts & Other Objects, Adding and Formatting Slides Notes and Handouts, Slide Shows, Printing E-mailing Exporting and Saving Slide Shows, Setting Up and Customizing Impress.

References:

1. “ Writer Guide “, IIT Bombay Spoken Tutorial, Shroff Publishers,2014
2. “ Calc Guide “, IIT Bombay Spoken Tutorial, Shroff Publishers,2014
3. “ Impress Guide “, IIT Bombay Spoken Tutorial, Shroff Publishers,2014

OET 2.2 : COMPUTER FUNDAMENTALS

Teaching: 4 Hrs./ Week

Credits: 04

Max Marks: 80, Cont. Assessments: 20

Total Teaching Hrs: 64

Preamble:

- To explore of basics of Computer Science, including evolution of computers, basic anatomy of computers, applications of computers.
- To understand the need and purpose of software's.

UNIT I

16Hrs

Evolution of Computers - Generations, Types of computers, Computer system characteristics, Basic components of a Digital Computer - Control unit, ALU, Input/Output functions and memory, Memory addressing capability of a CPU, Word length of a computer, processing speed of a computer, Computer Classification.

UNIT II

16Hrs

Input/Output Units:- Keyboard, Mouse, Trackball, Joystick, Digitizing tablet, Scanners, Digital Camera, MICR, CR, OMR, Bar-code Reader, Voice Recognition, Light pen, Touch Screen, Monitors and types of monitor -Digital, Analog, Size, Resolution, Refresh Rate, Dot Pitch, Video Standard - VGA, SVGA, XGA etc, Printers and types - Daisy wheel, Dot Matrix, Inkjet, Laser, Line Printer, Plotter, Sound Card and Speakers.

UNIT III

16Hrs

Memory - RAM, ROM, EPROM, PROM and other types of memory, Storage fundamentals - Primary Vs Secondary Data Storage, Various Storage Devices - Magnetic Tape, Magnetic Disks, Cartridge Tape, Hard Disk Drives, Floppy Disks (Winchester Disk), Optical Disks, CD, VCD, CD-R, CD-RW, Zip Drive, flash drives Video Disk, Blue Ray Disc, SD/MMC Memory cards, Physical structure of floppy & hard disk, drive naming conventions in PC.DVD, DVD-RW, USB Pen drive.

UNIT IV

16Hrs

Software and its Need, Types of Software - System software, Application software, System Software - Operating System, Utility Program, Algorithms, Flow Charts - Symbols, Rules for making Flow chart, Programming languages, Assemblers, Compilers and Interpreter, Computer Applications in Business. Introduction to Internet, Connecting to the Internet Hardware, Software and ISPs, Search Engines, Web Portals, Online Shopping, Email – Types of email, Compose and send a message. Reply to a message, Working with emails.

References:

1. Computer Fundamentals – B. Ram – New Age International Publishers
2. S.K.Basandra, “Computers Today“, Galgotia Publications.
3. Computer Fundamentals – P. K. Sinha – BPB Publication.
4. PC Software – Shree Sai Prakashan, Meerut.

PRACTICALS

HCP 2.1 PRACTICAL-I : DATA STRUCTURES LAB

Practical: 4 Hrs./ Week
Max Marks: 40, Cont. Assessments: 10

Credits: 02

Data Structure algorithms shall be implemented using C++.

- Linked lists: inserting, deleting, inverting a linked list
- Stacks and Queues: adding, deleting elements
- Circular Queue: Adding & deleting elements
- Evaluation of Arithmetic expressions
- Polynomial addition, Polynomial multiplication
- Sparse Matrices: Multiplication, addition.
- Recursive and Nonrecursive traversal of Trees
- Threaded binary tree traversal. AVL tree implementation
- Application of Trees.
- Application of sorting and searching algorithms

HCP 2.2 Practical-II : RDBMS LAB

Practical: 4 Hrs./ Week
Max Marks: 40, Cont. Assessments: 10

Credits: 02

Assignment shall be carried out to include the following features:

- SQL : Data definition in SQL, basic data retrieval, condition specification, arithmetic and
- Aggregate operators, SQL join, set manipulation, categorization, updates, views, views and updates.
- To develop a logical and physical database design for the given problem.
- The logical design performs the following tasks:
 - 1) Map the ER/EER diagrams to a relational schema.
 - 2) Identify primary keys, include all necessary foreign keys and indicate referential integrity constraints.
 - 3) Identify the functional dependencies in each relation,
 - 4) Normalize to the highest normal form possible.

SOFT CORE (ANY ONE)

SCP 2.1 PRACTICAL-III(a) : NETWORKS LAB

Practical: 4 Hrs./ Week
Max Marks: 40, Cont. Assessments: 10

Credits: 02

Assignment shall be carried out to include the following features:

- For error detecting code using CRC-CCITT (16-bits).
- Simple RSA algorithm to encrypt and decrypt the data.
- Hamming Code generation for error detection and correction.
- Congestion control using Leaky bucket algorithm
- A simple form with input fields for a name and an email address
- Using an understanding and assignment submission on the following commands: Ifconfig, netstat, ping, arp, telnet, ftp, finger
- To find and print the address of a local machine
- To download a web page
- Simple web browser
- A client / server program where in when the client makes a connection to the server, the server sends
- the system details of the server machine along with date and time
- Construct datagram packet to receive data
- By using LAN trainer kit for LAN protocols

SCP 2.2 PRACTICAL-III(b) : ANDROID LAB

Practical: 4 hrs./ Week
Max Marks: 40, Cont. Assessments: 10

Credits: 02

Assignment shall be carried out to include the following features:

- To add and create Android Projects in Eclipse.
- To create Android Virtual Device.
- Adding Logging support, media support, and location based services to Android applications.
- Creating instances with Action and Data.
- Configuration of Android Manifest File.
- Working with External Libraries, Permissions, Storing Graphics, Animation, Menus and Files.
- Working with String Arrays, Boolean Resources, Integer Resources, Colors, Images and Layouts.
- Using Buttons, Check Boxes and Radio Groups.
- Creating a simple Text Notification with an Icon.
- Working with the Notification Queue and updating Notification.
- Creating a service, controlling a service, Choosing a remote backup service and registering the backup agent.