

NAAC: B+( CGPA 2.60) Estd: 1937  
**SRR & CVR GOVT. DEGREE COLLEGE**  
**(Autonomous)**

VIJAYAWADA – 520 004 :: KRISHNA DISTRICT:: ANDHRA PRADESH  
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Date: 25-08-2022

Department of Computer Science

The department of Computer Science has organized a Board of Studies(BoS) meeting with regard to revision and upgradation of Syllabus for **all Semesters** of Under-Graduate courses that have Computer Science, Data Science and Computer Applications as major subject during their course of study. This BoS is also organized to finalize the syllabus of Life Skill Courses offered by this department.

**Agenda:**

1. Framing and approval of course structure and syllabus for all semesters of UG Computer Science, Data Science and Computer Applications programs.
2. Procedure for awarding internal marks
3. Presentation of proposed syllabus to BoS members.
4. Discussion on model question paper
5. Identifying industry oriented courses that can be offered as certificate courses to students
6. Identifying question paper setters and examiners for practical examinations.
7. Any other academic matters with the permission of the chairman

• **Members of Board of Studies**

- |                               |   |
|-------------------------------|---|
| 1. Sri Vijayadeep Gummadi     | Chairman, Dept of Computer Science                    |
| 2. Dr. Y. K. Sundar Krishna   | University Nominee, Krishna University                |
| 3. Dr. A. Kavitha             | Subject Expert, Govt. College for Women(A), Guntur    |
| 4. Dr. K. S. Rajesh           | Subject Expert, CSTS Govt. Kalasala, Jangareddi Gudem |
| 5. Smt. U. Lalitha            | Industry Member                                       |
| 6. Sri. D. Manikanta          | Alumni Member   |
| 7. Smt V. Lakshmi Sarvani     | Member  |
| 8. Sri Ch. Bharat Kumar       | Member  |
| 9. Smt. J. Sarada Lakshmi     | Member  |
| 10. Smt. J. Pavani Pravallika | Member  |
| 11. Kum. S. Tejaswini         | Member  |
| 12. Sri U. Vinod Kumar        | Member  |
| 13. Smt E. Sujatha            | Member  |
| 14. Kum T.Pavani              | Member  |
| 15. Sri A. Manoj Kumar        | Member  |
| 16. Sri DPV.Phani Raja Kumar  | Member  |
| 17. S.G. Sudhan               | Member  |


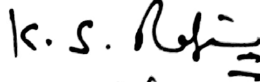
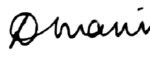
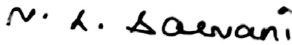


• **Resolutions**

1. It was unanimously resolved to adopt the revised Syllabus for all semesters of B.Sc.(Computer Science) programs MECS, MSCS, MPCS, MCCS.

2. It was unanimously resolved to adopt the revised Syllabus for Semesters of B.Sc.(Data Science) and was also resolved to adopt the course structure given by APSCHE with respect to list of subjects and modified syllabus.
3. It was unanimously resolved to adopt the revised syllabus for 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> semesters of B. Sc (Computer Applications).
4. It was unanimously resolved to adopt the revised syllabus for 1<sup>st</sup> and 2<sup>nd</sup> semesters of B. A (Computer Applications).
5. It was unanimously resolved to adopt the revised syllabus for 1<sup>st</sup> and 2<sup>nd</sup> semesters of B. Sc (IoT).
6. It was unanimously resolved to adopt the revised Syllabus for all semesters of B.Com (Computer Applications)
7. It was resolved to adopt the revised syllabus for E- Commerce subject offered during 2<sup>nd</sup> and 5<sup>th</sup> Semesters of Bachelors of Business Administration.
8. It was unanimously resolved to adopt the revised syllabus for Life Skill Courses offered during the 1<sup>st</sup> and 2<sup>nd</sup> Semesters of B.Sc/ B.Com/ B.A
9. The committee approved the model question paper and Question bank prepared for all subjects of all semesters for the convenience of the students
10. It was unanimously resolved to follow and adopt Krishna University pattern and guidelines for conducting practical sessions and examinations given from time to time.
11. The committee has approved the blue print for preparation of question paper.
12. It was unanimously resolved in the meeting, to divide the total 100 marks of all core subjects into 40 marks for internal Assessment and 60 marks for Semester End Examinations. External examination duration is of 3 hours.
13. 60 marks in **External assessment** is divided as
  - a. **20 marks in Section A** and
  - b. **40 marks in Section B**40 marks in **Internal Assessment** is divided as
  - c. 10 marks for Assignment,
  - d. 10 marks for Viva / Assessment / Seminar,
  - e. 20 marks for the Average of the two mid exams
14. It was resolved in the meeting to follow the **SOP** issued by the O/o CCE with regard to awarding of internal marks admitted during the academic year 2021-22 and there-after.
15. It was resolved in the meeting to divide 100 marks allocated to the subjects of Computer Applications as: 20 marks for internal, 60 marks for Semester End Exam and 20 marks for practical exam to be conducted at the end of the semester, from 2022-23 admitted batch while the previous batches will have a division of 40 marks for internal and 60 marks for semester end exam.

16. It was resolved to conduct external practical exam for B.Com (Computer Applications) with a weightage of 20 marks for the students admitted during the academic year 2022-23 and there-after. The external examiner will be from the department of Computer Science of the same college.
17. It was resolved to allocate 50 marks for End Semester Examination for Life Skill Courses with no internal assessment. Students have to answer 5 questions out of 10 Questions, with each question being given equal weightage.
18. It was resolved to take up Community Service Project at the end of Second Semester and Industrial Training at the end of Forth Semester, and evaluate the same for awarding of Credits and Marks.
19. It was also resolved to allow students to take-up six months internship either during fifth or sixth semesters.
20. It was resolved to offer a certificate course Web Designing or Data Science to students.
21. The HoD has to prepare the list of Examiners and Paper Setters and will submit to the Academic Council as and when instructed to submit.
22. It was unanimously resolved to conduct examinations **Off-Line/On-Line/Blended mode for this academic year because of prevailing COVID-19 situation**. The discretion powers of selecting **MODE** of examinations are with the Principal and CoE of this institution. The department will follow the instructions and pattern of examination given by the Principal and CoE from time-to-time.
23. Further the committee resolved to give empowerment to the BoS chairman for making any minor changes.
24. The committee has approved that all the above resolutions will be effective for the next two years i.e., 2022-23 and 2023-24 academic years.

**Signatures of the Members of Board of Studies:**

Name	Position	Signature
1. Sri Vijayadeep Gumjadi	Chairman	
2. Dr. Y. K. Sundar Krishna	University Nominee	Attended Online
3. Dr. A. Kavitha	Subject Expert	Attended Online
4. Dr. K. S. Rajesh	Subject Expert	
5. Smt. U. Lalitha	Industry Member	Attended Online
6. Sri. D. Manikanta	Alumni Member	
7. Smt V. Lakshmi Sarvani	Member	
8. Sri Ch. Bharat Kumar	Member	
9. Smt. J. Sarada Lakshmi	Member	

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|-------------------------------|--------|
| 10. Smt. J. Pavani pravallika | Member |
| 11. Kum. S. Tejaswini         | Member |
| 12. Sri U. Vinod Kumar        | Member |
| 13. Smt E. Sujatha            | Member |
| 14. Kum T.Pavani              | Member |
| 15. Sri A. Manoj Kumar        | Member |
| 16. Sri DPV.Phani Raja Kumar  | Member |
| 17. Sri G. Sridhar            | Member |

J. Pravalika

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E. Sujatha

T. Pavani

S. Tejaswini

A. Manoj Kumar

G. Sridhar

  
PRINCIPAL  
PRINCIPAL  
SRR & CVR GOVT. DEGREE COLLEGE  
(Autonomous)  
Machavaram, VIJAYAWADA-520 004

**SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA**  
**I BSc (Computer Science and Data Science)**

**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
I	CSC N-1305	PROBLEM SOLVING IN C	60	3

**Course Objectives:**

This course exposes students to problem-solving techniques using C language.

**Course Learning Outcomes:**

Upon successful completion of the course, a student will be able to:

1. Understand the evolution and functionality of a Digital Computer.
2. Develop an algorithm for solving a given problem.
3. Convert algorithms into executable C programs.
4. Choose a suitable 'C' language constructs like decision making statements, Array processing, functions, structures and Pointers, etc. to solve a given problem.
5. Develop multi file programs.

**UNIT I**

**General Fundamentals:** Introduction to computers: Block diagram of a computer, characteristics and limitations of computers, applications of computers, types of computers, compiler and interpreter.

**Introduction to Algorithms and Programming Languages:** Algorithm – Key features of Algorithms, Flow Charts, Programming Languages – Generations of Programming Languages – Structured Programming Language.

**UNIT II**

**Introduction to C:** Introduction – Structure of C Program – Writing the first C Program – File used in C Program – Compiling and Executing C Programs – Using Comments

Keywords – Identifiers – Basic Data Types in C – Variables – Constants – I/O Statements in C- Operators in C- Programming Examples.

**Decision Control and Looping Statements:** Introduction to Decision Control Statements– Conditional Branching Statements – Iterative Statements – Nested Loops – break and continue Statement – goto Statement

*G. Srinivas*

*Haradelekshmi*  
*A. Vijay*

*K.S. Reddy*

### UNIT III

**Arrays:** Introduction – Declaration of Arrays – Accessing elements of the Array – Storing Values in Array– Operations on Arrays – one dimensional, two dimensional and multi dimensional arrays, character handling and strings.

### UNIT IV

**Functions:** Introduction – using functions – Function declaration/ prototype – Function definition – function call – return statement – Passing parameters – Scope of variables – Storage Classes – Recursive functions.

**Structure and Enumerated Data Types:** Introduction – Nested Structures – Arrays of Structures – Structures and Functions – Enumerated Data Types.

### UNIT V

**Pointers:** Understanding Computer Memory – Introduction to Pointers – declaring Pointer Variables – Pointer Expressions and Pointer Arithmetic – Null Pointers - Passing Arguments to Functions using Pointer – Pointer and Arrays – Dynamic Memory Allocation – Drawbacks of Pointers

**Files:** Introduction to Files – Using Files in C – Reading Data from Files – Writing Data to Files – Detecting the End-of-file – Error Handling during File Operations – Accepting Command Line Arguments.

### BOOKS

1. E Balagurusamy – Programming in ANSIC – Tata McGraw-Hill publications.
2. Brain W Kernighan and Dennis M Ritchie - The 'C' Programming language" - Pearson publications.
3. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publications.
4. Yashavant Kanetkar - Let us 'C' – BPB Publications.

*G. S. S. S.*

*A. N. D. D.*

**SRR&CVR GOVT DEGREE COLLEGE (A):: VIJAYAWADA**  
**I BSc (Computer Science and Data Science)**

**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
II	CSC N-2305	DATA STRUCTURES USING C	60	3

**Course Objectives**

To familiarize with the concepts of Data Structures and its applications for developing efficient algorithms.

**Course Learning Outcomes:**

Upon successful completion of the course, a student will be able to:

1. Understand different types of data structures and metrics for measuring efficiency.
2. Simulate the operations of linear data structures.
3. Simulate the operations of non-linear data structures.
4. Analyze the performance of various searching and sorting algorithms.
5. Apply the knowledge of data structures to solve real time problems.

**UNIT – I:**

**Introduction to Data Structures:** Introduction to the Theory of Data Structures, Data Representation, Abstract Data Types, Data Types, Primitive Data Types, Data Structure and Structured Type, Introduction to Linear and Non- Linear Data Structures, Atomic Type, Difference between Abstract Data Types, Data Types, and Data Structures

**Principles of Programming and Analysis of Algorithms:** Software Engineering, Program Design, Algorithms, Different Approaches to Designing an Algorithm, Complexity, Big 'O' Notation, Algorithm Analysis.

**UNIT – II:**

**Arrays:** One- Dimensional Arrays, Two- Dimensional arrays, Array Operations- creation, insertion and Deletion.

**Linked Lists:** Limitations of Arrays, Introduction to Lists and Linked Lists, Dynamic Memory Allocation, Basic Linked List Operations on Singly, Doubly and Circular Linked List, Linked List versus Arrays

### UNIT – III:

**Stacks:** Introduction to Stacks, Stack as an Abstract Data Type, Representation of Stacks through Arrays and Linked Lists, Applications of Stacks- Expression evaluation, Recursive function evaluation.

**Queues:** Introduction, Queue as an Abstract data Type, Representation of Queues, Circular Queues, Priority Queues, Application of Queues

### UNIT – IV:

**Binary Trees:** Introduction Binary Trees, terminology, Types of Trees, Basic Definition of Binary Trees, Properties of Binary Trees, Representation of Binary Trees, Operations on a Binary Search Tree, Binary Tree Traversal, Heap trees- creation, insertion and deletion, Expression Trees.

### UNIT – V:

**Searching and sorting:** Sorting – An Introduction, Bubble Sort, Insertion Sort, Merge Sort, Quick Sort, Searching – An Introduction, Linear or Sequential Search, Binary Search

**Graphs:** Introduction to Graphs, Terms Associated with Graphs, Sequential Representation of Graphs, Linked Representation of Graphs, Traversal of Graphs, Spanning Trees, Shortest Path, Application of Graphs.

### BOOKS:

1. "Data Structures using C". ISRD group Second Edition, TMH
2. "Data Structures through C". Yashavant Kanetkar, BPB Publications
3. "Data Structures Using C" Balagurusamy E. TMH

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S. Tej

F. S. S. S.

K. S. R. S.

**SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA**  
**II BSc (Computer Science and Data Science)**

**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
III	CSC N-2305	DATABASE MANAGEMENT SYSTEMS	60	3

**Course Objective:**

This course enables students to design, develop and manage databases using SQL.

**Course Learning Outcomes:**

Upon successful completion of the course, a student will be able to:

1. Familiarize the fundamental concepts of DBMS with special emphasis on relational data model.
2. Design database using ER diagrams.
3. Apply normalization to reduce redundancy in database.
4. Demonstrate the DDL and DML commands.
5. Develop SQL, PL/SQL programs

**UNIT I**

**Overview of Database Management System:** Introduction to data, information, database, database management systems, file-based system, Drawbacks of file-Based System, database approach, Classification of Database Management Systems, Various Data Models, Components of Database Management System, three schema architecture of data base, costs and risks of database approach.

**UNIT II**

**Entity-Relationship Model:** Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization, IS A relationship and attribute inheritance, multiple inheritance, constraints on specialization and generalization, advantages of ER modelling.

**UNIT III**

**Relational Model:** Introduction, CODD Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra, relational calculus, Functional dependencies and normal forms upto 3<sup>rd</sup> normal form. **Additional Input:** BCNF

## UNIT IV

**Structured Query Language:** Introduction, History of SQL Standard, Commands in SQL, Data Types in SQL, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Join Operation, Set Operations, View, Sub Query.

## UNIT V

**PL/SQL:** Introduction, Shortcomings of SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Control Structure, Steps to Create a PL/SQL Program, sample programs, Iterative Control, Procedure, Function, Database Triggers, Types of Triggers

### TEXT BOOKS:

1. Database System Concepts by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill
2. Database Management Systems by Raghu Ramakrishnan, McGrawhill
3. Fundamentals of Database Systems by R. Elmasri and S. Navathe

### REFERENCE BOOKS

1. Principles of Database Systems by J. D. Ullman
2. SQL: The Ultimate Beginners Guide by Steve Tale.

*G. Sreedhar*  
*W. S. Reddelekshmi*  
*Chijayadeep*  
*K. S. Reddy*  
*P. Tej*

**SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA**  
**II B. Sc (Computer Science and Data Science)**  
**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
IV	CSC N-4305	OBJECT ORIENTATED PROGRAMMING THROUGH JAVA	60	3

**Objectives:**

To introduce the fundamental concepts of Object-Oriented programming and to design & implement object oriented programming concepts in Java.

**Course Learning Outcomes:** At the end of this course student will be able to:

1. Understand the benefits of a well-structured program
2. Understand different computer programming paradigms
3. Understand underlying principles of Object-Oriented Programming in Java
4. Develop problem-solving and programming skills using OOP concepts
5. Develop the ability to solve real-world problems through software development in high-level programming language like Java

**UNIT – I**

**Introduction to Java:** Features of Java, The Java virtual Machine, Parts of Java

**Naming Conventions and Data Types:** Naming Conventions in Java, Data Types in Java,

Literals

**Operators in Java:** Operators, Priority of Operators

**Control Statements in Java:** if... else Statement, do... while Statement, while Loop, for Loop, switch Statement, break Statement, continue Statement, return Statement

**Input and Output:** Accepting Input from the Keyboard, Reading Input with Java.util.Scanner Class.

**Arrays:** Types of Arrays(1D,2D), arrayname.length, Command Line Arguments

**UNIT – II**

**Strings:** Creating Strings, String Class Methods, String Comparison, Immutability of Strings

**Introduction to OOPs:** Problems in Procedure Oriented Approach, Features of Object-Oriented Programming System (OOPS)

**Classes and Objects:** Object Creation, Initializing the Instance Variables, Access Specifiers, Constructors

**Methods in Java:** Method Header or Method Prototype, Method Body, Understanding Methods, Static Methods, Static Block, The keyword 'this', Instance Methods, Passing Primitive Data Types to Methods, Passing Objects to Methods, Passing Arrays to Methods, Recursion.

**Inheritance:** Inheritance, The keyword 'super', The Protected Specifier, Types of Inheritance

### UNIT – III

**Polymorphism:** Polymorphism with Variables, Polymorphism using Methods, Polymorphism with Static Methods, Polymorphism with Private Methods, Polymorphism with Final Methods, final Class

**Type Casting:** Types of Data Types, Casting Primitive Data Types, Casting Referenced Data Types, The Object Class

**Abstract Classes:** Abstract Method and Abstract Class

**Interfaces:** Interface, Multiple Inheritance using Interfaces

**Packages:** Package, Different Types of Packages, The JAR Files, Interfaces in a Package, Creating Sub Package in a Package, Access Specifiers in Java, Creating API Document

**Exception Handling:** Errors in Java Program, Exceptions, throws Clause, throw Clause, Types of Exceptions, Re – throwing an Exception

### UNIT – IV

**Streams:** Stream, Creating a File using FileOutputStream, Reading Data from a File using FileInputStream, Creating a File using FileWriter, Reading a File using FileReader, Zipping and Unzipping Files, Serialization of Objects, Counting Number of Characters in a File, File Copy, File Class

**Threads:** Single Tasking, Multi Tasking, Uses of Threads, Creating a Thread and Running

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it, Terminating the Thread, Single Tasking Using a Thread, Multi Tasking Using Threads, Multiple Threads Acting on Single Object, Thread Class Methods, Thread Priorities, thread Group, Daemon Threads, Applications of Threads, Thread Life Cycle

#### UNIT – V

**Applets:** Creating an Applet, Uses of Applets, <APPLET> tag, A Simple Applet, An Applet with Swing Components, Animation in Applets, A Simple Game with an Applet, Applet Parameters

**Java Database Connectivity:** Database Servers, Database Clients, JDBC (Java Database Connectivity), Working with Oracle Database, Working with MySQL Database, Stages in a JDBC Program, Registering the Driver, Connecting to a Database, Preparing SQL Statements, Using jdbc-odbc Bridge Driver to Connect to Oracle Database, Retrieving Data from MySQL Database, Retrieving Data from MS Access Database, Result set.

#### TEXT BOOKS:

1. Core Java: An Integrated Approach, Authored by Dr. R. Nageswara Rao & Kogent Learning Solutions Inc.
2. E. Balaguruswamy, Programming with JAVA, A primer, 3e, TATA McGraw- Hill Company.
3. John R. Hubbard, Programming with Java, Second Edition, Schaum's outline Series, TMH.
4. Deitel & Deitel, Java TM: How to Program, PHI (2007)

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**SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA**  
**II BSc (Computer Science)**

Revised Syllabus 2022-23

Semester	Course Code	Course Title	Hours	Credits
IV	CSC N-4305	OPERATING SYSTEMS	60	3

**Course Objectives**

- To familiarize with the concepts, services and functionalities of Operating Systems.

**Course Outcomes**

Upon successful completion of the course students will be able to:

1. Differentiate the types of operating systems
2. Choose appropriate process scheduling algorithm to improve system performance.
3. Analyze memory management techniques, concepts of virtual memory and disk scheduling.
4. Understand the implementation of file systems and directories along with the interfacing of IO devices with the operating system.
5. Choose an appropriate algorithm to avoid deadlocks.

**UNIT – I**

**Operating System Introduction:** Operating Systems Objectives and functions. Computer System Architecture, OS Structure, OS Operations, Evolution of Operating Systems - Simple Batch, Multi programmed, time shared, Parallel, Distributed Systems, Real-Time Systems. Operating System services.

**UNIT – II**

Process and CPU Scheduling - Process concepts - The Process, Process State, Process Control Block, Threads, Process Scheduling - Scheduling Queues, Schedulers, Context Switch, Preemptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling algorithms, Case studies: Linux, Windows.

Process Coordination - Process Synchronization, The Critical section Problem, Synchronization Hardware, Semaphores, and Classic Problems of Synchronization, Monitors, Case Studies: Windows.



### UNIT - III

Memory Management and Virtual Memory - Logical & physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table, Segmentation, Segmentation with Paging, Virtual Memory, Demand Paging, Performance of Demanding Paging, Page Replacement Page Replacement Algorithms, Allocation of Frames.

### UNIT - IV

File System Interface - The Concept of a File, Access methods, Directory Structure, File System Mounting, File Sharing, Protection, File System Structure, Mass Storage Structure - Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling.

### UNIT - V

Deadlocks - System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

### REFERENCES BOOKS:

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8<sup>th</sup> Edition, Wiley Student Edition.
2. Principles of Operating Systems by Naresh Chauhan, OXFORD University Press
3. Operating systems - Internals and Design Principles, W. Stallings, 6th Edition, Pearson.
4. Modern Operating Systems, Andrew S Tanenbaum 3rd Edition PHI.
5. Operating Systems A concept - based Approach, 2nd Edition, D. M. Dhamdhare, TMH.
6. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
7. Operating Systems, A. S. Godbole, 2nd Edition, TMH

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**SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA**  
**III B. Sc (Computer Science and Data Science)**

**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
V / VI	CSC N-5306A1	WEB INTERFACE DESIGNING TECHNOLOGIÉS	45	3

**I. Learning Outcomes:** Students after successful completion of the course will be able to:

1. Understand and appreciate the web architecture and services.
2. Gain knowledge about various components of a website.
3. Demonstrate skills regarding creation of a static website and an interface to dynamic website.
4. Learn how to install word press and gain the knowledge of installing various plugins to use in their websites.

**Unit - I (9 hours)**

**HTML:** Introduction to web designing, difference between web applications and desktop applications, introduction to HTML, HTML structure, elements, attributes, headings, paragraphs, styles, colours, HTML formatting, Quotations, Comments, images, tables, lists, blocks and classes, HTML CSS, HTML frames, file paths, layout, symbols, HTML responsive.

**Unit – II (9 hours)**

**HTML forms:** HTML form elements, input types, input attributes, HTML5, HTML graphics, HTML media – video, audio, plug INS, you tube.

**HTML API'S:** Geo location, Drag/drop, local storage, HTML SSE.

**CSS:** CSS home, introduction, syntax, colours, back ground, borders, margins, padding, height/width, text, fonts, icons, tables, lists, position, over flow, float, CSS combinators, pseudo class, pseudo elements, opacity, tool tips, image gallery, CSS forms, CSS counters, CSS responsive.

**Unit – III (9 hours)**

**Client side Validation:** Introduction to JavaScript - What is DHTML, JavaScript, basics, variables, string manipulations, mathematical functions, statements, operators, arrays, functions. Objects in JavaScript - Data and objects in JavaScript, regular expressions, exception handling. DHTML with JavaScript - Data validation, opening a new window, messages and confirmations, the status bar, different frames, rollover buttons, moving images.

**Unit – IV (9 hours)**

**Word press:** Introduction to word press, servers like wamp, bitnami e.tc, installing and configuring word press, understanding admin panel, working with posts and pages, using

editor, text formatting with shortcuts, working with media-Adding, editing, deleting media elements, working with widgets, menus.

#### Unit – V (9 hours)

Working with themes-parent and child themes, using featured images, configuring settings, user and user roles and profiles, adding external links, extending word press with plug-ins. Customizing the site, changing the appearance of site using css , protecting word press website from hackers.

#### II. References

1. Chris Bates, Web Programming Building Internet Applications, Second Edition, Wiley (2007)
2. Paul S.WangSanda S. Katila, an Introduction to Web Design plus Programming, Thomson (2007).
3. Head First HTML and CSS, Elisabeth Robson, Eric Freeman, O'Reilly Media Inc.
4. An Introduction to HTML and JavaScript: for Scientists and Engineers, David R. Brooks, Springer, 2007
5. Schaum's Easy Outline HTML, David Mercer, Megraw Hill Professional.
6. Word press for Beginners, Dr.Andy Williams.
7. Professional word press, Brad Williams, David damstra, Hanstern.
8. Web resources:
  - a. <http://www.codecademy.com/tracks/web>
  - b. <http://www.w3schools.com>
  - c. <https://www.w3schools.in/wordpress-tutorial/>
  - d. <http://www.homeandlearn.co.uk>
9. Other web sources suggested by the teacher concerned and the college librarian including reading material.

E. Sujets

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**SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA**  
**III B. Sc (Computer Science and Data Science)**  
**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
V / VI	CSC N-5306A2	Web Applications Development using PHP & MYSQL	45	3

**Learning Outcomes:**

- Students after successful completion of the course will be able to:
1. Write simple programs in PHP.
  2. Understand how to use regular expressions, handle exceptions, and validate data using PHP.
  3. Apply In-Built functions and Create User defined functions in PHP programming.
  4. Write PHP scripts to handle HTML forms.
  5. Write programs to create dynamic and interactive web based applications using PHP and MYSQL.
  6. Know how to use PHP with a MySQL database and can write database driven web pages.

**Unit-1: (9 hours)**

The Building blocks of PHP: Variables, Data Types, Operators and Expressions, Constants. Flow Control Functions in PHP: Switching Flow, Loops, Code Blocks and Browser Output. Working with Functions: What is function?, Calling functions, Defining Functions, Returning the values from User-Defined Functions, Variable Scope, Saving state between Function calls with the static statement, more about arguments.

**Unit-2: (9 hours)**

Working with Arrays: What are Arrays? Creating Arrays, Some Array-Related Functions. Working with Objects: Creating Objects, Object Instance Working with Strings, Dates and Time: Formatting strings with PHP, Investigating Strings with PHP. Manipulating Strings with PHP. Using Date and Time Functions in PHP.

**Unit-3: (9 hours)**

Working with Forms: Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, Using Hidden Fields to save state, Redirecting the user, Sending Mail on Form Submission, and Working with File Uploads. Working with Cookies and User Sessions: Introducing Cookies, Setting a Cookie with PHP, Session Function Overview, Starting a Session, Working with session variables, passing session IDs in the Query String, Destroying Sessions and Unsetting Variables, Using Sessions in an Environment with Registered Users.

**Unit-4: (9 hours)**

Working with Files and Directories: Including Files with include(), Validating Files, Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from Files,

Writing or Appending to a File, Working with Directories, Open Pipes to and from Process Using popen(), Running Commands with exec(), Running Commands with system() or passthru().

Working with Images: Understanding the Image-Creation Process, Necessary Modifications to PHP, Drawing a New Image, Getting Fancy with Pie Charts, Modifying Existing Images, Image Creation from User Input.

#### Unit-5: (9 hours)

Interacting with MySQL using PHP: MySQL Versus MySQLi Functions, Connecting to MySQL with PHP, Working with MySQL Data, Creating an Online Address Book: Planning and Creating Database Tables, Creating Menu, Creating Record Addition Mechanism, Viewing Records, Creating the Record Deletion Mechanism, Adding Sub-entities to a Record.

#### References

1. Julie C. Meloni. SAMS Teach yourself PHP MySQL and Apache. Pearson Education (2007).
2. Steven Holzner , PHP: The Complete Reference, McGraw-Hill
3. Robin Nixon. Learning PHP, MySQL, JavaScript, CSS & HTML5, Third Edition O'reilly, 2014
4. Xue Bai Michael Ekedahl, The web warrior guide to Web Programming, Thomson(2006).
5. Web resources:
  - e. <http://www.codecademy.com/tracks/php>
  - f. <http://www.w3schools.com/PHP>
  - g. <http://www.tutorialpoint.com>
6. Other web sources suggested by the teacher concerned and the college librarian including reading material.

**SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA**  
**III B. Sc (Computer Science and Data Science)**  
**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
V / VI	CSC N-5306B1	INTERNET OF THINGS	45	3

**Learning Outcomes:** Students after successful completion of the course will be able to:

1. Appreciate the technology for IoT
2. Understand various concepts, terminologies and architecture of IoT systems.
3. Understand various applications of IoT
4. Learn how to use various sensors and actuators for design of IoT.
5. Learn how to connect various things to Internet.
6. Learn the skills to develop simple IOT Devices.

**Unit - I (9 hours)**

Fundamentals of IoT: Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M.

**Applications of IoT:** Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.

**Unit - II (9 hours)**

Sensors Networks : Definition, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: Arduino IDE and Board Types, RaspberriPi Development Kit, RFID Principles and components, Wireless Sensor Networks: History and Context, The node, Connecting nodes, Networking Nodes, WSN and IoT.

**Unit - III (9 hours)**

Wireless Technologies for IoT: WPAN Technologies for IoT: IEEE 802.15.4, Zigbee, HART, NFC, Z-Wave, BLE, Bacnet And Modbus.  
IP Based Protocols for IoT IPv6, 6LowPAN, LoRA, RPL, REST, AMPQ, CoAP, MQTT.  
Edge connectivity and protocols.

**Unit - IV (9 hours)**

Arduino Simulation Environment: Arduino Uno Architecture, Setting up the IDE, Writing Arduino Software, Arduino Libraries, Basics of Embedded C programming for Arduino, Interfacing LED, push button and buzzer with Arduino, Interfacing Arduino with LCD.

Sensor & Actuators with Arduino: Overview of Sensors working, Analog and Digital Sensors, Interfacing of Temperature, Humidity, Motion, Light and Gas Sensors with Arduino, Interfacing of Actuators with Arduino, Interfacing of Relay Switch and Servo Motor with Arduino.



### Unit - V (9 hours)

Developing IOT's: Implementation of IoT with Arduino, Connecting and using various IoT Cloud Based Platforms such as Blynk, Thingspeak, AWS IoT, Google Cloud IoT Core etc, Cloud Computing, Fog Computing, Privacy and Security Issues in IoT.

#### References

1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madiseti, Universities Press, 2015. ISBN: 9788173719547
2. Vijay Madiseti and ArshdeepBahga, "Internet of Things (A Hands-onApproach)", 1st Edition, VPT, 2014
3. Daniel Minoli, — "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications
4. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press
5. Open source software / learning websites
  - a) <https://github.com/connectIoT/iottoolkit>
  - b) <https://www.arduino.cc/>
  - c) [https://onlinecourses.nptel.ac.in/noc17\\_cs22/course](https://onlinecourses.nptel.ac.in/noc17_cs22/course)
  - d) [http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot\\_prot/index.html](http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html)
  - e) Contiki (Open source IoT operating system)
  - f) Ardudroid (open source IoT project)
  - g) <https://blynk.io> (Mobile app)
  - h) IoT Toolkit (smart object API gateway service reference implementation)
6. Other web sources suggested by the teacher concerned and the college librarian including reading material.

J. Pullik

Arshdeep

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**III B. Sc (Computer Science and Data Science)**  
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Semester	Course Code	Course Title	Hours	Credits
V / VI	CSC N-5306B2	APPLICATION DEVELOPMENT USING PYTHON	45	3

**Course 7B:**

**Learning Outcomes:** Students after successful completion of the course will be able to:

1. Understand and appreciate the web architecture and services.
2. Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
3. Demonstrate proficiency in handling Strings and File Systems.
4. Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
5. Interpret the concepts of Object-Oriented Programming as used in Python.
6. Apply concepts of Python programming in various fields related to IOT, Web Services and Databases in Python.

**Unit - I (9 hours)**

**Python basics, Objects-** Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types  
**Numbers** - Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions, Related Modules  
**Sequences** - Strings, Lists, and Tuples, Mapping and Set Types

**Unit – II (9 hours)**

**Files:** File Objects, File Built-in Function [ open() ], File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related Modules  
**Exceptions:** Exceptions in Python, Detecting and Handling Exceptions, Context Management, Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, Creating Exceptions, Why Exceptions (Now)?, Why Exceptions at All?, Exceptions and the sys Module, Related Modules  
**Modules:** Modules and Files, Namespaces, Importing Modules, Importing Module Attributes, Module Built-in Functions, Packages, Other Features of Modules

**Unit – III (9 hours)**

**Regular Expressions:** Introduction, Special Symbols and Characters, Res and Python  
**Multi-threaded Programming:** Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module, Related Modules

**UNIT –IV (9 hours)**

**GUI Programming:** Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs

**Web Programming:** Introduction, Web Surfing with Python, Creating Simple Web Clients, Advanced Web Clients, CGI-Helping Servers Process Client Data, Building CGI Application, Advanced CGI, Web (HTTP) Servers

**Unit – V (9 hours)**

**Database Programming:** Introduction, Python Database Application Programmer's Interface (DBAPI), Object Relational Managers (ORMs), Related Modules

**References**

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.
2. Think Python, Allen Downey, Green Tea Press.
3. Introduction to Python, Kenneth A. Lambert, Cengage.
4. Python Programming: A Modern Approach, Vamsi Kurama, Pearson.
5. Learning Python, Mark Lutz, O' Really.
6. Web sources suggested by the teacher concerned and the college librarian including reading material.

*A. Suresh*  
*Vijayadeep*  
*J. R. R. R.*  
*S. G.*

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**III B. Sc (Computer Science and Data Science)**  
**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
V / VI	CSC N-5306C1	DATA SCIENCE	45	3

**Learning Outcomes:** Students after successful completion of the course will be able to:

1. Develop relevant programming abilities.
2. Demonstrate proficiency with statistical analysis of data.
3. Develop the ability to build and assess data-based models.
4. Demonstrate skill in data management
5. Apply data science concepts and methods to solve problems in real-world contexts and will communicate these solutions effectively

**UNIT I (9 hours)**

**Introduction:** The Ascendance of Data, What is Data Science? , Finding key Connectors, Data Scientists You May Know, Salaries and Experience, Paid Accounts, Topics of Interest, Onward.

**Python:** Getting Python, The Zen of Python, Whitespace Formatting, Modules, Arithmetic, Functions, Strings, Exceptions, Lists, Tuples, Dictionaries, Sets, Control Flow, Truthiness, Sorting, List Comprehensions, Generators and Iterators, Randomness. Object – Orienting Programming, Functional Tools, enumerate, zip and Argument Unpacking, args and kwargs, Welcome to Data Science!

**Visualizing Data:** matplotlib, Bar charts, Line charts, Scatterplots.

**Linear Algebra:** Vectors, Matrices

**UNIT II (9 hours)**

**Statistics:** Describing a Single Set of Data, Correlation, Simpson’s Paradox, some Other Correlation Caveats, Correlation and Causation.

**Probability:** Dependence and Independence, Conditional Probability, Bayes’s Theorem, Random Variables, Continuous Distributions, The Normal Distribution, The Central Limit Theorem.

**Hypothesis and Inference:** Statistical Hypothesis Testing, Example: Flipping a Coin, Confidence Intervals, P-hacking, Example: Running an A/B Test, Bayesian Inference.

**Gradient Descent:** The Idea behind Gradient Descent, Estimating the Gradient, Using the Gradient, Choosing the Right Step Size, Putting It All Together, Stochastic Gradient Descent.

**UNIT III (9 hours)**

**Getting Data:** stdin and stdout, Reading Files – The Basics of Text Files, Delimited Files, Scraping the Web - HTML and the parsing Thereof, Example: O’Reilly Books About Data, Using APIs – JSON ( and XML), Using an Unauthenticated API, Finding APIs.

**Working with Data:** Exploring Your Data, Exploring One-Dimensional Data, Two Dimensions Many Dimensions, Cleaning and Munging, Manipulating Data, Rescaling, Dimensionality Reduction.

**Machine Learning:** Modeling, What Is Machine Learning? Over fitting and under fitting, Correctness, The Bias-Variance Trade-off, Feature Extraction and Selection

**UNIT IV (9 hours)**

**K-Nearest Neighbors:** The Model, Example: Favorite Languages, The Curse of Dimensionality.

**Naive Bayes:** A Really Dumb Spam Filter, A More Sophisticated Spam Filter, Implementation, Testing Our Model.

**Simple Linear Regression:** The Model, Using Gradient Descent, Maximum Likelihood Estimation.

**Multiple Regression:** The Model, Further Assumptions of the Least Squares Model, Fitting the Model, Interpreting the Model, Goodness of Fit.

#### UNIT V (9 hours)

**Logistic Regression:** The Problem, The Logistic Function, Applying the Model, Goodness of Fit Support Vector Machines.

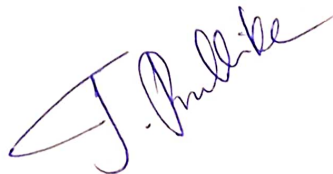
**Decision Trees:** What Is a Decision Tree? Entropy, The Entropy of a Partition, Creating a Decision Tree, Putting It All Together, Random Forests.

**Neural Networks:** Perceptron, Feed-Forward Neural Networks And Back propagation, Example: Defeating a CAPTCHA.

**Clustering:** The Idea, The Model, Example: Meetups , Choosing k, Example: Clustering Colors, Bottom-up Hierarchical Clustering.

#### References

1. Data Science from Scratch by Joel Grus O'Reilly Media
2. Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly, 2nd Edition, 2018.
3. Jake VanderPlas, "Python Data Science Handbook: Essential Tools for Working with Data", O'Reilly, 2017.
4. Web resources:
  - a. <https://www.edx.org/course/analyzing-data-with-pyhton>
  - b. [http://math.ecnu.edu.cn/~lfzhou/seminar/\[Joel\\_Grus\]\\_Data\\_Science\\_from\\_Scratch\\_First\\_Princ.pdf](http://math.ecnu.edu.cn/~lfzhou/seminar/[Joel_Grus]_Data_Science_from_Scratch_First_Princ.pdf)
5. 9. Other web sources suggested by the teacher concerned and the college librarian including reading material.



**SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA**  
**III BSc (Computer Science and Data Science)**  
**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
V / VI	CSC N-5306C2P	PHYTHON FOR DATA SCIENCE	45	3

**Learning Outcomes:** Students after successful completion of the course will be able to:

1. Identify the need for data science and solve basic problems using Python built-in data types and their methods.
2. Design an application with user-defined modules and packages using OOP concept
3. Employ efficient storage and data operations using NumPy arrays.
4. Apply powerful data manipulations using Pandas.
5. Do data pre-processing and visualization using Pandas

**Unit - I (9 hours)**

Introduction to Data Science - Why Python? - Essential Python libraries - Python Introduction, Identifiers, Reserved words, Indentation, Comments, Built-in Data types and their Methods: Strings, List, Tuples, Dictionary, Set - Type Conversion- Operators.

Decision Making- Looping- Loop Control statement User defined functions - function arguments & its types. Features of python programming language.

**UNIT -II (9 hours)**

User defined Modules and Packages in Python- Files: File manipulations, File and Directory related methods - Python Exception Handling.

OOPs Concepts -Class and Objects, Constructors – Data hiding- Data Abstraction- Inheritance.

**UNIT -III (10 hours)**

NumPy Basics: Numpy Arrays, The NumPy ndarray- Creating ndarrays- Data Types for ndarrays- Arithmetic with NumPy Arrays

Numpy arrays Basic Indexing and Slicing - Boolean Indexing-Transposing Arrays and Swapping Axes.

**UNIT -IV (10 hours)**

Introduction to pandas Data Structures: Series, Data Frame and Essential Functionality: Dropping Entries- Indexing, Selection, and Filtering- Function Application and Mapping- Sorting and Ranking.

Summarizing and Computing Descriptive Statistics- Unique Values, Value Counts, and Membership. Reading and Writing Data in Text Format .

**UNIT -V (10 hours)**

Data Cleaning and Preparation: Handling Missing Data - Data Transformation: Removing Duplicates, Transforming Data Using a Function or Mapping, Replacing Values, Detecting and Filtering Outliers .

Plotting with pandas: Line Plots, Bar Plots, Histograms and Density Plots, Scatter or Point Plots.

**Ref books:**

1. Y. Daniel Liang, "Introduction to Programming using Python", Pearson, 2012.
2. Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly, 2nd Edition, 2018.

Two handwritten signatures in blue ink. The first signature is on the left and the second is on the right, both written in a cursive style.

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**I BSc (Data Science)**

**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
II	DCSC N-2352	INTRODUCTION TO DATA SCIENCE WITH R	60	3

**Objective**

Data Science is a fast-growing interdisciplinary field, focusing on the analysis of data to extract knowledge and insight. This course will introduce students to the collection, preparation, analysis, modeling and visualization of data, covering both conceptual and practical issues. Examples and case studies from diverse fields will be presented, and hands-on use of statistical and data manipulation software will be included.

**Outcomes**

1. Recognize various disciplines that contribute to a successful data science effort.
2. Understand the processes of data science - identifying the problem to be solved, data collection, preparation, modeling, evaluation and visualization.
3. Be aware of the challenges that arise in data sciences.
4. Develop and appreciate various techniques for data modeling and mining.
5. Be cognizant of ethical issues in many data science tasks.
6. Be comfortable using commercial and open source tools such as the R language and its associated libraries for data analytics and visualization.
7. Learn skills to analyze real time problems using R
8. Able to use basic R data structures in loading, cleaning the data and preprocessing the data.
9. Able to do the exploratory data analysis on real time datasets
10. Able to understand and implement Linear Regression
11. Able to understand and use - lists, vectors, matrices, dataframes, etc.

**Unit-1:**

Introduction to Data Science- Introduction- Definition - Data Science in various fields - Examples - Impact of Data Science - Data Analytics Life Cycle - Data Science Toolkit - Data Scientist - Data Science Team

Understanding data: Introduction – Types of Data: Numeric – Categorical – Graphical – High Dimensional Data – Classification of digital Data: Structured, Semi-Structured and Un-Structured - Example Applications. Sources of Data: Time Series – Transactional Data – Biological Data – Spatial Data – Social Network Data – Data Evolution.

**Unit-2:**

Introduction to R- Features of R - Environment - R Studio. Basics of R-Assignment - Modes - Operators - special numbers - Logical values - Basic Functions - R help functions - R Data Structures - Control Structures. Vectors: Definition- Declaration - Generating - Indexing - Naming - Adding & Removing

elements - Operations on Vectors - Recycling - Special Operators - Vectorized if- then else-Vector Equality - Functions for vectors - Missing values - NULL values - Filtering & Subsetting.

### Unit-3:

Matrices - Creating Matrices - Adding or Removing rows/columns - Reshaping - Operations - Special functions on Matrices. Lists - Creating List - General List Operations - Special Functions - Recursive Lists. Data Frames - Creating Data Frames - Naming - Accessing - Adding - Removing - Applying Special functions to Data Frames - Merging Data Frames- Factors and Tables.

### Unit- 4:

Input / Output - Reading and Writing datasets in various formats - Functions - Creating User-defined functions - Functions on Function Object - Scope of Variables - Accessing Global Environment - Closures - Recursion. Exploratory Data Analysis - Data Preprocessing - Descriptive Statistics - Central Tendency - Variability - Mean - Median - Range - Variance - Summary - Handling Missing values and Outliers - Normalization

Data Visualization in R : Types of visualizations - packages for visualizations - Basic Visualizations. Advanced Visualizations and Creating 3D plots.

### Unit- 5:

Inferential Statistics with R - Types of Learning - Linear Regression- Simple Linear Regression - Implementation in R - functions on lm() - predict() - plotting and fitting regression line. Multiple Linear Regression - Introduction -comparison with simple linear regression - Correlation Matrix - F-Statistic - Target variables Vs Predictors - Identification of significant features - Implementation of Multiple Linear Regression in R.

### References

1. Nina Zumel, John Mount. "Practical Data Science with R", Manning Publications, 2014.
2. Jure Leskovec, Anand Rajaraman, Jeffrey D.Ullman, "Mining of Massive Datasets", Cambridge University Press, 2014.
3. Mark Gardener, "Beginning R - The Statistical Programming Language", John Wiley & Sons, Inc., 2012.
4. W. N. Venables, D. M. Smith and the R Core Team, "An Introduction to R", 2013.

*Pritya Deep*

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**II BSc (Data Science)**

**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
III	DCSC N-3325	<b>BIG DATA TECHNOLOGY</b>	60	3

**Objectives:**

This course provides practical foundation level training that enables immediate and effective participation in big data projects. The course provides grounding in basic and advanced methods to big data technology and tools, including MapReduce and Hadoop and its ecosystem.

**Outcome**

1. Learn tips and tricks for Big Data use cases and solutions.
2. Acquire knowledge of HDFS components, Namenode, Datanode, etc.
3. Acquire knowledge of storing and maintaining data in cluster, reading data from and writing data to Hadoop cluster.
4. Able to maintain files in HDFS
5. Able to write MapReduce applications to access data present on HDFS
6. Able to read different formats of files into map-reduce application.
7. Able to develop MapReduce applications to analyze Big Data related to the real world use cases.
8. Able to write MapReduce applications that can take data from multiple datasets and join them
9. Able to optimize the performance of Map-Reduce application

**Unit-I: Introduction to Big Data**

Introduction –Distributed File System – Big Data and its importance, Characteristics of Big Data, Limitation of Conventional Data Processing Approaches, Need of big data frameworks, Big data analytics, Limitations of Big Data and Challenges, Big data applications

**Unit-II**

**Hadoop:** Basic Concepts of Hadoop and its features -The Hadoop Distributed File System (HDFS)- Anatomy of a Hadoop Cluster - Hadoop cluster modes - Hadoop Architecture, Hadoop Storage - Hadoop daemons (Name node-Secondary name node-Job tracker-Task tracker-Data node,etc) - Anatomy of Read & Write operations – Interacting HDFS using command-line (HDFS Shell and FS shell commands) -Interacting HDFS using Java APIs – Dataflow – Blocks –Replica - YARN.

**Unit-III**

**Hadoop Ecosystem Components** – Schedulers- Fair and Capacity, Hadoop 2.0 Vs Hadoop 3.0 and its new features.

**Hadoop Cluster Setup – SSH & Hadoop Configuration –HDFS Administering – Monitoring & Maintenance.**

#### **Unit-IV**

Hadoop MapReduce - Introduction - Phases in MapReduce Framework - Anatomy of MapReduce Job run - Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features. Understanding Basic MapReduce Program (WordCount program): The Driver Code - The Mapper class - The Reducer class.

#### **Unit-V:**

Writing first MapReduce Program - Hadoop's Streaming API - Using Eclipse for Rapid Development – YARN Vs MapReduce Advanced MapReduce Concepts: Partitioner – Combiner – Joins – Map-side Join – Reduce-side Join - Case Study: Weblog Analysis done using Mapper, Reducer, Combiner, Partitioner, etc.

#### **References**

1. Boris Iubinsky, Kevin T. Smith, Alexey Yakubovich, "Professional Hadoop Solutions". Wiley, ISBN : 9788126551071, 2015.
2. Chris Eaton, Dirk Deroos et al., "Understanding Big Data", McGraw Hill , 2010.
3. Tom White, "HADOOP" : The definitive Guide", O Reilly 2012.
4. Srinath Perera, Thilina Gunarathne, "Hadoop MapReduce Cookbook", PACKT publishing, 2013.

*J. Pralika*  
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**SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA**  
**II B. Sc (Data Science)**

Revised Syllabus 2022-23

Semester	Course Code	Course Title	Hours	Credits
IV	DCSC N-4325-4	DATA MINING AND DATA ANALYSIS	60	3

**Objective**

- To learn data analysis techniques.
- To understand Data mining techniques and algorithms.
- Comprehend the data mining environments and application.

**Outcome: Students who complete this course will be able to**

1. To understand and demonstrate data mining
2. Compare various conceptions of data mining as evidenced in both research and application.
3. Characterize various kinds of patterns that can be discovered by association rule mining.
4. Evaluate mathematical methods underlying the effective application of data mining.
5. To Analyze the data using statistical methods
6. Gain hands-on skills and experience on data mining tools.

**Unit-I**

Data mining - KDD Vs Data Mining, Stages of the Data Mining Process-Task Primitives, Data Mining Techniques – Data Mining Knowledge Representation. Major Issues in Data Mining – Measurement and Data – Data Preprocessing – Data Cleaning - Data transformation- Feature Selection - Dimensionality reduction

**Unit-II: Predictive Analytics**

Classification and Prediction - Basic Concepts of Classification and Prediction, General Approach to solving a classification problem- Logistic Regression - LDA - Decision Trees: Tree Construction Principle – Feature Selection measure – Tree Pruning - Decision Tree construction Algorithm, Random Forest, Bayesian Classification-Accuracy and Error Measures- Evaluating the Accuracy of the classifier / predictor- Ensemble methods and Model selection.

**Unit-III : Classification and Descriptive Analytics**

Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction.

Descriptive Analytics - Mining Frequent Itemsets - Market based model – Association and Sequential Rule Mining

**Unit - IV : Cluster Analysis**

Cluster Analysis: Basic concepts and Methods – Cluster Analysis – Partitioning methods –Hierarchical methods – Density Based Methods – Grid Based Methods – Evaluation of Clustering – Advanced Cluster Analysis: Probabilistic model based clustering – Clustering High – Dimensional Data – Clustering Graph and Network Data – Clustering with Constraints- Outlier Analysis.

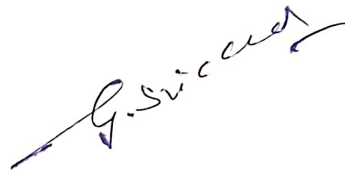
**Unit-V: Factor Analysis**

Factor Analysis: Meaning, objectives and Assumptions, Designing a factor analysis, Deriving factors and assessing overall factors, Interpreting the factors and validation of factor analysis.

## References

1. Adelchi Azzalini, Bruno Scapa, "Data Analysis and Data mining", 2<sup>nd</sup> Edition, Oxford Univeristy Press Inc., 2012.
2. Jiawei Han and Micheline Kamber, "Data Mining: Concepts and Techniques", 3<sup>rd</sup> Edition, Morgan Kaufmann Publishers, 2011.
3. Alex Berson and Stephen J. Smith, "Data Warehousing, Data Mining & OLAP", 10<sup>th</sup> Edition, TataMc Graw Hill Edition , 2007.
4. G.K. Gupta, "Introduction to Data Mining with Case Studies", 1<sup>st</sup> Edition, Easter Economy Edition, PHI, 2006.
5. Joseph F Hair, William C Black etal, "Multivariate Data Analysis", Pearson Education, 7<sup>th</sup> edition, 2013.

  
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# SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA

## II B. Sc (Data Science)

### Revised Syllabus 2022-23

Semester	Course Code	Course Title	Hours	Credits
IV	DCSC-4325-5	BIG DATA ACQUISITION AND ANALYSIS	60	3

#### Objective

Learn to develop Hadoop applications for storing processing and analyzing data stored in Hadoop cluster. The course is mainly covering Big Data tools for Data Transformation (Apache PIG), Data Analysis (HIVE) and for handling unstructured data HBase. To Understand the complexity and volume of Big Data and their challenges. To analyse the various methods of data collection. To comprehend the necessity for pre-processing Big Data and their issues

#### Outcome

1. Identify the various sources of Big Data
2. Able to collect and store Big Data from various sources
3. Able to write Pig Scripts- Extract, Transform and Load the data on HDFS
4. Able to write Hive Scripts- Extract, Transform, Load and Analyse the data present in HDFS
5. Able to write scripts to extract data from structured and un-structured data for analytics
6. Able to extract and process semi and un-structured data using HBase

#### Unit- I

**Introduction To Big Data Acquisition:** Big data framework – fundamental concepts of Big Data Management and analytics – Current challenges and trends in Big Data Acquisition. Map Reduce Algorithm- Hadoop Storage [HDFS], Common Hadoop Shell commands - Anatomy of File Write and Read. NameNode. Secondary NameNode, and DataNode - Hadoop Configuration – Pig Configuration – Hive Configuration - HBase Configuration.

#### Unit-II

**Data Collection And Transmission:** Big data collection – Strategies – Types of Data Sources – Structured Vs Unstructured data – ELT vs ETL – storage infrastructure requirements – Collection methods – Log files – sensors – Methods for acquiring network data (Libcap-based and zero-copy packet capture technology) – Specialized network monitoring softwares (Wireshark, Smartsniff and Winnetcap) – Mobile equipments, Transmission methods, Issues.

#### Unit-III

Apache Pig - Introduction - Pig features - Pig Architecture - Pig Execution modes, Pig Grunt shell and Shell commands. Pig Latin Basics: Data model, Data Types, Operators - Pig Latin Commands - Load & Store , Diagnostic Operators, Grouping, Cogroup, Joining, Filtering, Sorting, Splitting - Built-In Functions, User define functions. Pig Execution Modes: Batch Mode – Embedded Mode – Pig Execution in Batch Mode –Use cases - Map Reduce programs with Pig – Pig Vs SQL

#### Unit-IV

Hive: Introduction - Hive Features - Hive architecture -Hive Meta store - Hive data types - Hive Tables - Table types - Creating database, Altering database, Create table, alter table, Drop table, Built-In Functions - Built-In Operators, User defined functions(UDFs), View, Pig Vs Hive.

HiveQL—Introduction, HiveQL Select, HiveQL – MapReduce using HiveQL OrderBy, Group By Joins, LIMIT, Distribute By , Cluster By - Sorting And Aggregation – Partitioning: Static & Dynamic partitioning – Index Creation - Bucketing – Analysis of MapReduce execution – Hive Optimization – Setting Hive Parameters. Comparison between MapReduce, Hive QL and SQL. UseCase: Implementation of MapReduce programs with HiveQL.

### Unit-V

Hbase : HBasics, Features of HBase, Concepts, Clients, Example, Hbase Versus RDBMS, Limitations of HBase

**Big Data Privacy And Applications:** Data Masking – Privately identified Information (PII) – Privacy preservation in Big Data – Popular Big Data Techniques and tools –Applications- Social Media Analytics – Fraud Detection.

### References

1. Bart Baesens, "Analytics in a Big Data World: The Essential Guide to Data Science and its Applications", John Wiley & Sons, 2014.
2. Tom White " Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012.
3. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.
4. Min Chen. Shiwen Mao, Yin Zhang. Victor CM Leung, Big Data: Related Technologies, Challenges and Future Prospects, Springer, 2014.
5. Michael Minelli, Michele Chambers Ambiga Dhiraj, "Big Data, Big Analytics : Emerging Business Intelligence and Analytic Trends", John Wiley & Sons, 2013.
6. Raj. Pethuru " Handbook of Research on Cloud Infrastructures for Big Data Analytics", IGI Global.

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SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA  
III B. Sc (Data Science)

Revised Syllabus 2022-23

Semester	Course Code	Course Title	Hours	Credits
V / VI	DCSC N-5326A1	Soft Computing	45	3

Course Objective: The student should be made to:

- Classify the various soft computing frame works
- Be familiar with the design of neural networks, fuzzy logic and fuzzy systems
- Learn mathematical background for optimized genetic programming

### SYLLABUS

#### UNIT - I: INTRODUCTION TO SOFT COMPUTING

Soft Computing Constituents-From Conventional AI to Computational Intelligence- Artificial neural network: Introduction. characteristics- learning methods – taxonomy – Evolution of neural networks - basic models - important technologies - applications.

#### UNIT-II: NEURAL NETWORKS

McCulloch-Pitts neuron - linear separability - hebb network - supervised learning network: perceptron networks - adaptive linear neuron. multiple adaptive linear neuron, BPN, RBF, TDNN- associative memory network: auto-associative memory network, hetero-associative memory network, BAM, hopfield networks. iterative auto associative memory network & iterative associative memory network – unsupervised learning networks: Kohonen self-organizing feature maps.

#### UNIT- III: FUZZY LOGIC-I

Membership functions: features. fuzzification. methods of membership value assignments- Defuzzification: lambda cuts - methods - fuzzy arithmetic and fuzzy measures: fuzzy arithmetic - extension principle - fuzzy measures - measures of fuzziness -fuzzy integrals

#### UNIT- IV: FUZZY LOGIC-II

fuzzy rule base and approximate reasoning: truth values and tables, fuzzy propositions, formation of rules-decomposition of rules, aggregation of fuzzy rules, fuzzy reasoning-fuzzy inference systems- overview of fuzzy expert system-fuzzy decision making.

#### UNIT- V: GENETIC ALGORITHM

Genetic algorithm- Introduction - biological background - traditional optimization and search techniques - Genetic basic concepts - operators – Encoding scheme – Fitness evaluation -crossover - mutation - genetic programming – multilevel optimization – real life problem- advances in GA.

#### References:

1. J.S.R.Jang, C.T. Sun and E.Mizutani, Neuro-Fuzzy and Soft Computing, PHI / Pearson Education 2004.

2. S.N.Sivanandam and S.N.Deepa, "Principles of Soft Computing", Wiley India Pvt Ltd, 2011.
3. S.Rajasekaran and G.A.Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications", Prentice-Hall of India Pvt. Ltd., 2006.
4. George J. Klir, Ute St. Clair, Bo Yuan, Fuzzy Set Theory: Foundations and Applications Prentice Hall, 1997.
5. David E. Goldberg, Genetic Algorithm in Search Optimization and Machine Learning Pearson Education India, 2013.
6. James A. Freeman, David M. Skapura, Neural Networks Algorithms, Applications, and Programming Techniques, Pearson Education India, 1991.
7. Simon Haykin, Neural Networks Comprehensive Foundation Second Edition, Pearson Education, 2005.

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**SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA**  
**III B. Sc (Computer Science and Data Science)**

**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
V / VI	DCSC N-5326A2	AI Concepts and Techniques	45	3

**Objectives:**

This course provides an introduction to the fundamentals of artificial intelligence. Demonstrates fundamental understanding of the history of artificial intelligence (AI) and its foundations. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning. Demonstrates awareness and a fundamental understanding of various applications of AI techniques in intelligent Agents.

**Learning outcomes:**

1. List the objectives and functions of modern Artificial Intelligence.
2. Categorize an AI problem based on its characteristics and its constraints.
3. Understand and implement search algorithms.
4. Learn how to analyse the complexity of a given problem and come with suitable optimizations.
5. Demonstrate practical experience by implementing and experimenting with the learnt algorithms.

**UNIT- I**

Problems and Search: What is Artificial Intelligence, The AI Problems, and Underlying Assumption, AI Techniques, Applications of AI, Current Trends in AI Problems, Problems Spaces, and Search: Defining the problem as a state space search, production systems, problems characteristics, issues in the design of search programs.

**UNIT- II**

**Uninformed search techniques:** Depth first search, Breadth first search, uniformed search.  
**Heuristic Search Techniques:** Generate-and-test, Hill Climbing, Best-First Search, Problem Reduction, Constraint Satisfaction, Means-Ends Analysis

**UNIT- III**

**Knowledge Representation Issues:** Representations and Mapping, Approaches to Knowledge Representation, The frame problem, Using Predicate Logic: Representing simple facts in logic, Representing Isa relationships, predicates, Resolution

**UNIT- IV**

**Representing Knowledge using Rules:** Procedural Vs Declarative knowledge, Logic Programming, Forward Vs Backward Reasoning, Matching, Control Knowledge

**UNIT- V**

**Symbolic Reasoning under Uncertainty:** Introduction to Non-monotonic Reasoning, Logics for Non-monotonic Reasoning, Implementation issues, Augmenting a Problem solver, implementation: DFS, BFS.  
**Statistical Reasoning:** Probability and Bayes Theorem, Certainty Factors and Rule-Based Systems, Bayesian Networks, Dempster-Shafer Theory.

**SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA**  
**III B. Sc (Data Science)**

**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
V / VI	DCSC N-5326B1	Supervised Machine Learning	45	3

**Objectives of Course:**

The purpose of this course is to serve as an introduction to Supervised machine learning with Python. We will explore several classifications, regression algorithms and see how they can help us perform a variety of Supervised machine learning tasks.

**Learning outcomes of Course:**

- Able to understand introduction to machine learning concepts.
- Able to Loading datasets, build models and model persistence.
- Understand Feature extraction from data sets.
- Able to do Regression & Classification.
- Able to compare SVM with other classifiers.

**UNIT- 1**

**Machine Learning Basics:** What is machine learning? Key terminology, Key tasks of machine learning, how to choose right algorithm, steps in developing a machine learning, why python? Getting started with Numpy library

**Classifying with k-Nearest Neighbors:** The k-Nearest Neighbors classification algorithm. Parsing and importing data from a text file, creating scatter plots with Matplotlib, Normalizing numeric values

**UNIT- II**

**Splitting datasets one feature at a time-Decision trees:** Introducing decision trees, measuring consistency in a dataset, using recursion to construct a decision tree, plotting trees in Matplotlib

**UNIT- III**

**Classifying with probability theory-Naïve Bayes:** Using probability distributions for classification, learning the naïve Bayes classifier, Parsing data from RSS feeds, using naïve Bayes to reveal regional attitudes

**UNIT- IV**

**Logistic regression:** Classification with logistic regression and the sigmoid function, Using optimization to find the best regression coefficients, the gradient descent optimization algorithm, Dealing with missing values in the our data

**UNIT- V**

**Support vector machines:** Introducing support vector machines, using the SMO algorithm for optimization, using kernels to “transform” data, Comparing support vector machines with other classifiers

**REFERENCE:**

- Machine learning in action, Peter Harrington by Manning publications

**SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA**  
**III B. Sc (Data Science)**

**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
V / VI	DCSC N-5326B2	Unsupervised Machine Learning	45	3

**Aim and objectives of Course (Unsupervised ML with Python):**

Unsupervised Machine Learning involves finding patterns in datasets. The core of this course involves study of Clustering, feature extraction and optimization algorithms. The purpose of this course is to serve as an introduction to machine learning with Python.

**I. Learning outcomes of Course:**

- Able to do Clustering, feature extraction and optimization.
- Students will be able to understand and implement in Python algorithms of Unsupervised Machine Learning and apply them to real-world datasets.

**UNIT- I**

**Unsupervised Learning:** Clustering: k-means clustering algorithm, Improving cluster performance with post processing, Bisecting k-means, Example: clustering points on a map

**UNIT- II**

**Association analysis :** Apriori algorithm: Association analysis, The Apriori principle, Finding frequent item sets with the Apriori algorithm, Mining association rules from frequent item sets, uncovering patterns in congressional voting

**UNIT- III**

**Finding frequent item sets:** FP-growth –FP trees, Build FP-tree, mining frequent from an FP-tree, finding co-occurring words in a Twitter feed, mining a click stream from a news site.

**UNIT- IV**

**Principal component analysis:** Dimensionality reduction techniques, using PCA to reduce the dimensionality of semiconductor manufacturing data

**UNIT- V**

**Singular value decomposition:** Applications of the SVD, Matrix factorization, SVD in Python, Collaborative filtering–based recommendation engines, a restaurant dish recommendation engine

**Text Books:**

- Machine learning in action, Peter Harrington by Manning publications



**SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA**  
**III B. Sc (Data Science)**

**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
V / VI	DCSC N-5326C1	Artificial Neural Network	45	3

Learning Outcomes: By completing this course the student will be able to:

- Create different neural networks of various architectures both feed forward and feed backward.
- Perform the training of neural networks using various learning rules.
- Perform the testing of neural networks and do the perform analysis of these networks for various pattern recognition applications.

**Course Objectives:**

- To understand the biological neural network and to model equivalent neuron models.
- To understand the architecture, learning algorithm and issues of various feed forward and feedback neural networks.

**UNIT - I**

**Introduction:** A Neural Network, Human Brain, Models of a Neuron, Neural Networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks

**Learning Process:** Error Correction Learning, Memory Based Learning, Hebbian Learning, Competitive, Boltzmann Learning, Credit Assignment Problem, Memory, Adaption, Statistical Nature of the Learning Process

**UNIT - II**

**Single Layer Perceptrons:** Adaptive Filtering Problem, Unconstrained Organization Techniques, Linear Least Square Filters, Least Mean Square Algorithm, Learning Curves, Learning Rate Annealing Techniques, Perceptron –Convergence Theorem, Relation Between Perceptron and Bayes Classifier for a Gaussian Environment

**UNIT-III**

**Multilayer Perceptron:** Back Propagation Algorithm XOR Problem, Heuristics, Output Representation and Decision Rule, Computer Experiment, Feature Detection.

**UNIT - IV**

**Back Propagation:** Back Propagation and Differentiation, Hessian Matrix, Generalization, Cross Validation, Network Pruning Techniques, Virtues and Limitations of Back Propagation Learning, Accelerated Convergence, Supervised Learning

## UNIT - V

**Self-Organization Maps (SOM):** Two Basic Feature Mapping Models, Self- Organization Map, SOM Algorithm, Properties of Feature Map, Computer Simulations, Learning Vector Quantization, Adaptive Patter Classification

### REFERENCES:

1. Neural Networks a Comprehensive Foundations, Simon Haykin, PHI edition.
2. Artificial Neural Networks - B. Vegnanarayana Prentice Hall of India P Ltd 2005
3. Neural Networks in Computer Inteligance, Li Min Fu MC GRAW HILL EDUCATION 2003
4. Neural Networks -James A Freeman David M S Kapura Pearson Education 2004.
5. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

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# SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA

## III B. Sc (Data Science)

### Revised Syllabus 2022-23

Semester	Course Code	Course Title	Hours	Credits
V / VI	DCSC N-5326C2	Deep Learning	45	3

#### Aim and Objectives of Course:

Deep learning has resurged with the availability of massive datasets and affordable computing, enabling new applications in computer vision and natural language processing. This course introduces convolutional, recurrent, and other neural network architectures for deep learning. Students design, implement, and train these models to solve real-world problems.

#### Learning outcomes of Course:

- Solve problems in linear algebra, probability, optimization, and machine learning.
- The advantages and disadvantages of deep learning neural network architectures and other approaches.
- Implement deep learning models in Python using the PyTorch library and train them with real-world datasets.
- Design convolution networks for handwriting and object classification from images or video.
- Design recurrent neural networks with attention mechanisms for natural language classification, generation, and translation.

#### UNIT I

**Introduction to Deep Learning:** Artificial intelligence, machine learning and deep learning, history of machine learning, why deep learning? Why now?

The mathematical building blocks of neural networks: A first look at a neural network, Data representations for neural networks, The gears of neural networks: tensor operations, The engine of neural networks: gradient-based optimization.

#### UNIT II

**Getting started with neural networks:** Anatomy of a neural network, Introduction to Keras, setting up a deep-learning workstation, Classifying movie reviews: a binary classification Example, classifying newswires: a multiclass classification example, Predicting house prices: a regression example.

**Fundamentals of machine learning:** Four branches of machine learning, Evaluating machine-learning models, Data preprocessing, feature engineering and feature learning, Overfitting and underfitting, The universal workflow of machine learning.

#### UNIT III

**Deep learning for computer vision:** Introduction to convnets, training a convnet from scratch on a small dataset, using a pretrained convnet, visualizing what convnets learn.

#### UNIT IV

**Deep learning for text and sequences:** Working with text data, Understanding recurrent neural networks, Advanced use of recurrent neural networks, Sequence processing with convnets.

#### UNIT V

**Advanced deep-learning best practices:** Going beyond the Sequential model: the Keras functional API, Inspecting and monitoring deep-learning models using Keras callbacks and Tensor Board, Getting the most out of your models.

#### References:

1. "Deep Learning with Python" by Francois Chollet, , 2018 Edition, Manning Publications.
2. "Deep Learning with Python" by Nikhil Ketkar, JojoMoolayil, Second Edition, Apress.
3. "Python Deep Learning" by Ivan Vasilev, Daniel Slatter, Second Edition, Packt Publications

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**SRR&CVR GOVT DEGREE COLLEGE (A): VIJAYAWADA**  
**I BSc/ BA (Computer Applications)**  
 Revised Syllabus 2022-23

Semester	Course Code	Course Title	Hours	Credits
I	CAP N-1307	COMPUTER FUNDAMENTALS AND OFFICE TOOLS	60	3

**Course Objectives:**

To introduce the fundamental concepts of Computers, Hardware, Software and able to interact with documentation, Power point, and Spreadsheet.

**Course Outcomes:**

1. To learn about Basics of Computers
2. To learn about basics of Hardware Components
3. To learn about basics of Operating System Software
4. To learn about basics of Application System Software
5. To practice handful exercises on Documentation, Spreadsheet, and Presentation

**Unit-I: Basics of Computers :** Definition of a Computer - Characteristics and Applications of Computers – Block Diagram of a Digital Computer – Classification of Computers based on size and working – Central Processing Unit – I/O Devices.

**Unit-II:** Primary, Auxiliary and Cache Memory – Memory Devices. Software, Hardware, Firmware and People ware – Definition and Types of Operating System – Functions of an Operating System – MS-DOS – MS Windows – Desktop, Computer, Documents, Pictures, Music, Videos, Recycle Bin, Task Bar – Control Panel.

**Unit-III: MS-Word:** Features of MS-Word – MS-Word Window Components – Creating, Editing, Formatting and Printing of Documents – Headers and Footers – Insert/Draw Tables, Table Auto format – Page Borders and Shading – Inserting Symbols, Shapes, Word Art, Page Numbers, Equations – Spelling and Grammar – Thesaurus – Mail Merge.

**Unit-IV: MS-PowerPoint:** Features of PowerPoint – Creating a Blank Presentation -Creating a Presentation using a Template - Inserting and Deleting Slides in a Presentation – Adding Clip Art/Pictures -Inserting Other Objects, Audio, Video - Resizing and scaling of an Object – Slide Transition – Custom Animation.

**Unit-V: MS-Excel:** Overview of Excel features – Creating a new worksheet, selecting cells, Entering and editing Text, Numbers, Formulae, Referencing cells – Inserting Rows/Columns –Changing column widths and row heights, auto format, changing font sizes, colours, shading.



SRR&CVR GOVT DEGREE COLLEGE (A):: VIJAYAWADA  
I BSc / B.A (Computer Applications)

Revised Syllabus 2022-23

Semester	Course Code	Course Title	Hours	Credits
II	CAP N-2307	PROGRAMMING IN C	60	3

Course Objectives:

- This course exposes students to problem-solving techniques using C language.

Course Learning Outcomes:

Upon successful completion of the course, a student will be able to:

- Develop an algorithm for solving a given problem.
- Convert algorithms into executable C programs.
- Choose a suitable decision making statements to develop a program
- Develop programs using modular approach.
- Simulate the operations on Arrays and Strings.
- Develop programs using Structures and pointers concept.

UNIT - I:

12 Hrs

**Introduction to Algorithms:** Algorithm - Key features of Algorithms - examples of Algorithms, Flow Charts.

**Introduction to C :** Structure of C Program. Writing the first C Program , Files used in C Program , Compiling and Executing C Programs , Using Comments, Keywords, Identifiers ,Basic Data Types in C, Variables , Constants, I/O Statements in C , Operators in C , Type Conversion and Type Casting.

UNIT - II:

16 Hrs

**Decision Control and Looping Statements:** Introduction to Decision Control Statements, Conditional Branching Statements, Iterative Statements, Nested Loops , Break and Continue Statement, Goto Statement.

**Functions:** Introduction, using functions – Function declaration/ prototype – Function definition function call – return statement – Passing parameters, Recursive functions .

UNIT - III:

16 Hrs

**Arrays:** Introduction, Declaration of Arrays , Accessing elements of the Array – Storing Values in Array. One dimensional array -declaration,initialization,Accessing one dimensional array, assing one dimensional array to function. Two dimensional Arrays-declaration,initialization, Accessing two dimensional arrays, passing two dimensional arrays to functions.

**Strings:** Introduction , String and Character functions, String Operations using String functions- strcat() , strcmp() , strcpy() , strlen().



**UNIT - IV:**

**8 Hrs**

**Pointers:** declaring Pointer Variable, Pointer Expressions and Pointer Arithmetic , Passing Arguments to Functions using Pointers, Memory Allocation in C Programs, Drawbacks of Pointers.

**UNIT - V:**

**8 Hrs**

**Structures:** Introduction to structures, Arrays of Structures, Nested Structures .  
**Union, and Enumerated Data Types:** Introduction to Union – accessing union elements , Enumerated Data Types.

**TEXT BOOKS:**

1. Computer Fundamentals and Programming in C by REEMA THAREJA from OXFORD UNIVERSITY PRESS

**REFERENCE BOOKS:**

1. E Balagurusamy— Programming in ANSI C Tata McGraw-Hill publications.
2. Brain W Kernighan and Dennis M Ritchie - The ‘C’ Programming language” - Pearson publications.
3. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publications.
4. Yashavant Kanetkar - Let Us ‘C’ BPB Publications.

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**SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA**  
**II BSc (Computer Applications)**

**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
III	CAP N-3307	DATABASEMANAGEMENT SYSTEMS	60	3

**Course Objective:**

1. To educate student regarding databases and how to manage databases.
2. To provide knowledge about creating relationships.
3. To provide knowledge about dependencies and relational constraints.
4. To enable student to write various types of queries for handling data.

**Course Learning Outcomes:** On completing the subject, students will be able to:

1. Gain knowledge of Database and DBMS.
2. Understand the fundamental concepts of DBMS with special emphasis on relational data model.
3. Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database
4. Model database using ER Diagrams and design database schemas based on the model.
5. Create a small database using SQL.

**UNIT-I**

**12Hrs**

**Introduction:** Data and Information, **Characteristics of the Database Approach:**

Self-Describing Nature of the a Database System. Insulation between Programs and Data. Data Abstraction. Support of Multiple Views of the data. Sharing of Data and multiuser Transaction Processing. **Actors on the Scene:** Database Administrators, Database Designers, End Users, System Analysts and Application. Advantages of DBMS. **Data Models, Schemas and Instances:** Categories of Data Models, Schemas, Instances, and Database State, **DBMS Architecture and Data Independence:** The Three-Schema Architecture. Data Independence.

**UNIT-II**

**12Hrs**

**Entity Relationship Model:** Introduction, Entity types, Entity sets, Attributes and Keys, Entities and Attributes, Entity Types, Entity Sets, Keys and Value Sets, Relationships, Relationship types, Roles, and Structural Constraints, Relationship Types, Sets and Instances, Relationship Degree, Role Names, and Recursive Relationships, Constraints on Relationship Types, Attributes



of Relationship Types, Weak Entity Types, ER Diagrams, Naming Conventions, and Design Issues

**Enhanced Entity-Relationship:**

Subclasses, super classes, and inheritance, Specialization and Generalization, Constraints and characteristics of Specialization and Generalization.

**UNIT-III**

**12Hrs**

**The relational data model, Relational Constraints:**

Introduction, Relational Model Concepts, Domains, Attributes, Tuples and Relations, Characteristics of Relations, Relational Model Notation Relational Constraints and Relational

**Database Schemas:**

Domain Constraints, Key Constraints and Constraints on Null, Relational Databases and Relational Database Schemas, Entity Integrity, Referential Integrity and Foreign Keys

**Functional Dependencies and normalization for Relational Databases:**

Functional Dependencies, Definition of Functional Dependency, Inference Rules for Functional Dependencies, Equivalence of sets of Functional Dependencies, Minimal Sets of Functional Dependencies

**Normal forms based on primary keys:**

Introduction to Normalization, First Normal Form, Second Normal Form, Third Normal Form

**UNIT-IV**

**12Hrs**

**The Relational Algebra:**

Basic Relational Algebra Operation, The SELECT Operation, The PROJECT operation, Sequences of Operations and the, RENAME Operation, Set Theoretic Operations, The JOIN Operation, A Complete Set of Relational Algebra Operations, The DIVISION Operation

**Additional Relational Operations:**

Aggregate Functions and Grouping, Recursive Closure Operations, OUTER JOIN and OUTER UNION Operations

**UNIT-V**

**12Hrs**

**SQL(STRUCTUREDQUERYLANGUAGE)**

Data Definition, Constraints and Schema changes in SQL, The CREATE TABLE Command and SQL Data Types and Constraints, The DROP SCHEMA and DROP TABLE Command, The ALTER TABLE Command, The SELECT-FROM-WHERE Structure of SQL Queries WHERE-Clause , Aggregate Functions and Grouping, Insert,

Delete, and Update Statements in SQL, The INSERT Command, The DELETE Command

**Prescribed Books:**

1. "Fundamentals of Database Systems " by R.Elmasri and S.Navathe
2. "Introduction to Database Management System" Atul Kahate PEARSON EDUCATION  
*ISBN:9789332505537*
3. "Database System Concepts" by Abraham Silberschatz, Henry Korth, and S.Sudarshan,  
McGrawhill, 2010.

**Reference Books:**

1. "Database Management Systems" by Raghu Rama krishnan, McGrawhill,2002
2. "Principles of Database Systems" by J.D.Ullman
3. "An Introduction to Database Systems" by Bipin C Desai
4. "Fundamentals of Relational Database Management Systems" by S.Sumathi, S.  
Esakkirajan, Springer Publications

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# SRR&CVR GOVT DEGREE COLLEGE (A):: VIJAYAWADA

## II B.Sc./ B.A (Computer Applications)

### Revised Syllabus 2022-23

Semester	Course Code	Course Title	Hours	Credits
IV	CAP N-3307-4	Object Oriented Programming using Java	60	3

#### Course Objective:

To introduce the fundamental concepts of Object-Oriented programming and to design & implement object oriented programming concepts in Java.

#### Course Learning Outcomes:

On completing the subject, students will be able to:

1. Understand the concept and underlying principles of Object-Oriented Programming. Understand how object-oriented concepts are incorporated into the Java programming language.
2. Implement Object Oriented Programming Concepts (class, constructor, overloading, inheritance, overriding) in java.
3. Create and use interfaces in a Java.
4. Implement Multi-threading, exception handling in Java.
5. Create and use packages and applets.

#### UNIT-I

13hours

**FUNDAMENTALSOFOBJECT-ORIENTED PROGRAMMING:** Introduction, Object Oriented paradigm, Basic Concepts of OOP, Benefits of OOP, Applications of OOP, Java features.

**OVERVIEW OFJAVALANGUAGE:** Simple Java program structure, Java tokens, Implementing a Java Program, Java Virtual Machine, Command line arguments.

**CONSTANTS, VARIABLES&DATATYPES:** Constants, Variables, Data Types, Declaration of Variables, Giving Value to Variables, Getting Value of Variables, Operators in Java.

#### UNIT-II

12Hrs

**ISION MAKING & BRANCHING :** Decision making with if statement-Simple if statement, If-Else statement, Nesting of if-else statements, the else-if ladder, the switch statement, the conditional operator.

**LOOPING:** The While statement, the do-while statement, the for statement.

**CLASSES, OBJECTS & METHODS:** Defining a class, Adding variables, Adding methods, Creating objects, Accessing class members, Constructors, Method overloading, Static members.

#### UNIT-III

12hours

**INHERITANCE:** Extending a class, Overriding methods, Final variables and methods, Final classes, Abstract methods and classes.

**ARRAYS, STRINGS:** Arrays, One-dimensional arrays, Two- dimensional arrays, Strings.

**INTERFACES:** Introduction to multiple inheritance, Defining interfaces, Extending interfaces, Implementing interfaces.

**UNIT-IV**

**10hours**

**MULTITHREADED PROGRAMMING:** Creating Threads, Extending the Threads, Stopping and Blocking a Thread, Life cycle of a Thread, Using Thread Methods.

**MANAGING ERRORS AND EXCEPTIONS:** Types of errors, Compile-time errors, Run-time errors, Exceptions, Exception handling, Multiple Catch Statements, Using finally statement.

**UNIT-V**

**13hours**

**APPLET PROGRAMMING:** Local and remote applets, Applets and Applications, Building Applet code, Applet Life cycle:-Initialization state, Running state, Idle or stopped state, dead state, Display state.

**PACKAGES:** Java API Packages, Creating Packages, Accessing a Package, Using a Package.

**TEXTBOOKS:**

1. E. Bala Guru Swami, Programming with JAVA, A primer, 3e, TATA McGraw-Hill Company.

**REFERENCEBOOKS:**

1. Core Java: An Integrated Approach, Authored by Dr. R. Nageswara Rao & Kogent Learning Solutions Inc.
2. John R. Hubbard, Programming with Java, Second Edition, Schaum's outline Series, TATA McGraw-Hill Company.
3. Deitel & Deitel. Java TM: How to Program, PHI(2007)
4. Object Oriented Programming Through Java by P. Radha Krishna, Universities Press (2008)

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# SRR&CVR GOVT DEGREE COLLEGE (A): VIJAYAWADA

## II B.Sc. / B.A (Computer Applications) Semester –IV

### Revised Syllabus 2022-23

Semester	Course Code	Course Title	Hours	Credits
IV	CAP N-3307-5	WEBDESIGNING	60	3

#### Course Objectives:

To introduce the fundamental concepts of HTML, PHP, MySQL and able to design the webpages using scripting languages.

#### Course Outcomes:

1. To learn about Basic tags in Html and CSS
2. To learn about the Building Blocks of PHP, functions.
3. To learn about Different types of Arrays.
4. To learn about working with Forms, Sessions, Cookies.
5. To learn about Interacting with MySQL using PHP.

#### Unit-I: Introduction to HTML:

10hours

Introduction to HTML, Basic html, Document body text, Hyperlinks, Adding more formatting Lists, Tables, Images, Multimedia Objects, Frames, Forms.

#### Unit-II: Building blocks of PHP:

10hours

Variables, Data Types, Operators and Expressions, Constants, Flow Control Functions in PHP: Switching Flow, Loops, Code Blocks and Browser Output. Working with Functions: Defining Functions, Calling functions, returning the values from User Defined Functions, Variable Scope, Saving State between Function calls with the Static statement, more about arguments.

#### Unit-III: Working with Arrays:

13hours

Arrays, Creating Arrays, some Array-Related Functions, Working with Objects: Creating Objects, Object Instance. Working with Strings, Dates and Time: Formatting Strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP

#### Unit-IV: Working with Forms:

14hours

Creating Forms, Accessing Form - Input with User defined Arrays, Combining HTML and PHP code on a single Page, Redirecting the user, Sending Mail on Form Submission, and Working with File Uploads. Working with Cookies and User Sessions: Introducing Cookies, Setting a Cookie with PHP, Session Function Overview, Starting a Session, Working with session variables, passing session IDs in the Query String, Destroying Sessions and Unsetting Variables, Using Sessions in an Environment with Registered Users.

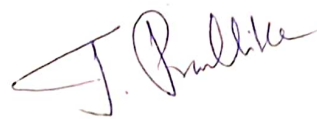
**Unit-V: Interacting with MySQL using PHP:**

**13hours**

MySQL versus MySQL Function, Connecting to MySQL with PHP, Working with MySQL Data. Creating Database Tables, Creating Menu, Creating Record Addition Mechanism, Viewing Records. Creating the Record Deletion Mechanism, Adding Sub-entities to a Record

**Prescribed Books:**

1. Chris Bates, Web Programming Building Internet Application, Second Edition, Wiley(2007)
2. Head First Servlets and JSP 2<sup>nd</sup> Edition, Bryan Basham, Kathy Sierra Uttam Kumar Roy, Web Technologies from Oxford University Press
3. Julie C. Meloni, PHP MySQL and Apache, SAMS Teach yourself, Pearson Education (2007).
4. Xue Bai Michael Ekedahl, The web warrior guide to Web Programming, Thomson(2006)



SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA  
I B.Com (Computer Applications)  
Revised Syllabus 2022-23

Semester	Course Code	Course Title	Hours	Credits
I	CARN-125I	INFORMATION TECHNOLOGY	60	3

**Course Objectives:**

This course aims at providing exposure to students in Information Technology towards basic office applications.

**Learning Outcomes:**

After successful completion of the course, student will be able to:

1. Demonstrate basic understanding of computer hardware and software.
2. Apply skills and concepts for basic use of a computer.
3. Identify appropriate tool of MS office to prepare basic documents, charts, spreadsheets and presentations.
4. Create personal, academic and business documents using MS office.
5. Create spreadsheets, charts and presentations.
6. Analyze data using charts and spread sheets.

**Unit-I: Introduction:**

Computer Definition - Characteristics and limitations of computer Hardware - Generations of Computer, Classification of Computers, Applications of Computer, Basic Components of PC, Computer Architecture - primary and secondary memories-input and output devices operating system-function of operating system-types of operating system-languages and its types

**Unit-II: MS word:**

Word processing-Features- window components -Creating, saving, closing, opening and editing of a document-Moving and Coping a text Formatting of Text and paragraph-bullets and Numbering-Find and Replace-Insertion of tables- Headers and footers-page formatting-auto format page borders and shading-spelling and grammar-mail merge-macros

**Unit-III: MS Excel:**

Features spread sheet-creating a new Work sheet-Cell-selecting cells, entering, and editing text, numbers-insert tables- formulas-types of function-templates-macros-Data sorting- charts -filtering-consolidation-grouping-pivot table

**Unit-IV: MS Power point:**

Introduction - Starting-parts-Creating of tables-create presentation-inserting and deleting slides in a presentation-templates-Auto content Wizard-Slide show-Editing of presentation-Inserting objects and charts Simple Access Database - Working with Table

**Unit-V: MS Access:**

Orientation to Microsoft Access Create Data Modify Table Data- Sort and Filter Records - Querying a Database - Create Basic Queries - Sort and Filter Data in a Query - Perform Calculations in a Query - Create Basic Access Forms - Work with Data on Access Forms - Create a Report - Add Controls to a Report - Format Reports.

*P. Sivalakshmi*

*Q. Rajagadeep*

*K.S. Reddy*

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## I B.Com (Computer Applications)

Revised Syllabus 2022-23

Semester	Course Code	Course Title	Hours	Credits
II	CARN-2251	E-COMMERCE & WEB DESIGN	60	3

### Course Objective:

The objectives of the course are to introduce the concept of electronic commerce, and to understand how electronic commerce is affecting business enterprises, governments, consumers and people in general. Acquaint students with a fundamental understanding of the environment and strategies in the New Economy.

### Course Outcome:

The aim of the course is to introduce students to:

- (1) The fundamental principles of e-business and e- Commerce and the role of Management
- (2) The underlying used technologies with emphasis on Internet Technologies.
- (3) Recognize the fundamental principles of e-Business and e- Commerce.
- (4) Examine applications of e-Commerce in relation to the applied strategic. Develop and publish web pages using HTML5, CSS3 and JavaScript.
- (5). Use tools and services of the internet in the development of a virtual e - commerce site

### Program outcomes

1. Acquaint students with a fundamental understanding of the environment and strategies in the New Economy.
- 2: Provide analytical tools to understand opportunities in unserved or underserved New Economy markets.
- 3: Provide a fundamental understanding of the different types and key components on Business models in the New Economy.
- 4: Provide guiding principles behind the design and strategy of the customer web interface.

### Unit I: Introduction:

Meaning, nature, concepts, advantages, disadvantages and reasons for transacting online, types of E-Commerce, e-commerce business models (introduction , key elements of a business model and categorizing major E-commerce business models), forces behind e-commerce.

**Technology used in E-commerce:** The dynamics of World Wide Web and internet (meaning, evolution and features); Designing, building and launching e-commerce website (A systematic approach involving decisions regarding selection of hardware, software, outsourcing vs. in-house development of a website)

### Unit II: Security and Encryption:

Need and concepts, the e-commerce security environment: (dimension, definition and scope of e-security), security threats in the E-commerce environment (security intrusions and breaches, attacking methods like hacking, sniffing, cyber-vandalism etc.), technology solutions (Encryption, security channels of communication, protecting networks and protecting servers and clients)

### Unit III: E-payment System:

Models and methods of e-payments (Debit Card, Credit Card, Smart Cards, e-money), digital signatures (procedure, working and legal position), payment gateways, online banking (meaning, concepts, importance, electronic fund transfer, automated clearing house, automated ledger posting), risks involved in e-payments.

#### **Unit IV: On-line Business Transactions:**

Meaning, purpose, advantages and disadvantages of transacting online, E-commerce applications in various industries like {banking, insurance, payment of utility bills, online marketing, e-tailing (popularity, benefits, problems and features), online services (financial, travel and career), auctions, online portal, online learning, publishing and entertainment} Online shopping (Amazon, Snap deal, Alibaba, Flipkart, etc.)

#### **Unit V: Website designing**

Designing a home page, HTML document, Anchor tag Hyperlinks, Head and body section, Header section, Title, Prologue, links, colorful pages, comment, body section, heading horizontal ruler, paragraph, tabs, images and pictures, lists and their types, nested lists, table handling. Frames: Frameset definition, frame definition, nested framesets, Forms and form elements. DHTML and Style Sheets: defining Styles, elements of styles, linking a style sheet to a HTML document, inline styles, External style sheets, internal Style sheets & Multiple Style Sheets.

#### **References:**

1. E-commerce and E-business Himalaya publishers
2. E-Commerce by Kenneth C Laudon, PEARSON INDIA
3. Web Design: Introductory with MindTap Jennifer T Campbell, Cengage India
4. HTML & WEB DESIGN: TIPS & TECHNIQUES JAMSA, KRIS, McGraw Hill
5. Fundamentals Of Web Development by Randy Connolly, Ricardo Hoar, Pearson
6. HTML & CSS: COMPLETE REFERENCE POWELL, THOMAS, McGraw Hill

*E. Sujatha*

*J. Pallavi*

*DR*

*S. Ty*

**SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA**  
**II B.Com (Computer Applications)**  
**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
III	CARN-3251	PROGRAMMING WITH C & C++	60	3

**Course objective:**

- (1) To learn the fundamental programming concepts and methodologies which are essential to building good C/C++ programs.
- (2) To practice the fundamental programming methodologies in the C/C++ programming language via laboratory experiences.
- (3) To code, document, test, and implement a well-structured, robust computer program using the C/C++ programming language.
- (4) To write reusable modules (collections of functions)

**Course outcomes:**

- a) Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.
- b) Understand dynamic memory management techniques using pointers, constructors, destructors, etc
- c) Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.
- d) Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.
- e) Demonstrate the use of various OOPs concepts with the help of programs.

**Program Outcomes:**

1. Introduction to the use of the C/C++ programming language as an aid to solving mathematical and scientific problems.
2. Students design, write, implement programs and problem solving.

**Unit-I: Introduction and Control Structures:**

History of 'C' - Structure of C program – C character set, Tokens, Constants, Variables, Keywords, Identifiers – C data types - C operators - Standard I/O in C - Applying if and Switch Statements

**Unit-II: Loops and Arrays:**

Use of While, Do While and For Loops - Use of Break and Continue Statements - Array Notation and Representation - Manipulating Array Elements - Using Multi Dimensional Arrays

**Unit-III: Strings and Functions:**

Declaration and Initialization of String Variables - String Handling Functions -Defining Functions -Function Call - Call By Value, Call By Reference – Recursion

**Unit-IV: Classes and Objects**

Introduction to OOP and its basic features - C++ program structure - Classes and objects - Friend Functions-Constructor – Types of constructors – Destructors- Polymorphism -constructor overloading, Method over loading and Operator over loading.

**Unit-V: Inheritance:**

Inheritance - Types of Inheritance -Types of derivation- Public – Private - Protected Hierarchical Inheritance - Multilevel Inheritance – Multiple Inheritance - Hybrid Inheritance

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Semester	Course Code	Course Title	Hours	Credits
IV	CARN-4251A	OBJECT ORIENTED PROGRAMMING WITH JAVA	60	3

**Course Objective:**

Design & develop database for large volumes & varieties of data with optimized data processing techniques.

**Learning Outcomes:**

At the end of the course, the student will able to:

- Understanding the meaning and necessity of audit in modern era
- Comprehend the role of auditor in avoiding the corporate frauds
- Identify the steps involved in performing audit process
- Determine the appropriate audit report for a given audit situation
- Apply auditing practices to different types of business entities
- Plan an audit by considering concepts of evidence, risk and materiality

**SYLLABUS:**

**Unit I:** Introduction to OOPs: Problems in Procedure Oriented Approach, Features of Object Oriented Programming

Introduction to Java: Features of Java, The Java Virtual Machine (JVM), Parts of Java program, Naming Conventions in Java, Data Types in Java, Operators in Java, Reading Input using scanner Class, Displaying Output using System.out.println(), Command Line Arguments.

**Unit II:** Control Statements in Java: if... else, do... while Loop, while Loop, For loop, Switch Statement, break Statement, continue Statement

Arrays: Types of Arrays, array name, length.

Strings: Creating Strings, String Class Methods, String Comparison, Immutability of Strings.

**Unit III:** Classes and Objects: Object Creation, Initializing the Instance Variables, Access Specifiers, Constructors

Inheritance: Inheritance, Types of Inheritance

Polymorphism: Method overloading, Operator overloading

Abstract Classes: Abstract Method and Abstract Class

**Unit IV:** Packages: Package, Different Types of Packages, Creating Package and Accessing a Package

Streams: Stream classes, Creating a File using File Output Stream, Reading Data from a File using File Input Stream, Creating a File using File Writer, Reading a File using File Reader

**Unit V: Exception Handling: Errors in Java Program, Exceptions, throws Clause, throw Clause, Types of Exceptions**

Threads: Single Tasking, Multi-Tasking, Uses of Threads, Creating a Thread and Running it, Terminating the Thread, Thread Class Methods.

**References:**

1. The Complete Reference JAVA Seventh Edition Herbert Schildt. Tata McGraw Hill Edition.
2. Core Java: An Integrated Approach, Dr. R. Nageswara Rao & Kogent Learning Solutions Inc.
3. E. Balaguruswamy, Programming with JAVA, A primer, 3e, TATA McGrawHill Company

**Online Resources:**

<https://stackify.com/java-tutorials/>

<https://www.w3schools.com/java/>

<https://www.javatpoint.com/java-tutorial>

<https://www.tutorialspoint.com/java/index.html>

**Practical Component: @ 2 hours/week/batch**

1. Write a program to implement command line arguments.
2. Write a program to read Student Name, Reg.No, Marks and calculate Total, Percentage, and Result. Display all the details of students .
3. Write a program to perform String Operations.
4. Java program to implement Addition of two N X N matrices.
5. Java program to implement bubble sort.
6. Java program to demonstrate the use of Constructor.
7. Calculate area of the following shapes using method overloading.  
a. Rectangle b. Circle c. Square
8. Implement multilevel inheritance
9. Java program for to display Serial Number from 1 to 5 by creating two Threads
10. Java program to demonstrate the following exception handlings  
a. Divided by Zero b. Array Index Out of Bound c. Arithmetic Exception

*G. Sreedhar*

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II B.Com (Computer Applications)  
Revised Syllabus 2022-23

Semester	Course Code	Course Title	Hours	Credits
IV	CARN-4251-5	DATA BASE MANAGEMENT SYSTEM	60	3

**Course Objective:**

Design & develop database for large volumes & varieties of data with optimized data processing techniques.

**Course Outcomes:**

On completing the subject, students will be able to:

1. Design and model of data in database.
2. Store, Retrieve data in database.

**Program Outcomes:**

1. Student knows database structure and its design
2. Students are able to understand Different data models used for database design
3. Students are able to understand database transactions and data recovery
4. Students can use DML, DDL, DCL commands to manipulate data in the database

**Unit-I: Overview of Database Management System:** Introduction, Data and Information, Database, Database Management System, Objectives of DBMS, Evolution of Database Management Systems, Classification of Database Management System.

**Unit-II: File-Based System:** File-Based System, Drawbacks of File-Based System , DBMS Approach, Advantages of DBMS, Data Models , Components of Database System, Database Architecture. DBMS Vendors and their Products.

**Unit-III: Entity–Relationship Model:** Introduction, The Building Blocks of an Entity–Relationship, Classification of Entity Sets , Attribute Classification, Relationship Degree, Relationship Classification, Generalization and Specialization, aggregation and composition; CODD’S Rules, Relational Data Model , Concept of ,Relational Integrity

**Unit-IV: Structured Query Language:** Introduction, History of SQL Standard, Commands in SQL, Data types in SQL, Data Definition Language (DDL), Selection Operation Projection Operation, Aggregate Functions, Data Manipulation Language, Table Modification, Table Truncation, Imposition of Constraints, Set Operations, Sub queries, correlated sub-queries.

**Unit -V: PL/SQL:** Introduction, Structure of PL/SQL, PL/SQL Language Elements ,Data Types, Control Structure., Steps to Create a PL/SQL Program, Iterative Control ,Cursors , Steps to Create a Cursor , Procedure, Function ,Packages ,Exceptions Handling, Database Triggers, Types of Triggers.

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**III B.Com (Computer Applications)**  
**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
V		BIG DATA ANALYTICS USING R	60	3

**Learning Outcomes:**

Upon successful completion of the course, a student will be able to:

1. Understand data and classification of digital data.
2. Understand Big Data Analytics.
3. Load data in to R.
4. Organized at a in the form of R objects and manipulate the mass needed.
5. Perform analytics using R programming.

**Syllabus:** (Total hours: 70 including Theory, Practical, Training, Unit tests etc.)

**Unit– 1: Introduction to Big data**

Data, classification Of Digital Data--structured, unstructured, semi-structured data. characteristics of data, evaluation of big data, definition and challenges of big data, what is big data and why to use big data?, business intelligence Vs big data.

**Unit – 2: Big data Analytics**

What is and isn't big data analytics? Why hype around big data analytics? Classification of analytics, top challenges facing big data, importance of big data analytics, technologies needed to meet challenges of big data.

**Unit–3: Introduction to R and getting started with R**

What is R? Why R?, advantages of R over other programming languages, Data types in R-logical, numeric, Integer, character, double, complex, raw , coercion , is()command, expressions, variables and functions, control structures, Array, Matrix, Vectors, R packages.

**Unit–4: Exploring data in R**

Data frames-data frame access, ordering data frames, R functions for data frames dim(),nrow(), ncol(), str(), summary(), names(), head(), tail(), edit() .Load data frames—reading from .CSV files, sub setting data frames, reading from tab separated value files, reading from tables.

**Unit–5: Data Visualization using R**

Reading and getting data into R(External Data): XML files, Web Data, JS ON files, Data bases, Excel files.

Working with R Charts and Graphs: Histograms, Bar Charts, Line Graphs, Scatter plots, Pie Charts

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III B.Com (Computer Applications)  
Revised Syllabus 2022-23

Semester	Course Code	Course Title	Hours	Credits
V	7A	DATA SCIENCE USING PYTHON	60	3

**Learning Outcomes:**

Upon successful completion of the course, a student will be able to:

1. Understand basic concepts of data science
2. Understand why python is a useful scripting language for developers.
3. Use standard programming constructs like selection and repetition.
4. Use aggregated data (list, tuple, and dictionary).
5. Implement functions and modules.

**Syllabus :**( Total hours: 70 including Theory, Practical, Training, Unit tests etc.)

**Unit – 1: Introduction to data science**

Data science and its importance, advantages of data science, the process of data science, Responsibilities of a data scientist, qualifications of data scientists, would you be a good data scientist, why to use python for data science.

**Unit – 2: Introduction to python**

What is python , features of python, history of python, writing and executing the python program, basic syntax, variables, keywords, data types ,operators ,indentation, Conditional statements-if, if-else, nested if-else, looping statements-for, while, break, continue, pass.

**Unit – 3: Control structures and strings**

**Strings** - definition, accessing, slicing and basic operations

**Lists** - introduction, accessing list, operations, functions and methods,

**Tuples** - introduction, accessing tuple

**Dictionaries** - introduction, accessing values in dictionaries.

**Unit – 4: Functions and modules**

**Functions** - defining a function, calling a function, types of functions, function arguments, local and global variables, lambda and recursive functions, Modules- math and random.

**Unit-5: Classes & Objects**

Classes and Objects, Class method and self-argument, class variables and object variables, public and private data members, private methods, built-in class attributes, static methods.

SRR & CVR Govt. Degree College (Autonomous), Vijayawada  
Department of Commerce and Business Management

Syllabus: 2022-23

Semester – V

Subject: E-Commerce & Web Design

Group: II BBA-DM

**Course Objective:**

The objectives of the course are to introduce the concept of electronic commerce, and to understand how electronic commerce is affecting business enterprises, governments, consumers and people in general. Acquaint students with a fundamental understanding of the environment and strategies in the New Economy.

**Course Outcome:**

The aim of the course is to introduce students to:

- (1) The fundamental principles of e-business and e-Commerce and the role of Management
- (2) The underlying used technologies with emphasis on Internet Technologies,
- (3) Recognize the fundamental principles of e-Business and e-Commerce.
- (4) Examine applications of e-Commerce in relation to the applied strategic. Develop and publish web pages using HTML5, CSS3 and Javascript.
- (5) Use tools and services of the internet in the development of a virtual e-commerce site

**Program outcomes**

1. Acquaint students with a fundamental understanding of the environment and strategies in the New Economy.
2. Provide analytical tools to understand opportunities in unserved or underserved New Economy markets.
3. Provide a fundamental understanding of the different types and key components on business models in the New Economy.
4. Provide guiding principles behind the design and strategy of the customer web interface.

**UNIT-I: E-commerce and its Technological Aspects**

Overview of developments in Information Technology and Defining E-Commerce: The scope of E-commerce, Electronic Market, Electronic Data Interchange, Internet Commerce, Benefits and limitations of E-Commerce, Produce a generic framework for E-Commerce, Architectural framework of Electronic Commerce, Web based E Commerce Architecture.

**UNIT-II: Consumer Oriented E Commerce**

E-Retailing: Traditional retailing and e retailing, Benefits of e retailing, Key success factors, Models of e retailing, Features of e retailing. E services: Categories of e-services, Web-enabled services, match making services, Information-selling on the web, e entertainment, Auctions and other specialized services. Business to Business Electronic Commerce

**UNIT-III: Electronic Data Interchange:** Benefits of EDI, EDI technology, EDI standards, EDI communications, EDI Implementation, EDI Agreements, EDI Security. Electronic Payment Systems, Need of Electronic Payment System: Study and examine the use of Electronic Payment system and the protocols used, Study Electronic Fund Transfer and secure electronic transaction protocol for credit card payment. Digital economy: Identify the methods of payments on the net – Electronic Cash, cheques and credit cards on the Internet.

**UNIT-IV: Introduction to Hyper text markup languages – HTML, XML, and DHTML, - HTML basics-**Structure of HTML document, Body tag attributes, Heading tags, semantic and syntactic style tags,

Anchor tag, Font tag, Image tag and its attributes.

**UNIT-V: Advanced HTML:** List tags, table tags, frame tags, form tag and its attributes, form input types- **Introduction to CSS** – Advantages, CSS syntax, CSS rules, CSS selectors, Types of style sheets, Layers, creating a new style sheet.

**References:**

1. Elias. M. Awad, " Electronic Commerce", Prentice-Hall of India Pvt Ltd.
2. Ravi Kalakota, Andrew B. Whinston, "Electronic Commerce-A Manager's guide", Addison-Wesley.
3. E fraim Turban, Jae Lee, David King, H.Michael Chung, "Electronic Commerce–A Managerial Perspective",Addison-Wesley.
4. Elias M Award, "Electronic Commerce from Vision to Fulfilment", 3<sup>rd</sup> Edition, PHI, Judy Strauss, Adel El-Ansary, Raymond Frost, "E-Marketing", 3<sup>rd</sup> Edition, Pearson Education.
5. E-Commerce – An Indian perspective-6<sup>th</sup> Edition by P.T.Joseph S.J, PHI Publishers.
6. Sams Teach Yourself HTML, CSS And JavaScript All In One Paperback – 1, Pearson Education of India.

*G. S. S. S.*

**SRR& CVR GOVT DEGREE COLLEGE (A), VIJAYAWADA**  
**DEGREE EXAMINATION SYLLABUS**  
**BBA-DIGITAL MARKETING**  
**SEMESTER- IV**

**Course: SEARCH ENGINE OPTIMIZATION**

BBA	Semester: IV	Credits: 4
Course: 2C	Search Engine Optimization	Hrs/Wk: 5

**Course Objective:**

With millions of people performing millions of searches each day to find content on the Internet, it makes sense that marketers want their products to be found by potential consumers. Search engines use closely guarded algorithms to determine the results that are displayed. However, determining what factors these algorithms take into account has led to a growing practice known as search engine optimization.

**Learning Outcomes:**

- Learn what search engine optimization (SEO) is and how a Web site needs to be structured.
- Appreciate the construction of search engine-friendly Web sites.
- Attract inbound Links from other Web Sites.

**UNIT I:**

Concepts of search engine optimization (SEO), Relevance, Importance, Popularity, Trust, Authority, Search engines and directories, How search engines work, Crawlers, robots, spiders, Algorithms, Search engine indexing, Ranking, Directories, Website architecture, Static pages, Dynamic pages.

**UNIT II:**

Search engine Friendliness and Specific Rankings Page coding, Managing spiders/robots, Craw lability, Rewriting pages, Subdomains, Alexa ranking, Image optimization, google search console analysis, crawler issues, remove URLs, sitemap submission

**UNIT III:**

On-page SEO, importance, influence factors, Optimizing Web Page, Website Optimization, title, description and keyword tags, header tags, Anchor Text, Navigation Links, Contextual links, Canonical URLs, Page Nations, keyword research, meta tag optimization, SEO content optimization, sitemap creation submission, robots.txt

**UNIT IV:**

Off-page SEO, importance, influence factors, Right and wrong ways to link, Reciprocal links, Three way links, Purchased links, Link networks, Redirected links, Link bait, Trust rank and worthless links, Quality directories Performing and Implementing SEO, SEO goals, and Commercial intent, Fixing broken links, Sitemaps, Useful directory links, complaining to search engines, How to address a copyright violation

**UNIT V:**

Web 2.0 and other important considerations Website ecosystem, Micro sites, RSS feeds, Blogosphere, Social media, Google calendar, Press releases, SEO for blogs, SEO for content management systems, SEO for local search, SEO for mobile search, Measurements, Google API, SEO tools, Free tools, Research and resources, Google my business listing, google places

SRR & CVR Government Degree College (Autonomous), Vijayawada  
Department of Commerce and Business Management  
Proposed syllabus of  
III Year B. Com (Accounting & Taxation) Degree Course – V Semester  
(w.e.f 2022-23 Academic Year)  
Course 17- A. SOFTWARE SOLUTIONS TO ACCOUNTING

No. of lecture hours/week	05	Continuous Internal Assessment (CIA)	40
No. of Credits	04	Semester End Evaluation (SEE)	60
Total numbers of lecture hours	75	Total Marks	100

**Course Outcomes**

After completing the course, the student shall be able to:

At the end of the course, the student will able to:

- CO-1: . Understand the technical environment of accounting soft wares.  
CO-2: Highlight the major accounting soft wares in India.  
CO-3: . Apply basics of accounting soft wares into business firms for accounting transactions.  
CO-4: Understand the various versions of Tally and other soft wares.  
CO-5: Integrate the concept of different Accounting soft wares for accounting purpose  
CO-6: Design new approaches for use of accounting software environment.

**Unit-1: Computerized Accounting**

Microsoft Excel Spread Sheet- Functions in Excel- Preparation of Accounts, Statements and Budgets using MS Excel- Analysis and Interpretation.

**Unit-II: Introduction to Leading Accounting Soft wares - Busy - Marg – Quick Books - Zoho Books - Tally- Features and Accounting.**

**Unit-III: Tally ERP-9 - Company Creation -Tally Startup Screen- Gateway of Tally- Create a Company - Alter & Delete company- Backup and Restore- Security Features in Tally.**

**Unit-IV: Tally- Accounting Masters - Groups- Create Ledgers- Alter& Delete - Inventory Masters- Creating Stock Groups - Stock Items- Unit of Measurement- Alter & Delete.**

**Unit- V: Tally-Voucher Entry -Vouchers Types - Vouchers Entry - Alter and deleting Settings Purchase Vouchers and Sales Vouchers including Tax component –Reports Generation.**

**References**

1. Nadhani, Ashok K. Tally ERP 9 Training Guide, BPB Publications
2. Tally 9 in Simple Steps, Kogent Solutions Inc., John Wiley & Sons.
3. Tally 9.0 (English Edition), (Google eBook) Computer World
4. Tally.ERP 9 Made Simple Basic Financial Accounting by BPB Publisher. 5. Tally ERP 9 For Real Time Accounting by Avichi Krishnan
6. Fundamentals of Computers, by V. Rajaraman, PHI.
7. Tally ERP 9 book advanced user, Swayam Publication ([www.tallyerp9book.com](http://www.tallyerp9book.com))
8. Web resources suggested by the Teacher concerned and the College Librarian including reading material.



**SRR&CVR GOVT DEGREE COLLEGE(A)::VIJAYAWADA**  
**I Year Common to BA / B. Sc / B. Com**

**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
1	LS N-1011	BASICS OF COMPUTER APPLICATIONS	30	2

**Objectives:**

This course aims at providing exposure to students in skill development towards basic office applications.

**Course Learning Outcomes:**

After successful completion of the course, student will be able to:

1. Demonstrate basic understanding of computer hardware and software.
2. Identify the features of MS Windows
3. Create personal, academic and business documents using MS office.
4. Create spreadsheets, charts and presentations.

**Unit-I: (08 hrs)**

**Basics of Computers:** Definition of a Computer - Characteristics of computers, Applications of Computers – Block Diagram of a Digital Computer – I/O Devices, hardware, software human ware, application software, system software, Memories - Primary, Auxiliary and Cache Memory.

**MS Windows** – Desktop, Recycle bin. My Computer, Documents, Pictures, Music, Videos. Task Bar, Control Panel.

**Unit-II: (08 hrs)**

**MS-Word :** Features of MS-Word - MS-Word Window Components - Creating, Editing, Formatting and Printing of Documents – Headers and Footers – Insert/Draw Tables, Table Auto format – Page Borders and Shading – Inserting Symbols, Shapes, Word Art, Page Numbers, Mail Merge.

**Unit-III: (10 hrs)**

**MS-Excel :** Overview of Excel features – Creating a new worksheet, Selecting cells,

QR

Entering and editing Text, Numbers, Inserting Rows/Columns –Changing column widths and row heights, Formulae, Referencing cells , Changing font sizes and colors, Insertion of Charts, Auto fill, Sort.

**MS-PowerPoint:** Features of PowerPoint – Creating a Presentation - Inserting and Deleting Slides in a Presentation – Adding Clip Art/Pictures -Inserting Other Objects, Audio, Video - Resizing and scaling of an Object – Slide Transition – Custom Animation.

#### REFERENCE BOOKS:

1. Working in Microsoft Office – Ron Mansfield - TMH.
2. MS Office 2007 in a Nutshell –Sanjay Saxena – Vikas Publishing House.
3. Excel 2020 in easy steps-Michael Price – TMH publications

*R. Srinivas*  
*Chigayadap*  
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**SRR&CVR GOVT DEGREE COLLEGE(A):: VIJAYAWADA**  
**I Year Common to BA / B.Sc / B.Com**

**Revised Syllabus 2022-23**

Semester	Course Code	Course Title	Hours	Credits
II	LS N-2014	INFORMATION & COMMUNICATION TECHNOLOGY	30	2

**Objectives:**

To gain knowledge of basic ICT tools they use in their day to day life as well as in office and research.

**Course outcomes:** Upon completion of the course, student will be able to:

1. Understand the literature of social networks and their properties.
2. Develop skills to use various social networking sites like twitter, flickr, etc.
3. Work with mailing services and G-Suite
4. Learn few GOI digital initiatives in higher education.
5. Get acquainted with internet threats and security mechanisms.

**UNIT-I: (08 hrs)**

Fundamentals of Internet: What is Internet?, Internet applications. Internet Addressing – Entering a Web Site Address, URL–Components of URL, Searching the Internet. Browser

–Types of Browsers. Introduction to Social Networking: Twitter, Tumblr, LinkedIn, Facebook, flickr, Skype, yahoo, YouTube, WhatsApp .

**UNIT-II:(08 hrs)**

E-mail: Definition of E-mail -Advantages and Disadvantages –User Ids, Passwords, Email Addresses, Domain Names, Mailers, Message Components, Message Composition. Mail Management.

G-Suite: Google drive, Google documents, Google spread sheets, Google Slides and Google forms.

**UNIT-III:(10 hrs)**

Overview of Internet security, E-mail threats and secure E-mail, Viruses and antivirus software, Firewalls, Cryptography, Digital signatures, Copyright issues.

What are GOI digital initiatives in higher education? (SWAYAM, SwayamPrabha, National Academic Depository, National Digital Library of India, E-Sodh-Sindhu, Virtual labs, e- acharya, e-Yantra and NPTEL).

