Government College for Women(A), Guntur.

COURSE INFORMATION BOOKLET

2023-2024

DEPARTMENT OF COMPUTER SCIENCE

CONTENTS

Vision and Mission of the Department

Vision

Empowering undergraduate computer science students to become globally competitive, ethically responsible and innovative problem solvers, fostering a dynamic and inclusive technological ecosystem.

Mission

1. To foster interdisciplinary collaboration by encouraging computer science students to work on projects that integrates their knowledge with other fields, such as healthcare, agriculture, or environmental sciences, to address real-world challenges.
2. To enhance digital literacy and problem-solving skills among undergraduate computer science students by engaging them in the creation of educational technology tools and resources that can benefit students and teachers at all levels.
3. To promote open-source software development practices and ethical considerations by encouraging students to contribute to open-source projects and develop solutions that prioritizes data privacy, security, and responsible AI.
4. To foster entrepreneurship and innovation by challenging students to develop startups, Apps, or services that address societal needs and encourage an entrepreneurial mindset within the computer science curriculum.

Objectives for a B.Sc. Computer Science programme:

The Computer Science undergraduate program aims to:

- Provide students with the educational experiences that will enable them to cope up with the rapidly changing subjects of Computer Science.
- Provide students with up-to-date training in the discipline so as to prepare them to take on entry level positions in the local Information Technology sector, (with the exception of hardware engineer and technician) and to grow into other positions with one- or two-years working experience.
- Provide students with a sufficiently broad range of courses to enable them to be successful in post graduate programs anywhere in the world.
- Employ a range of assessment methods and techniques and to enable students to demonstrate the depth of their understanding and their capacity for independent thought.

- Give students support and guidance in what, for most students, is a new discipline.

Program Specific outcomes of B.Sc. Computer Science

PSO	After completion of the B.Sc. Computer Science programme, students will be able to
PSO 1	Demonstrate proficiency in different computing paradigm needed for a proper understanding of computer science and learn the design, and development of software used to solve problems in a variety of business, scientific and social contexts.
PSO 2	Demonstrate knowledge of computer networks, database systems, software engineering, and theory of computing, and be able to apply this knowledge to implement real-life tasks more efficiently.
PSO 3	Show that they have learned different programming languages to enhance and increase the power of computers and internet and capable of oral and written scientific communication and will prove that they can think critically and work independently.

List of Programmes offered by the Department

S. No	Title of the programme
1	B. Sc., Computer Science Major
2	B.Sc. Cloud Computing Major
3	B.Sc. Data Science Major
4	B.Sc. Mathematics, Physics, Computer Science
5	B. Sc. Mathematics, Statistics, Computer Science
6	B.Sc. Mathematics, Electronics, Computer Science
7	B. Sc. Mathematics, Multimedia, Computer Science
8	B.Sc. Mathematics, Cloud Computing, Computer Science

B.Sc Computer Science course structure (Three major system)

Sem	Paper	Title of the Course	Course Code	No. of hours per week	No. of Credits	IA	EA	Total Marks	Max Credits
I	I	Problem Solving in C	CS304-1	4	3	30	70	100	**5**
		Problem Solving in C Lab	CS304-1P	2	2	-	50	50	
II	II	Data Structures using C	CS304-2	4	3	30	70	100	**5**
		Data Structures using C Lab	CS304-2P	2	2	-	50	50	
First phase of Apprenticeship/Internship/On the Job Training (During Summer Vacation) – 8 Weeks -180 Hours – Credits – 4 - 100 Marks									**4**
SECOND YEAR									
III	III	Database Management System	CS304-3	4	3	30	70	100	5
		Database Management System Lab	CS304-3P	2	2	-	50	50	
		Yoga			1				1
IV	IV	Object Oriented Programming using Java	CS304-4	4	3	30	70	100	10
		Object Oriented Programming using Java Lab	CS304-4P	2	2	-	50	50	
	V	Operating Systems	CS304-5	4	3	30	70	100	
		Operating Systems Lab using C/Java	CS304-5P	2	2	-	50	50	
		NCC/NSS/Sports/Extra Curricular			2				2
		Yoga			1				1
Second phase of Apprenticeship/Internship/On the Job Training (During Summer Vacation) -8 Weeks-180 Hours-Credits-4-100 Marks									4
THIRD YEAR									
V	VI	Web Interface Designing Technologies	CS304-6A	3	3	I-20 FW-5	75	100	10
		Web Interface Designing Technologies-Practical	CS304-6AP	3	2	-	50	50	
	VII	Web Applications Development using PHP& MYSQL	CS304-7A	3	3	I-20 FW-5	75	100	
		Web Applications Development using PHP& MYSQL-Practical	CS304-7AP	3	2	-	50	50	
		Or							

	VI	Internet of Things	CS304-6B	3	3	I-20 FW-5	75	100	10
		Internet of Things-Practical	CS304-6B P	3	2	-	50	50	
	VII	Application Development using Python	CS304-7B	3	3	I-20 FW-5	75	100	
		Application Development using Python-Practical	CS304-7B P	3	2	-	50	50	
		Or							
	VI	Data science	CS304-6C	3	3	I-20 FW-5	75	100	
		Data science-Practical	CS304-6C P	3	2	-	50	50	
	VII	Python for Data science	CS304-7C	3	3	I-20 FW-5	75	100	
		Python for Data Science-Practical	CS304-7C P	3	2	-	50	50	
		Or							
	VI	Python Programming	CS304-6D	3	3	I-20 FW-5	75	100	10
		Python Programming - Practical	CS304-6D P	3	2	-	50	50	
	VII	Web Applications Development using PHP& MYSQL	CS304-7D	3	3	I-20 FW-5	75	100	
		Web Applications Development using PHP& MYSQL-Practical	CS304-7D P	3	2	-	50	50	
VI	Third Phase of Apprenticeship/Internship/On the Job Training – Entire 5th or Entire 6thSemester -540 Hours-Credits-12 -200 Marks(Internal-50M, External-150M)								12

Note-1: For Semester–V, for the domain subject Computer Science any one of the three pairs of SECs shall be chosen as courses VI and VII, i.e., VIA & VIIA or VIB & VIIB or VIC & VIIC. The pair shall not be broken (A, B, C allotment is random, not on any priority basis).

B.Sc Computer Science course structure (Single major system)

Year	Semester	Course	Course Type	Course Code	Title of the Course	Hrs. / Week	Max Credits	IA	EA	Total Marks
	FIRST YEAR									
I	I	1	Major	1PS-CM-01	Essentials and applications of Mathematical, Physical and Chemical Sciences	5	4	40	60	100
		2	Major	1PS-CM-02	Advances in Mathematical, Physical and Chemical Sciences	5	4	40	60	100
	II	3		2CS-03	Problem Solving using C - (T)	3	3	40	60	100
				2CS-03P	Problem Solving using C- (P)	2	1	-	50	50
		4	Major	2CS-04	Digital Logic Design- (T)	3	3	40	60	100
				2CS-04P	Digital Logic Design- (P)	2	1	-	50	50
		First Internship - Community Service Project (Duration-8 Weeks)-180 Hours					4			100
II	III	5	Major		Object Oriented Programming using Java-(T)	3	3	40	60	100
					Object Oriented Programming using Java - (P)	2	1	-	50	50
		6	Major		Data Structures using C - (T)	3	3	40	60	100
					Data Structures using C - (P)	2	1	-	50	50
		7	Major		Computer Organization - (T)	3	3	40	60	100
					Computer Organization- (P)	2	1	-	50	50
		8	Major		Operating Systems - (T)	3	3	40	60	100
					Operating Systems - (P)	2	1	-	50	50
	IV	9	Major		Database Management System - (T)	3	3	40	60	100
					Database Management System - (P)	2	1	-	50	50
		10	Major		Object Oriented Software Engineering - (T)	3	3	40	60	100
					Object Oriented Software Engineering - (P)	2	1	-	50	50
		11	Major		Data Communications and Computer Networks - (T)	3	3	40	60	100
					Data Communications and Computer	2	1	-	50	50

					Networks - (P)					
					Short-Term Internship					
III	V	12	Major		Web Interface Designing Technologies - (T)	3	3	40	60	100
					Web Interface Designing Technologies - (P)	2	1	-	50	50
		13	Major		Web Applications Development using PHP & MYSQL - (T)	3	3	40	60	100
					Web Applications Development using PHP & MYSQL - (P)	2	1	-	50	50
		14A	Major		Internet of Things (T)	3	3	40	60	100
					Internet of Things (P)	2	1	-	50	50
		OR								
		14B	Major		Foundations of Data Science - (T)	3	3	40	60	100
					Foundations of Data Science - (P)	2	1	-	50	50
		15A	Major		IoT Applications Development and Programming - (T)	3	3	40	60	100
					IoT Applications Development and Programming - (P)	2	1	-	50	50
		OR								
		15B	Major		Application development using Python - (T)	3	3	40	60	100
					Application development using Python - (P)	2	1	-	50	50
	VI				Internship/ Apprenticeship					
IV	VII	16A	Major		Advanced Data Structures - (T)	3	3	40	60	100
					Advanced Data Structures - (P)	2	1	-	50	50
		OR								
		16B	Major		Artificial Intelligence - (T)	3	3	40	60	100
					Artificial Intelligence - (P)	2	1	-	50	50
		17A	Major		Computer Graphics - (T)	3	3	40	60	100
					Computer Graphics - (P)	2	1	-	50	50
		OR								
		17B	Major		Design and Analysis of Algorithms - (T)	3	3	40	60	100
					Design and Analysis of Algorithms - (P)	2	1	-	50	50
		18A	Major		Principles of Machine Learning - (T)	3	3	40	60	100
					Principles of Machine Learning - (P)	2	1	-	50	50
		OR								
		18B	Major		Software Testing- (T)	3	3	40	60	100
					Software Testing- (P)	2	1	-	50	50

	SEC	19A	Major		Advanced Java Programming - (T)	3	3	40	60	100
					Advanced Java Programming - (P)	2	1	-	50	50
		OR								
		19B	Major		Mobile Application Development - (T)	3	3	40	60	100
					Mobile Application Development - (P)	2	1	-	50	50
		20A	Major		MEAN Stack Development - (T)	3	3	40	60	100
					MEAN Stack Development - (P)	2	1	-	50	50
		OR								
		20B	Major		R Programming - (T)	3	3	40	60	100
					R Programming - (P)	2	1	-	50	50
	VIII	21A	Major		Big Data Technologies - (T)	3	3	40	60	100
					Big Data Technologies - (P)	2	1	-	50	50
		OR								
		21B	Major		Compiler Design - (T)	3	3	40	60	100
					Compiler Design - (P)	2	1	-	50	50
		22A	Major		Data Mining Concepts & Techniques - (T)	3	3	40	60	100
					Data Mining Concepts & Techniques - (P)	2	1	-	50	50
		OR								
		22B	Major		Digital Image Processing - (T)	3	3	40	60	100
					Digital Image Processing - (P)	2	1	-	50	50
		23A	Major		Information Security and Cryptography - (T)	3	3	40	60	100
					Information Security and Cryptography - (P)	2	1	-	50	50
		OR								
		23B	Major		Mobile ADHOC and Sensor Networks - (T)	3	3	40	60	100
					Mobile ADHOC and Sensor Networks - (P)	2	1	-	50	50
	SEC	24A	Major		Advanced DBMS - (T)	3	3	40	60	100
					Advanced DBMS - (P)	2	1	-	50	50
		OR								
		24B	Major		Cloud Computing - (T)	3	3	40	60	100
					Cloud Computing - (P)	2	1	-	50	50
		25A	Major		Computer Vision - (T)	3	3	40	60	100
					Computer Vision - (P)	2	1	-	50	50
		OR								
		25B	Major		Digital Forensics - (T)	3	3	40	60	100
					Digital Forensics - (P)	2	1	-	50	50

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science

I B.Sc. Computer Science - I SEMESTER

COURSE 1 : ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL ANDCHEMICAL SCIENCES – Syllabus

Course Code: **Credits: 4** **Hours: 5hrs/Week (75 Hours)**

Course Objectives:

The objective of this course is to provide students with a comprehensive understanding of the essential concepts and applications of mathematical, physical, and chemical sciences. The course aims to develop students' critical thinking, problem-solving, and analytical skills in these areas, enabling them to apply scientific principles to real-world situations.

Course outcomes:

1. Apply critical thinking skills to solve complex problems involving complex numbers, trigonometric ratios, vectors, and statistical measures.
2. To Explain the basic principles and concepts underlying a broad range of fundamentalareas of physics and to Connect their knowledge of physics to everydaysituations
3. To Explain the basic principles and concepts underlying a broad range of fundamentalareas of chemistry and to Connect their knowledge of chemistry to dailylife.
4. Understand the interplay and connections between mathematics, physics, and chemistry invarious applications. Recognize how mathematical models and physicaland chemical
5. Principles can be used to explain and predict phenomena in different contexts.
6. To explore the history and evolution of the Internet and to gain an understanding ofnetwork security concepts, including threats, vulnerabilities, andcountermeasures.

UNIT V: ESSENTIALS OF COMPUTER SCIENCE:

Milestones of computer evolution - Internet, history, Internet Service Providers, Types of Networks, IP, Domain Name Services, applications.

Ethical and social implications: Network and security concepts- Information Assurance Fundamentals, Cryptography-Symmetric and Asymmetric, Malware, Firewalls, Fraud Techniques-Privacy and Data Protection

Recommended books:

1. Functions of one complex variable by John.B.Conway, Springer- Verlag.
2. Elementary Trigonometry by H.S.Hall and S.R.Knight
3. Vector Algebra by A.R.Vasishtha, Krishna Prakashan Media(P)Ltd. 4.Basic Statistics

byB.L.Agarwal, New age international Publishers
4. University Physics with Modern Physics by Hugh D. Young and Roger A. Freedman
5. Fundamentals of Physics by David Halliday, Robert Resnick, and Jearl Walker
6. Physics for Scientists and Engineers with Modern Physics" by Raymond A. Serway andJohn W. Jewett Jr.
7. Physics for Technology and Engineering" by John Bird
8. Chemistry in daily life by Kirpal Singh
9. Chemistry of bio molecules by S. P. Bhutan
10. Fundamentals of Computers by V. Raja Raman
11. Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science

I B.Sc. Computer Science - I SEMESTER

Course 2: ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES – Syllabus

Course Code: **Credits: 4** **Hours: 5hrs/Week (75 Hours)**

Course Objective:

The objective of this course is to provide students with an in-depth understanding of the recent advances and cutting-edge research in mathematical, physical, and chemical sciences. The course aims to broaden students' knowledge beyond the foundational concepts and expose them to the latest developments in these disciplines, fostering critical thinking, research skills, and the ability to contribute to scientific advancements.

Learning outcomes:

- Explore the applications of mathematics in various fields of physics and chemistry, to understand how mathematical concepts are used to model and solve real-world problems.
- To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations.
- Understand the different sources of renewable energy and their generation processes and advances in nanomaterials and their properties, with a focus on quantum dots. To study the emerging field of quantum communication and its potential applications. To gain an understanding of the principles of biophysics in studying biological systems. Explore the properties and applications of shape memory materials.
- Understand the principles and techniques used in computer-aided drug design and drug delivery systems, to understand the fabrication techniques and working principles of nanosensors. Explore the effects of chemical pollutants on ecosystems and human health.
- Understand the interplay and connections between mathematics, physics, and chemistry in various advanced applications. Recognize how mathematical models and physical and chemical principles can be used to explainand predict phenomena in different contexts.
- Understand and convert between different number systems, such as binary, octal, decimal, and hexadecimal. Differentiate between analog and digital signals and understand theircharacteristics.Gain knowledge of different types of transmission media, such as wired (e.g., copper cables, fiber optics) and wireless (e.g., radio waves, microwave, satellite)..

UNIT V: Advanced Applications of computer Science

Number System-Binary, Octal, decimal, and Hexadecimal, Signals-Analog, Digital, Modem, Codec, Multiplexing, Transmission media, error detection and correction- Parity check and CRC, Networking devices-Repeater, hub, bridge, switch, router, gateway.

Recommended books:

1. Coordinate Geometry by S.L.Lony, Arihant Publications
2. Calculus by Thomas and Finny, Pearson Publications
3. Matrices by A.R.Vasishtha and A.K.Vasishtha, Krishna Prakashan Media(P)Ltd.
4. "Renewable Energy: Power for a Sustainable Future" by Godfrey Boyle
5. "Energy Storage: A Nontechnical Guide" by Richard Baxter
6. "Nanotechnology: Principles and Applications" by Sulabha K. Kulkarni and Raghvendra A. Bohara
7. "Biophysics: An Introduction" by Rodney Cotterill
8. "Medical Physics: Imaging" by James G. Webster
9. "Shape Memory Alloys: Properties and Applications" by Dimitris C. Lagoudas
10. Nano materials and applications by M.N.Borah
11. Environmental Chemistry by Anil.K.D.E.
12. Digital Logic Design by Morris Mano
13. Data Communication & Networking by Bahrouz Forouzan.

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science

I B.Sc. Computer Science - II SEMESTER

Course 3: Problem Solving using C – Syllabus

(Same for Sem-II Computer Science Minor-Course-1)

Course Code: **Credits: 3** **Hours: 3 Hrs/Week (45 Hours)**

Course Objectives

1. To explore basic knowledge on computers
2. Learn how to solve common types of computing problems.
3. Learn to map problems to programming features of C.
4. Learn to write good portable C programs.

Course Outcomes

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

1. Understand the working of a digital computer and Fundamental constructs of Programming and use the ‘C’ language constructs in the right way
2. Analyze and develop a solution to a given problem with suitable control structures
3. Apply the derived data types in program solutions
4. Apply the Dynamic Memory Management for effective memory utilization

UNIT-I

Introduction to computer and programming: Introduction, Characteristics, Basic block diagram and functions of various components of computer, Concepts of Hardware and software, Compiler and interpreter, Concepts of Machine level, Assembly level and high-level programming, Flowcharts and Algorithms

Fundamentals of C: History of C, Features of C, C Tokens-variables and keywords and identifiers, constants and Data types, Rules for constructing variable names, Operators,

UNIT-II

Structure of C program, Input /output statements in C-Formatted and Unformatted I/O **Control statements:** Decision making statements: if, if else, else if ladder, switch statements. **Loop control statements:** while loop, for loop and do-while loop. **Jump Control statements:** break, continue and goto.

UNIT-III

Derived data types in C: Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays -Declaration, Initialization and Memory representation. **Strings:** Declaring & Initializing string variables; String handling functions, Character handling functions

UNIT-IV

Functions: Function Prototype, definition and calling. Return statement. Nesting of functions. Categories of functions. Recursion, Parameter Passing by address & by value. Local and Global variables**. Storage classes:** automatic, external, static and register.

Pointers: Pointer data type, Pointer declaration, initialization, accessing values using pointers. Pointer arithmetic. Pointers and arrays.

UNIT-V

Dynamic Memory Management: Introduction, Functions-malloc, calloc, realloc, free **Structures:** Basics of structure, structure members, accessing structure members, nested structures, array of structures, structure and functions, structures and pointers. **Unions** - Union definition; difference between Structures and Unions.

Text Books:

1. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978-1-25- 90046-2
2. Herbert Schildt, ―Complete Reference with C, Tata McGraw Hill, 4th Edn., ISBN- 13:9780070411838, 2000
3. Computer fundamentals and programming in C, REEMA THAREJA,OXFORDUNIVERSITY PRESS

Reference Books

1. E Balagurusamy, COMPUTING FUNDAMENTALS & C PROGRAMMING– TataMcGraw-Hill, Second Reprint 2008, ISBN 978-0-07-066909-3.

2. Ashok N Kamthane, Programming with ANSI and Turbo C, Pearson Edition Publ, 2002.
3. Henry Mullish&Huubert L.Cooper: The Spirit of C An Introduction to modernProgramming, Jaico Pub. House,1996.
4. Y kanithkar, let us C BPB, 13 th edition-2013, ISBN:978-8183331630,656 pages.

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science

I B.Sc. Computer Science - II SEMESTER

Course 4: Digital Logic Design – Syllabus

Course Code: **Credits: 3** **Hours: 3hrs/Week (45 Hours)**

Course Objectives

To familiarize with the concepts of designing digital circuits.

Course Outcomes

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

1. Understand how to Convert numbers from one radix to another radix and perform arithmetic operations.
2. Simplify Boolean functions using Boolean algebra and k- maps
3. Design adders, subtractors circuits and Combinational logic circuits such as decoders, encoders, multiplexers and demultiplexers.
4. Use flip flops to design registers and counters.

UNIT-I

Number Systems: Binary, octal, decimal, hexadecimal number systems, conversion of numbers from one radix to another radix, r's, (r-1)'s complements, signed binary numbers, addition and subtraction of unsigned and signed numbers, weighted and unweighted codes.

UNIT – II

Logic Gates and Boolean Algebra: NOT, AND, OR, universal gates, X-OR and X-NOR gates, Boolean laws and theorems, complement and dual of a logic function, canonical and standard forms, minimizations of logic functions (POS and SOP) using Boolean theorems, K-map (up to four variables), don't care conditions.

UNIT – III

Combinational Logic Circuits – 1: Design of half adder, full adder, half subtractor, fullsubtractor, ripple adders and subtractors, ripple adder / subtractor.

UNIT – IV

Combinational Logic Circuits – 2: Design of decoders, encoders, priority encoder, multiplexers, demultiplexers, higher order decoders, demultiplexers and multiplexers, realization of Boolean functions using decoders, multiplexers.

UNIT – V

Sequential Logic Circuits: Classification of sequential circuits, latch and flip-flop, RS- latch using NAND and NOR Gates, truth tables, RS, JK, T and D flip-flops, truth and excitation tables,conversion of flip- flops.

Design of registers, Design of Counters.

Text Books:

1. **M. Morris Mano, Michael D Ciletti, "Digital Design", 5th edition, PEA.**

Reference Books

1. Kohavi, Jha, "Switching and Finite Automata Theory", 3rd edition, Cambridge.
2. 2. Leach, Malvino, Saha, "Digital Principles and Applications", 7th edition, TMH.
3. 3. Roth, "Fundamentals of Logic Design", 5th edition, Cengage.

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science

II B.Sc. Computer Science-Semester-III

Paper-III Database Management System – Syllabus

Course code: CS304-3 Credits: 3 Hours: 60

Course Objectives

The objective of the course is to introduce the design and development of databases with special emphasis on relational databases.

Course 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. Design database using ER model and create a database using SQL and fetch the information using SQL queries

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, advantages of database approach, 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, advantages of ER modeling.

UNIT-III

RELATIONAL MODEL: Introduction, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra, relational calculus, tuple relational calculus, domain relational Calculus (DRC), Functional dependencies and normal forms up to 3rd normal form.

UNIT-IV

STRUCTURED QUERY LANGUAGE:

Introduction, History of SQL Standard, Commands in SQL, Data Types in SQL, Data Definition Language, Data Manipulation Language, DCL and TCL Statements, Join Operation, Set Operations, View, Group by Having Clauses, Sub Query.

UNIT-V

PL/SQL: Introduction, Shortcomings of SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL, Program, Iterative Control, Procedure, Function, Database Triggers, Types of Triggers.
Additional Inputs : Embedded SQL, noSQL

Reference Books:

1. Database System Concepts by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill
2. Database Management Systems by Raghu Ramakrishnan, McGrawhill
3. Principles of Database Systems by J. D. Ullman
4. Fundamentals of Database Systems by R. Elmasri and S. Navathe
5. SQL: The Ultimate Beginners Guide by Steve Tale.

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science

II B.Sc. Computer Science-Semester-IV

Paper-IV Object Oriented Programming through Java – Syllabus

Course code: CS304-4 Credits: 3 Hours: 60

Course Objectives

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

Course Outcomes

At the end of this course student will:

1. Understand the syntax and semantics of java programming language and basicconcepts of OOPs
2. Apply the java programming concepts to solve the real-world problems
3. Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages.
4. Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes.
5. Design and develop applets for web applications for the real-world scenarios

UNIT I

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

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, Displaying Output with System.out.printf(), Displaying Formatted Output with String.format()

UNIT II

Arrays: Types of Arrays, Three Dimensional Arrays (3D array), arrayname.length, Command Line Arguments

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

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

UNIT III

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,

Encapsulation: Definition and advantages

Inheritance: Inheritance, The keyword,"super", Types of Inheritance, Method overriding

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

Abstract Classes: Abstract Method and Abstract Class

Interfaces: Interface, Multiple Inheritance using Interfaces

UNIT- IV

Packages: Introduction, Java API Packages, Using System Packages, Naming conventions, CreatingPackages, Accessing a Package, using a Package

Exception Handling: Types of errors : Compile-time errors, Run-time errors, Exceptions, Exceptionhandling,

Multiple Catch Statements, Using finally statement,

Throws keyword

Threads: Single Tasking, Multi-Tasking, Uses of Threads, Thread Life Cycle, Creating a Thread andRunning it, Terminating the Thread, Single Tasking Using a Thread, Multi Tasking Using Threads, Multiple Threads Acting on Single Object, Thread Class Methods, Applications of Threads,

UNIT-V

Streams: Introduction, Concept of Streams, Stream classes, Byte Stream Classes, Character Stream classes, Input Stream Classes, Output Stream Classes,: Reader stream classes, Writer Stream classes,Reading and writing files

Applets: 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, Designing a web page, passing Parameters to Applets

Swing: swing controls, Swing Buttons- JButton, JCheck Box, JRadio Button,JList, JCombo Box, SwingMenus

Additional input : Differences between Structured programming and Object orientedprogramming.

REFERENCE BOOKS

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

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science

II B.Sc. Computer Science-Semester-IV

Paper-V Operating Systems – Syllabus

Course code: CS304-5 Credits: 3 Hours: 45

Course Objectives

This course aims to introduce the structure and organization of a file system. It emphasizes various functions of an operating system like memory management, process management, device management, etc.

Course Outcomes

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

1. Know Computer system resources and the role of operating system in resource management with algorithms and understand the Operating System Architecturaldesign and its services, types of operating systems including Unix and Android. 2.Understand various process management concepts including scheduling, synchronization, and deadlocks and multithreading.
3. Comprehend different approaches for memory management, understand and identify potential threats to operating systems and the security features design to guard againstthem.
4. Specify objectives of modern operating systems and describe how operating systems have evolved over time and describe the functions of a contemporary operating system.

UNIT I

What is Operating System? History and Evolution of OS, Basic OS functions, Resource Abstraction, Types of Operating Systems– Multiprogramming Systems, Batch Systems, Time Sharing Systems; Operating Systems for Personal Computers, Workstations and Hand-held Devices, Process Control & Real time Systems

UNIT II

Processor and User Modes, Kernels, System Calls and System Programs, System View of the Process and Resources, Process Abstraction, Process Hierarchy, Threads, Threading Issues, Thread Libraries; Process Scheduling, Non-Pre-emptive and Pre-emptive Scheduling Algorithms.

UNIT III

Process Management: Deadlock, Deadlock Characterization, Necessary and Sufficient Conditions for Deadlock, Deadlock Handling Approaches: Deadlock Prevention, Deadlock Avoidance and Deadlock Detection and Recovery. Concurrent and Dependent Processes, Critical Section, Semaphores, Methods for Inter-process Communication; Process Synchronization, Classical Process Synchronization Problems: Producer-Consumer, Reader- Writer.

UNIT- IV

Memory Management: Physical and Virtual Address Space; Memory Allocation Strategies– Fixed and -Variable Partitions, Paging, Segmentation, Virtual Memory.

UNIT-V

File and I/O Management, OS Security: Directory Structure, File Operations, File Allocation Methods, Device Management, Pipes, Buffer, Shared Memory, Security Policy Mechanism, Protection, Authentication, Disk Scheduling algorithms : FCFS, SSTF, SCAN, CSCAN, LOOK Scheduling Algorithms.

Additional input : UNIX operating System

REFERENCE BOOKS

1. Operating System Principles by Abraham Silberschatz, Peter Baer Galvin and Greg Gagne (7thEdition) Wiley India Edition.
2. Operating Systems: Internals and Design Principles by Stallings (Pearson)
3. Operating Systems by J. Archer Harris (Author), Jyoti Singh (Author) (TMH)
4. Online Resources for UNIT V

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science III

B.Sc. Computer Science-Semester-VSkill

Enhancement Course (Elective)

Paper-VI-A Web Interface Designing Technologies – Syllabus

Course code: CS304-6A Credits: 3 Hours: 45

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 dynamicwebsite.
4. Learn how to install word press and gain the knowledge of installing various pluginsto use in their websites.

II. Syllabus:

(Total Hours: 90 including Teaching, Lab, and Field training, Unit tests etc.)

Unit - I

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.

Unit – II

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

Unit – III

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

Unit – IV

Word press: Introduction to word press, servers like wamp, bitnami etc., 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

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.
Additional Input : Demonstration on various real time websites

III. 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, Mcgraw 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.

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science III

B.Sc. Computer Science-Semester-V

Skill Enhancement Course (Elective)

Paper-VII-A Web Applications Development using PHP & MySQL – Syllabus

Course code: CS304-7A Credits: 3 Hours: 45

I. Learning Outcomes: Students after successful completion of the course will be ableto:

1. Understand how to use regular expressions, handle exceptions, and validatedata usingPHP.
2. Apply In-Built functions and Create User defined functions in PHP programming.
3. Write PHP scripts to handle HTML forms.
4. Write programs to create dynamic and interactive web based and database applications using PHPand MYSQL.

II. Syllabus:

(Total Hours: 90 including Teaching, Lab, and Field training, Unit tests etc.)

Unit-1:

Basics of PHP : Working with php.ini file, Variable names, Strings, Comments, Expressions, Operators : Increment/Decrement Operators, String concatenation, Ternary operator, side-effect assignment, type conversion/casting, Equality and Identity operators; ControlStructures

Unit-2:

PHP Arrays :

Associative arrays, indices, var_dump, print_r, Building up an array, Looping through anarray, Arrays of Arrays;

Array Functions : array_key_exists(), isset(), count(), is_array(), sort(), ksort(), asort(),shuffle(), exploding arrays, HTTP and PHP arrays

PHP Functions :

Built-in Functions, user defined functions, Return values, Arguments, Call by value, Call by reference, Variable scope, including files in PHP

Unit-3:

PHP and HTML Forms :

PHP Global variables, Forms-User input types, HTML5 form fields, form data submission, GET and POST with forms, form data validation, form data processing, HTML injection, persisting form data, htmlentities(), MVC Architecture.

PHP Objects :

OOP, Class, instance, method, Constructor, destructor, Object life cycle in PHP, Inheritance, Visibility (public, private, protected) , Creating objects in PHP

Unit-4:

Cookies and Sessions :
Cookies in PHP, setcookie(), $_COOKIE, Sessions in PHP, Session identifier, $_SESSION, session_start(), session_destroy.

Unit-5:

PHP and MySQL :
SQL Basics, MySQL database connectivity, Basic MySQL Functions, CRUD operations along with PHP
Additional Input : Case study

III. References

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

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science

III B.Sc. Computer Science-Semester-V

Skill Enhancement Course (Elective)

Paper-VI-B Internet of Things – Syllabus

Course code: CS304-6B Credits: 3 Hours: 45

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

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

II. **Syllabus:** *(Total Hours: 90 including Teaching, Lab, Field training, Unit tests etc.)*

Unit - I

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, IoTand 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

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

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

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

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.

III. References

1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-onApproach)", 1stEdition, 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
    d. 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.

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science III

B.Sc. Computer Science-Semester-V

Skill Enhancement Course (Elective)

Paper-VII-B Application Development using Python – Syllabus

Course code: CS304-7B Credits: 3 Hours: 45

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

1. Examine Python syntax and semantics and be fluent in the use of Python flow control and apply concepts of Python programming in various fields related toIOT, WebServices and Databases in Python.
2. Demonstrate proficiency in handling Strings, function and File Systems.
3. Create, run and manipulate Python Programs using core data structures like Lists,Dictionaries and use Regular Expressions.
4. Interpret the concepts of Object-Oriented Programming as used in Python.

II. **Syllabus:** *(Total Hours: 90 including Teaching, Lab, Field training, Unit tests etc.)*

Unit - I

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

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, PersistentStorage 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 thesys Module, Related Modules

Modules: Modules and Files, Namespaces, Importing Modules, Importing Module Attributes, Module Built-in Functions, Packages, Other Features of Modules

Unit – III

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

Unit – IV

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

Web Programming: Introduction, Wed 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

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

III. References

1. **C**ore 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 includingreading material.

IV. Co-Curricular Activities:

a) **Mandatory:** *(Training of students by teacher in field related skills: (lab: 10 + field: 05)*

1. For Teacher: Training of students by the teacher in laboratory/field for not less than 15 hours on field related skills like building an IOT device with the help of Python.

2. For Student: Students shall (individually) identity the method to link their IOT projectdone in Paper 7A with Python and submit a hand-written Fieldwork/Project work/Project work/Project work/Project work Report not exceeding 10 pages. It should include a briefreport on the selected case study of IOT device, algorithm and Python program to operate the IOT device.

3. Max marks for Fieldwork/Project work/Project work/Project work/Project work/Projectwork Report: 05.

4. Suggested Format for Fieldwork/Project work/Project work/Project work/Project work: *Title page, student details, index page, design of the IOT device, implementation of Python program to connect the IOT device, findings and acknowledgements*.

5. Unit tests (IE).

b) Suggested Co-Curricular Activities

1. Training of students by related industrial experts.
2. Assignments
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Presentation by students on best websites.

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science III

B.Sc. Computer Science-Semester-V

Skill Enhancement Course (Elective)

Paper-VI-C Data Science – Syllabus

Course code: CS304-6C Credits: 3 Hours: 45

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

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

II. **Syllabus:** (*(Total Hours: 90 including Teaching, Lab, Field training, Unit tests etc.)*

UNIT I

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 Sciencester!

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

Linear Algebra: Vectors, Matrices

UNIT II

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

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

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,Fittingthe Model, Interpreting the Model, Goodness of Fit.

UNIT V

Logistic Regression: The Problem, The Logistic Function, Applying the Model, Goodness ofFit 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.

III. 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 withData", O'Reilly, 2017.
4. Web resources:
    a. https://www.edx.org/course/analyzing-data-with-python
    b. http://math.ecnu.edu.cn/~lfzhou/seminar/[Joel_Grus]_Data_Science_from_Scr atch_First_Princ.pdf
5. 9. Other web sources suggested by the teacher concerned and the college librarianincluding reading material.

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science III

B.Sc. Computer Science-Semester-V

Skill Enhancement Course (Elective)

Paper-VII-C Python for Data Science – Syllabus

Course code: CS304-7C Credits: 3 Hours: 45

I. 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 datatypes 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 and do data pre-processing and visualization using Pandas

II. **Syllabus:** *(Total Hours: 90 including Teaching, Lab, Field training, Unit tests etc.)*

Unit - I

Introduction to Data Science - Why Python? - Essential Python libraries - **Python Introduction**- Features, 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- Math and Random numberfunctions. User defined functions - function arguments & its types.

UNIT –II

User defined Modules and Packages in Python- Files: File manipulations, File and Directoryrelated methods - Python Exception Handling.
OOPs Concepts -Class and Objects, Constructors – Data hiding- Data Abstraction- Inheritance.

UNIT –III

NumPy Basics: Arrays and Vectorized Computation- The NumPy ndarray- Creating ndarrays- Data Types for ndarrays- Arithmetic with NumPy Arrays- Basic Indexing and Slicing - Boolean Indexing-Transposing Arrays and Swapping Axes.
Universal Functions: Fast Element-Wise Array Functions- Mathematical and Statistical Methods-Sorting- Unique and Other Set Logic.

UNIT –IV

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

Data Cleaning and Preparation: Handling Missing Data - Data Transformation: Removing Duplicates, Transforming Data Using a Function or Mapping, Replacing Values, Detecting and Filtering Outliers- **String Manipulation:** Vectorized String Functions in pandas.
Plotting with pandas: Line Plots, Bar Plots, Histograms and Density Plots, Scatter or Point Plots.

III. References

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.
3. Jake VanderPlas, "Python Data Science Handbook: Essential Tools for Working withData", O'Reilly, 2017.
4. Wesley J. Chun, "Core Python Programming", Prentice Hall, 2006.
5. Mark Lutz, "Learning Python", O'Reilly, 4th Edition, 2009.
6. Web resources:
    a. https://www.edx.org/course/python-basics-for-data-science
    b. https://www.edx.org/course/analyzing-data-with-python
    c. https://www.coursera.org/learn/python-plotting?specialization=data-science-python
    d. https://www.programmer-books.com/introducing-data-science-pdf/
    e. https://www.cs.uky.edu/~keen/115/Haltermanpythonbook.pdf
7. Other web sources suggested by the teacher concerned and the college librarianincluding reading material.

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science III

B.Sc. Computer Science-Semester-V

Skill Enhancement Course (Elective)

Paper-VI-D Python Programming – Syllabus

Course code: CS304-6D **Credits: 3** **Hours: 45**

Learning Outcomes : After the completion of the course, the students will :

1) Understanding of Python syntax, data types, variables, and basic programming constructs and they will be able to write simple Python programs to solve elementary computational problems.
2) Develop the ability to analyze problems, design algorithms, and implement solutions using Python and will be able to break down complex problems into smaller, manageable tasks and write Python code to address them.
3) Be proficient in working with data using Python. This includes the ability to manipulate and analyze data structures (e.g., lists, dictionaries) and use librarieslike Pandas for more advanced data manipulation and analysis tasks.
4) Plan, develop, and present a Python projects that demonstrate their ability to create practical applications or scripts, which could be related to areas like web development, data analysis, automation, or any field relevant to their interests.

Unit-1

Basics of python programming :

Features of python : history, the features of python, writing and executing first python program, **literal constants:** numbers, strings, variables, identifiers, data types, assigning of initializing values to variables, multiple statements on a single line, Boolean, input operation,commands, reserved words, indentation, **operators and expressions :** arithmetic, comparison, assignment and in-place or shortcut, unary, bitwise, shift, logical, numbership, identity operators, operators precedence and associative, expressions in python, **operationson strings:** concatenation, multiplication, string repetition, slice a string, **other datatypes :**tuples, dictionary, type conversion

Unit 2

Decision control statements :

Introduction to Decision control statements, **selection or conditional branching statements :** if, if else, nested If, if-elif-else statement, **basic loop structures/iterative statements :** while loop, for loop, selecting an appropriate loop, nested loops, the break statement, continue statement, the pass statement, the else statement used with loops

Unit 3

Functions and modules :

Introduction: need for functions, function definition, **function call :** function parameters, variables scope, **lifetime :** local and global variables, using the global statement, resolution of names the written statement. **More on defining functions :** required arguments, keyword arguments, default arguments, variable length arguments. **Recursive functions :** greatest common divisior, finding exponents, the fibonacci series, recursion vs iteration, **introduction to modules:** the from import statement, name of module, making your own modules, the dir(), the python module, modules and names spaces, packages in python, standard library modules, globals(), locals() and re load(), function redefinition.

Unit 4

Python strings :

Introduction, concatenating, appending and multiplying strings, strings are immutable, string formatting operator, built-in string methods and functions, **slice operation:** specifying stride while slicing strings, ord() and chr() functions, in and not in operators, comparing strings, iterating string, the string module, regular expressions, the math() function, the search() function, the sub() function, the find all() function and finditer() functions, flag options.

Unit-5

File handling :

Introduction, file path, **types of files:** ASCII text files, binary files, **opening and closing files:** the open() functions, the file object attributes, the close() method. **Reading And writing files :** write() and write lines() methods, append() methods, the read () and read line() methods, opening files using with keyword, splitting words, file positions, renaming and deleting files, **dictionary methods :** methods from the os ,module.

References :

1. Python Crash Course: A Hands-On, Project-Based Introduction to Programming by Eric Matthes

2. Automate the Boring Stuff With Python: Practical Programming for Total Beginners by Al Sweigart

3. Fluent Python: Clear, Concise, and Effective Programming by Luciano Ramalho

Head First Python, 2nd Edition, by Paul Barry. Released November 2016
Publisher(s): O'Reilly Media, Inc. ISBN: 9781491919538

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science III

B.Sc. Computer Science-Semester-V

Skill Enhancement Course (Elective)

Paper-VII-D Web Applications Development using PHP & MySQL – Syllabus

Course code: CS304-7D Credits: 3 Hours: 45

Learning Outcomes: Students after successful completion of the course will beable to:

1. Observe how to use regular expressions, handle exceptions, and validate data using PHP.
2. Use In-Built functions and Create User defined functions in PHP programming.
3. Create PHP scripts to handle HTML forms.
4. Create dynamic and interactive web based and database applications usingPHP and MYSQL.

Syllabus:

(Total Hours: 90 including Teaching, Lab, and Field training, Unit tests etc.)

Unit-1:

Basics of PHP : Working with php.ini file, Variable names, Strings, Comments, Expressions, Operators : Increment/Decrement Operators, String concatenation, Ternary operator, side-effect assignment, type conversion/casting, Equality and Identity operators; ControlStructures

Unit-2:

PHP Arrays :
Associative arrays, indices, var_dump, print_r, Building up an array, Looping through anarray, Arrays of Arrays;
Array Functions : array_key_exists(), isset(), count(), is_array(), sort(), ksort(), asort(),shuffle(), exploding arrays, HTTP and PHP arrays
PHP Functions :
Built-in Functions, user defined functions, Return values, Arguments, Call by value, Call by reference, Variable scope, including files in PHP

Unit-3:

PHP and HTML Forms :PHP Global variables, Forms-User input types, HTML5 form fields, form data submission, GET and POST with forms, form data validation, form data processing, HTML injection, persisting form data, htmlentities(), MVC Architecture.
PHP Objects :
OOP, Class, instance, method, Constructor, destructor, Object life cycle in PHP, Inheritance, Visibility (public, private, protected) , Creating objects in PHP

Unit-4:

Cookies and Sessions :
Cookies in PHP, setcookie(), $_COOKIE, Sessions in PHP, Session identifier, $_SESSION, session_start(), session_destroy()

Unit-5:

PHP and MySQL :
SQL Basics, MySQL database connectivity, Basic MySQL Functions, CRUD operations along with PHP
Additional Input : Case study

References

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

List of LDCs, SDCs offered by the Department

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science

I B.Sc. - Semester-II

Paper-SEC Digital Literacy – Syllabus

Course Code: Credits: 2 Hours: 2hr/Week (30 Hrs)
Objectives: This course aims at enhancing the skill of students in Digital Literacy.

Course Learning Outcomes: By undergoing the Digital Literacy course, one should acquire basic knowledge on Computer and he/she will be able to :

1. Perform operations on a computer and access the Internet and find information of interest
2. Register for an E-mail account and operate it
3. Make bill payments and use other applications of Internet
4. Create, edit and format documents using a word processor

Unit-I: Operate the elements of a computer and performing operations on the computer

Operate the elements of a computer including power cord, power switch, network connecting cable, USB ports, Mouse operations, Keyboard operations, interface icons, GUI elements, Editing options, perform operations including switching on the computer, logging in, locating a file, opening a file, printing a document, storing a file with proper extension, creating a folder/ sub folder in a volume on hard disk and desktop, shifting files from one folder to another, shutting off the computer

Unit-II: Access the Internet to browse information and E-mail operation

Access the Internet, use a search engine, find information on the topic of interest, register for a web-based E-mail account, access E-mail with attachments, reply to an E-mail, forward an E-mail and delete an E-mail message

Unit-III: Make bill payments, other applications using Internet and word processing

Make utility bill payments, booking bus/train tickets, bank transactions, personal transactions, job search through employment portals, mobile/DTH recharge, word processing basics, creating, editing and formatting of text, saving and printing of word document

Prescribed readings:

1. Appreciation of Digital Literacy Handbook published by Department of Electronics & Information Technology, Ministry of Communications & Information Technology, Government of India

Web Resources:

1. https://youtu.be/b2X_j5Bz-VM
2. https://youtu.be/jln3-P6L2ro
3. https://youtu.be/cfDisqUMIvw
4. https://youtu.be/3h_PyURcdrc
5. https://youtu.be/EqN0LBcydBg

Note: Digital Literacy course should be taught by blending the practical demonstration of concepts with hands-on experience by learners using desktop/laptop computer and mobile handset devices

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science

Ability Enhancement Certificate Course
Intelligent Document Processing (Mandatory course for 1st Semester students)

Duration of the course: The course shall be for a period of 30 Days. (1 hour session everyday)

Medium of instruction and examinations: The medium of instruction and examinationsshall be in English.

Note : 2 Formative and 1 Summative assessment will be conducted and the learner will be given 2 credits after the completion of the course.

Objectives:

- To give certain professional skills needed to students in the processing of documentsusing Microsoft Office.

Course outcomes:

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

1. Process documents as needed.
2. Use the Microsoft Office Software to process documents.
3. Work on commercial projects

SYLLABUS:

Unit-1

Introduction to MS Office - MS Word- Working with Documents -Opening & Saving files, Editing text documents, Inserting, Deleting, Cut, Copy, Paste, Undo, Redo, Find, Search, Replace, Formatting page & setting Margins, Converting files to different formats, Importing & Exporting documents, Sending files to others, Using Tool bars, Ruler, Using Icons, using help, Formatting Documents - Setting Font styles, Font selection- style, size, colour etc, Type face - Bold, Italic, Underline, Case settings, Highlighting, Special symbols, Setting Paragraph style, Alignments, Indents, Line Space, Margins, Bullets & Numbering. Setting Page style - Formatting Page, Page tab, Margins, Layout settings, Paper tray, Border & Shading, Columns, Header & footer, Setting Footnotes & end notes – Shortcut Keys; Inserting manual page break, Column break and line break, Creating sections & frames, Anchoring & Wrapping, Setting Document styles, Table of Contents, Index, Page Numbering, date & Time, Author etc., Creating Master Documents, Web page. Creating Tables- Table settings, Borders, Alignments, Insertion, deletion, Merging, Splitting, Sorting, and Formula, Drawing - Inserting Clip Arts, Pictures/Files etc., Tools – Word Completion, Spell Checks, Mail merge, Templates, Creating contents for books, Creating Letter/Faxes, Creating Web pages, Using Wizards, Tracking Changes, Security, Digital Signature.Printing Documents – Shortcut keys.

Unit-2

Introduction to MS Office – MS Excel : Spread Sheet & its Applications, Opening Spread sheet, Menus - main menu, Formula Editing, Formatting, Toolbars, Using Icons, Using help, Shortcuts,

Spread sheet types. Working with Spread sheets- opening, Saving files, setting Margins, Converting files to different formats (importing, exporting, sending files to others), Spread sheet addressing - Rows, Columns & Cells, Referring Cells & Selecting Cells – Shortcut Keys. Entering & Deleting Data- Entering data, Cut, Copy, Paste, Undo, Redo, Filling Continuous rows, columns, Highlighting values, Find, Search & replace, Inserting Data, Insert Cells, Column, rows & sheets, Symbols, Data from external files, Frames, Clipart, Pictures, Files etc, Inserting Functions, Manual breaks, Setting Formula - finding total in a column or row, Mathematical operations (Addition, Subtraction, Multiplication, Division, Exponentiation), Using other Formulae. Formatting Spreadsheets- Labelling columns & rows, Formatting- Cell, row, column & Sheet, Category - Alignment, Font, Border & Shading, Hiding/ Locking Cells, Anchoring objects, Formatting layout for Graphics, Clipart etc., Worksheet Row & Column Headers, Sheet Name, Row height & Column width, Visibility - Row, Column, Sheet, Security, Sheet Formatting & style, Sheet background, Colour etc, Borders & Shading – Shortcut keys. Working with sheets – Sorting, Filtering, Validation, Consolidation, and Subtotal. Creating Charts - Drawing. Printing. Using Tools – Errorchecking, Spell Checks, Formula Auditing, Creating & Using Templates, Pivot Tables, Tracking Changes, Security, Customization.

Unit-3

Introduction to MS Office-MS Access: Introduction, Planning a Database, Starting Access, Access Screen, Creating a New Database, Creating Tables, Working with Forms, Creating queries, Finding Information in Databases, Creating Reports, Types of Reports, Printing & Print Preview
– Importing data from other databases viz. MS Excel etc.

Unit-4

Introduction to MS Office-MS Power Point : Introduction to presentation – Opening new presentation, Different presentation templates, Setting backgrounds, Selecting presentation layouts. Creating a presentation - Setting Presentation style, Adding text to the Presentation. Formatting a Presentation - Adding style, Colour, gradient fills, Arranging objects, Adding Header & Footer, Slide Background, Slide layout. Adding Graphics to the Presentation- Inserting pictures, movies, tables etc into presentation, Drawing Pictures using Draw. Adding Effects to the Presentation- Setting Animation & transition effect. Printing Handouts, Generating Standalone Presentation viewer.

GOVT. COLLEGE FOR WOMEN(AUTONOMOUS), GUNTUR

Department of Computer Science

Certificate course -1
Audio Video Production
(For all interested students)

Eligibility for admission: Candidate for admission to the Course shall be required to have passed the +2 in State or central board of examinations.

Duration of the course: The course shall extend over a period of 40 Days (1 hour session every day)

Medium of instruction and examinations: The medium of instruction and examinationsshall be in English.

Note : 2 Formative and 1 Summative assessment will be conducted and the learner will be given 1 credit after the completion of the course.

Objectives:

- To give certain professional skills needed to students in the area of Audio Video Production so that they can grow as entrepreneurs or freelancers.

Course outcomes:

After completion of the course, students will be able to:

1. Act as a director for films
2. Become a video and audio editor
3. Work on commercial projects.

SYLLABUS:

Unit-1 MOTION PICTURE CAMERA AND LENSES

Topics:

1. Introduction to the Principles of Cinematography
2. Mechanical parts of motion picture camera - Functions of various parts.
3. Study of lens - Study of lens systems - study of lens formats
4. Working principles of various types of shutters
5. Types of lens mounts - Matte box.
6. Frame rates - Shutter speed calculation - Shutter angle
7. The factors responsible for visual attention to the audience.
8. Importance of the quality of a motion picture camera lens
9. Image formation with cinematographic lens
10. Advantages and Disadvantages of block and zoom lenses.

Unit-2 FUNDAMENTALS OF FILM AND VIDEO EDITING

Topics:

1. Study of the using of Editing Equipments

2. Shooting Reports - Camera Report - Sound Report and Direction Reports
3. Knowing the both Film and Video Equipments and their accessories
4. Basic systems in Video Editing
5. Study of Editorial marks -Learning about Editing of silent sequence and talkiesequence.
6. Study of Film Dubbing and video dubbing
7. Study of video effects - Using of bridging shot
8. Inter cutting- Parallel cutting and constructive editing
9. Basic Transition Visual Effects - Standard video effects Digital Video effects
10. How to use Optical effects and Mechanical effects

Unit-3 PRODUCING THE FILM

Topics:

1. Overview of Scheduling, Script Breakdown
2. Day -Out-of-Days Schedule, Scheduling Each Shoot Day
3. First Day of Principal Photography
4. Finding Locations, Create Location List, Specifics of Location Scouting
5. Police / Fire Department, Shoot Day Protocol
6. Sound Recording During Principal Photography
7. How to get Best Sound on Set, Audio post production
8. Creating and Recording Foley Work, Recording ADR
9. Laying in Music Tracks, Sound Mixing

Original Music Composition for your Project, Music Supervisors

GOVT. COLLEGE FOR WOMEN (AUTONOMOUS), GUNTUR

Department of Computer Science

Certificate course -2
(For all the interested students)Open
Office Management

Eligibility for admission: Candidate for admission to the Course shall be required to havepassed the +2 in State or central board of examinations.

Duration of the course: The course shall extend over a period of 40 Days (1 hour sessionevery day)

Medium of instruction and examinations: The medium of instruction and examinationsshall be in English.

Note : 2 Formative and 1 Summative assessment will be conducted and the learner willbe given 1 credit after the completion of the course.

Objectives:

- To give certain professional skills needed to students in the processing of documents intelligently using advanced techniques

Course outcomes:

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

1. Process documents in a smart way.
2. Use the advanced applications available to process documents intelligently.

3. Work on commercial projects

SYLLABUS:

Unit-1

Introduction to MS Office OPEN OFFICE - WRITER: Introduction to Open Office Suite - Selecting the application package, Working with Documents- Formatting Documents - Setting Page style- Creating Tables - Drawing- Tools - Printing Documents - Operating with MS Word documents.

Unit-2

Introduction to MS Office Open Office-Calc - Introduction – Introduction to Spread sheets, Overview of a Worksheet, Creating Worksheet & Workbooks, Organizing files, Managing files & workbooks, Functions & Formulas, Working with Multiple sheets, Creating Charts & Printing Charts – Operating with MS Excel documents, which are already created and saved in MS Excel.

Unit-3

Introduction to MS Office Open Office-Base – Introduction- Database Concepts – Creating a New Database, Creating Tables, Working with Forms, Creating queries, Finding Information in Databases, Creating Reports, Types of Reports, Printing and Printing preview – Operating with other databases i.e. MS Access etc.

Unit-4

Introduction to MS Office- Open Office-Impress - Introduction – Creating Presentation, Saving Presentation Files, Master Templates & Re-usability, Slide Transition, Making Presentation CDs, Printing Handouts – Operating with MS Power Point files / slides