Department of Computer Science (UG)

SYLLABUS AND REGULATIONS

Under

OUTCOME-BASED EDUCATION

2020

(Effective for the Students Admitted from the Academic year 2020-2021)

AUXILIUM COLLEGE (Autonomous)

(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)

Gandhi Nagar, Vellore-632 006

D) LIST OF COURSES

Sem	Part	Paper Code	Title	Hours	Exam Hours		Credits	Marks
					Th	Pr		
I	I	ULTAA20	Tamil Paper – I	6	3	-	3	40+60
	II	UENGA20	English Paper – I	6	3	-	3	40+60
	III	UCCSA20	Programming in C	4	3	-	4	40+60
	III	UCCSB20	Practical – I : C	2	-	3	2	40+60
	III	UCCSC20	Practical – II: Digital Logics and Fundamentals	3	-	3	2	40+60
	III	UAMAA20	Allied I : Mathematics-I	6	3	-	5	40+60
	IV	-	Skill-Based Elective – I	2	2	-	2	40+60
	IV	UVEDA15	Value Education	1	-	-	-	-
Total							**21**	**700**
II	I	ULTAB20	Tamil Paper – II	6	3	-	3	40+60
	II	UENGB20	English Paper – II	6	3	-	3	40+60
	III	UCCSD20	Data Structures with C++	4	3	-	4	40+60
	III	UAMAB20	Allied II: Mathematics-II	6	3	-	5	40+60
	III	UCCSE20	Practical III: Data Structures with C++	2	-	3	2	40+60
	III	UCCSF20	Practical IV: Microprocessor	3	-	3	2	40+60
	IV	-	Skill-Based Elective – II	2	2	-	2	40+60
	IV	UVEDA15	Value Education	1	-	-	-	-
Total							**21**	**700**
III	I	ULTAC20	Tamil Paper III	6	3	-	3	40+60
	II	UENGC20	English Paper III	5	3	-	3	40+60
	III	UCCSG20	Java Programming	4	3	-	4	40+60
	III	UCCSH20	Practical V: Programming in Java	2	3	-	2	40+60
	III	UANAA20	Allied III: Numerical Analysis I	6	3	-	5	40+60
	III	UCCSI20	Practical VI: Windows Programming with VB.NET	4	-	3	2	40+60
	IV	-	Skill-Based Elective III	2	2	-	2	40+60
	IV	UVEDA15	Value Education	1	-	-	-	-
Total							**21**	**700**
IV	I	ULTAD20	Tamil Paper IV	5	3	-	3	40+60
	II	UENGD20	English Paper IV	5	3	-	3	40+60
	III	UCCSJ20	Operating System	4	3	-	4	40+60
	III	UANAB20	Allied IV: Numerical Analysis II	6	3	-	5	40+60

III	UCCSK20	Practical VII :Linux	2	-	3	2	40+60
III	UCCSL20	Practical VIII: Python Programming	3	-	3	2	40+60
IV	UNEVS17	Environmental Studies	2	2	-	2	40+60
IV	-	Skill-Based Elective IV	2	2	-	2	40+60
IV	UVEDA15	Value Education	1	-	-	-	-
		Total				**23**	**800**
V	III	UCCSM20	Relational Database Management Systems	5	3	-	4	40+60
	III	UCCSN20	.NET Programming in C#	5	3	-	4	40+60
	III	UCCSO20	Data Communications and Networks	5	3	-	4	40+60
	III	UECSA20	Elective - I A: Software Engineering	5	3	-	4	40+60
	III	UECSB20	Elective - I B: Data Mining					
	III	UCCSP20	Practical IX: RDBMS	2	-	3	2	40+60
		UCCSQ20	Practical X: .NET Programming in C#	2	-	3	2	
	IV	-	Non-Major Elective - I	3	3	-	2	40+60
	IV	-	Skill-Based Elective -V	2	2	-	2	40+60
	IV	UVEDA15	Value Education	1	-	-	-	-
			Total				**24**	**700**
VI	III	UCCSR20	Internet and Web Programming	5	3	-	4	40+60
	III	UCCSS20	Cloud Computing	4	3	-	4	40+60
	III	UECSC20	Elective - II A: Software Testing	5	3	-	4	40+60
	III	UECSD20	Elective - II B: Data Science					
	III	UECSE20	Elective - III A: Artificial Intelligence	5	3	-	4	40+60
	III	UECSF20	Elective - III B: Computer Graphics					
	IV	UCCST20	Practical XI: Internet and Web Programming	2	-	2	2	40+60
	IV	UCCSU20	Practical XII: Project	3	-	2	3	40+60
	IV	-	Non-Major Elective - II	3	2	-	2	40+60
	IV	-	Skill-Based Elective - VI	2	2	-	2	40+60
	IV	UVEDA15	Value Education	1	2	-	2	40+60
			Total				**27**	**900**
	V		Extension Activities (90 Hours)				1	
			Grand Total				**138**	**4500**

F) PROGRAM OUTCOMES (POs)

PO1: Attain knowledge and understand the principles and concepts in the respective discipline.

PO2: Acquire and apply analytical, critical and creative thinking, and problem-solving skills

PO3: Effectively communicate general and discipline-specific information, ideas and opinions.

PO4: Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society.

PO5: Emulate positive social values and exercise leadership qualities and team work.

PO6: Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

G) PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO 1: Ability to attain knowledge and understand the mathematical and logical concepts, algorithmic principles and computer fundamentals.

PSO 2: Understand the basic concepts of system software, hardware and evolution of computer graphics.

PSO 3: Demonstrate the knowledge on appropriate theory, practices and tools for the specification, design and implementation.

PSO 4: Utilize the practical skill to examine, plan and engineer the applications of technology using computing tools and techniques.

PSO 5: Apply the recent technology in multidisciplinary domains and evaluate the methods to implement it, to create high level design and implement robust software applications using latest technological skills.

PSO 6: Be ethically and professionally responsible with the ability to relate IT applications to broader social context for the growth of the nation.

SEMESTER I

UCCSA20 - PROGRAMMING IN C

Year: I	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
SEM: I	UCCSA20	Programming in C	Theory	Core	4	4	100

Course Learning Objectives (CLO)

1. To learn the fundamental programming concepts and methodologies which are essential to build good C programs.
2. Develop a greater understanding of the issues involved in programming language design and implementation.
3. To practice the fundamental programming methodologies in the C/C++ programming language via laboratory experiences.
4. Develop an in-depth understanding of functional, logic and object-oriented programming paradigms.
5. To code, document, test, and implement a well-structured, robust computer program using the C/C++ programming language.

Course Outcomes (COs)

The Learners will be able to

1. Introduce the students to understand the concept of basic programming - thereby reducing the design complexity and increasing the reusability of a component.
2. Construct the basic structure of C programming, declaration and usage of variable.
3. Understand and develop conditional and iterative statements to write programs.
4. Exercise C programs that uses array and string.
5. Develop user defined functions to solve real time problems.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	L	M	M	L	M
CO2	M	M	L	L	M	M
CO3	M	L	L	M	M	M
CO4	H	H	L	L	L	M
CO5	H	L	M	M	M	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	M	H	L	L	M	L
CO2	L	M	H	M	M	M
CO3	M	H	M	H	L	L
CO4	L	L	M	H	L	L
CO5	L	M	M	L	H	L

Unit I   **(Hour 12)**

1.1 Algorithm and Flowchart. (K2)

1.2 Basic Technique - Sum of Two Given Numbers. (K2)

1.3 Swapping Two Numbers - Simple Interest Calculation. (K2)

1.4 Overview of C. (K2)

1.5 Constants and Variables. (K2)

1.6 Data Types. (K2)

Unit II   **(Hour 12)**

2.1 Operators. (K1,K2)

2.2 Expressions. (K1,K2)

2.3 Managing Input and Output Operations. (K1,K2)

2.4 Decision Making and Branching. (K1,K2)

2.5 Decision Making and Looping. (K1,K2)

2.6 Decision Making and Looping. (K1,K2)

Unit III   **(Hour 12)**

3.1 Arrays – One Dimensional Array – Predefined Streams. (K2)

3.2 Introduction - Reading and Writing String. (K2)

3.3 Arithmetic Operation on Characters. (K2)

3.4 Putting String Together - Comparison of Two Strings - String Handling. (K2)

3.5 Functions. (K2)

3.6 Other Features of Strings. (K2)

Unit IV   **(Hour 12)**

4.1 User defined Function Introduction. (K2,K4)

4.2 Defining and Accessing Functions. (K2,K4)

4.3 Function Prototypes. (K2,K4)

4.4 Categories of Function. (K2,K4)

4.5 Passing Arguments. (K2,K4)

4.6 Nesting of Functions. (K2,K4)

Unit V   **(Hour 12)**

5.1 Recursion. (K2)

5.2 Passing Array to Functions. (K2)

5.3 Passing Strings to Functions. (K2)

5.4 Scope - Visibility and Lifetime of Variables. (K2)

5.5 Visibility and Lifetime of Variables. (K2)

5.6 Structures and Unions. (K2)

Text Books

1. Balagurusamy, "Programming in C", 6th Edition, Tata McGraw Hill Publication, 2012.
2. M. G. Venkateshmurthy, "Programming Techniques through C: A Beginner's Companion", 1st Edition, Pearson India, 2006.

Reference Book

1. Ashok N. Kamathane, "Programming with C", 3rd Edition, Pearson Publication, 2011.

Open Educational Resources (OER)

1. http//www.freebookcentre.net/programming-books-download/C-Language-Tutorial-(PDF-124P).html
2. http://www2.cs.uregina.ca/~hilder/cs833/Other%20Reference%20Materials/The%20C%20Programming%20Language.pdf
3. http://www-personal.acfr.usyd.edu.au/tbailey/ctext/ctext.pdf
4. http//www.slideshare.net/gauravjuneja11/c-language-ppt
5. http://www.iitg.ac.in/physics/fac/charu/courses/ph508/lecture2.ppt

UCCSB20 - PRACTICAL I: C

Year: I SEM: I	Course Code: UCCSB20	Title of the Course: Practical I: C	Course Type: Practical	Course Category: Core	H/W 2	Credits 2	Marks 40+60

Course Learning Objectives (CLO)

1. To make the student learn a programming language.
2. Develop a greater understanding of the issues involved in programming language design and implementation.
3. To learn problem solving techniques.
4. Develop an in-depth understanding of functional, logic and object-oriented programming paradigms.
5. To teach the student to write programs in C and to solve the problems.

Course Outcomes (COs)

The Learners will be able to

1. Exercise with basic structure of the C program, declaration and usage of variable.
2. Resolve mathematical and scientific problem.
3. Develop the programs using conditional and iterative statements.
4. Implement array and string concept in C program.
5. Write real time problems using user defined functions

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	L	M	M	L	M
CO2	H	M	H	L	M	M
CO3	L	L	L	H	M	M
CO4	H	H	L	M	L	H
CO5	H	L	M	M	M	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	M	M	M	M	L	M
CO2	L	L	L	L	M	L
CO3	H	H	H	M	L	H
CO4	M	M	M	M	H	M
CO5	L	L	L	M	L	L

Practical Programs (Hour 30)

1. Input and Output Operations. (K1,K2)
2. Decision Making Statements. (K1,K2)
3. Arrays and Looping Statements. (K1,K2)
4. Two Dimensional Arrays. (K2,K6)
5. The Concept of Functions. (K2,K6)
6. Recursion. (K1,K6)
7. Character Arrays. (K1,K6)
8. Structures and Unions. (K1,K6)

SEMESTER I
UCCSC20 –PRACTICAL II: DIGITAL LOGICS AND FUNDAMENTALS

Year: I	Course Code: UCCSC20	Title of the Course:	Course Type:	Course Category :	H/W	Credits	Marks
Sem: I		Practical II: Digital Logics and Fundamentals	Practical	Core	3	2	100

Course Learning Objectives (CLO)

1. The objective of this course is to provide the fundamental concepts associated with the digital logic and Circuit design.
2. To introduce the basic concepts and laws involved in the Boolean algebra and logic families and digital circuits.
3. To familiarize with the different number systems, logic gates and combinational and sequential circuits utilized in the different digital circuits and systems.
4. The course will help in design and analysis of the digital circuit and system.
5. The course will help in design and analysis of the Combinational circuits and system.

Course Outcomes (COs)

The Learners will be able to

1. Understand working of logic families and logic gates.
2. To minimize the Boolean expression using Boolean algebra.
3. Design and analyze the combinational and sequential logic circuits.
4. Simulate digital circuits and implement them using hardware component.
5. Design and implementation of combinational circuits.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	L	M
CO2	H	M	H	L	M	M
CO3	L	L	M	H	M	M
CO4	H	H	L	L	M	H
CO5	H	L	M	M	M	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	L	H	L	L
CO2	M	H	L	H	L	M
CO3	H	H	H	H	M	M
CO4	H	M	H	H	M	L
CO5	H	M	H	H	H	L

(Low -L, Medium -M, High-H)

Unit I (Hour 9)

1.1 Number System - Binary Numbers - Conversion from one number system to other – Number Base Conversion. (K2)
1.2 Octal and Hexadecimal Numbers – Complements - Binary Arithmetic. (K3)
1.3 Binary Codes - Binary Logics - Logic gates. (K3)
1.4 Truth Table - Boolean Algebra - Basic Definition. (K2,K3)
1.5 Axiomatic Definition of Boolean Algebra. (K2)
1.6 Basic Theorems and properties of Boolean Algebra – Duality - Basic theorems. (K3)

Unit II (Hour 9)
2.1 Simplification of Boolean Function - The Map method. (K3,K4)
2.2 Two and Three Variable Maps - Four Variable Maps. (K5)
2.3 Five and Six Variable Maps - Tabulation Methods - McClausky Tabulation Methods. (K4, K5)
2.4 Combinational Logic – Adders - Half Adder - Full Adder. (K2)
2.5 Subtractor – Half Subtractor – Full Subtractor. (K2)
2.6 Encoders – Decoders – Multiplexer - Demultiplexer. (K1, K2)

Unit III (Hour 9)
3.1 Design of Circuits using Decoders/ Multiplexer, Demultiplexer. (K6)
3.2 Sequential Logic – Introduction - Flip Flops - Basic Flip Flop Circuits. (K2)
3.3 Closed RS Flip flops - JK Flip flops - D Flip flops - T Flip flops. (K2)
3.4 Registers - Registers with parallel load. (K3)
3.5 Shift Registers - Serial transfer - Bidirectional shift Register with parallel Load. (K3)
3.6 Serial Addition using sequential logic. (K3)

Unit IV (K6) (Hour 9)
1. Verify the truth table of logic gates AND, OR and NOT gate.
2. Construct the Half Adder Circuit using Logic Gates.
3. Construct the Full Adder Circuits using Logic Gates.
4. Construct the Half Subtractor Circuit using Logic Gates.

Unit V   (K6)   (**Hour 9**)

5. Construct the Full Subtractor Circuit using Logic Gates.

6. Implement the Karnaugh Map method as Sum of Product (SOP) using NAND Gate.

7. Implement the Karnaugh Map method as Product of Sum (POS) using NOR Gate.

Text Books

1. Morris M.Mano, "Digital Logic Fundamentals" - Pearson's Education- 5th edition, 2015.

Reference Books

1. Vijendran, "Digital Computer Fundamentals", 1st Edition - Lakshmi Publications, 2001.
2. Thomas M.Floyd, "Digital Fundamentals", 8th Edition-USB Publications, 2009.

Open Educational Resources (OER)
1. Karnaugh Map video Tutorial- http// Youtube/ wjM2RDG5Yti.
2. Full Adder and Half AddER Video Tutorial-http//youtube/FSFNefbKckM.
3. Karnaugh Map – NAND Gate - https://www.youtube.com/watch?v=LuXdFI8iK1U

SEMESTER II

UCCSD20 – DATA STRUCTURES WITH C++

Year: I	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: II	UCCSD20	Data Structures with C++	Theory	Core	4	4	40+60

Course Learning Objectives (CLO)

1. To understand how C++ expands C with object-oriented features.
2. To learn how to implement copy constructors and class member functions.
3. To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
4. To identify problem involving trees and binary search trees.
5. To apply Algorithm for solving problems like sorting, searching, insertion and deletion of data using linked list.

Course Outcomes (COs)

1. Describe the procedural and object-oriented paradigm with concepts of streams, classes, functions, data and objects.
2. Understand dynamic memory management techniques using pointers, constructors, destructors, etc.
3. Describe the concept of function overloading, operator overloading, virtual functions.
4. Identify problem involving trees and binary search trees.
5. Analyse graphs and describe the hash function and concepts of collision and its resolution methods.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	M	M	L	H
CO2	M	L	H	L	M	M
CO3	L	L	M	H	L	M
CO4	M	M	L	M	M	M
CO5	H	L	M	M	M	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	M	M	H
CO2	M	H	M	H	H	L
CO3	H	M	H	L	L	H
CO4	M	H	L	M	H	M
CO5	L	M	H	H	M	M

(Low -L, Medium -M, High-H)

Unit I (Hour 12)

1.1 Principles of OOP – Basic concepts - Benefits – Applications (K2, K4)

1.2 Introduction to C++ –Tokens-Keywords – Identifiers – Variables (K1, K2)

1.3 Operators – Expressions and Control structures. (K1, K2, K4)

1.4 Function Function Prototyping (K4, K5, K6)

1.5 Parameter Passing in Function – Values Returned by Functions (K4, K6)

1.6 Inline Functions – Function Overloading. (K2, K4, K6)

Unit II (Hour 12)

2.1 Classes and Objects - Constructors and Destructors - Introduction (K2, K4, K6)

2.2 Types of Constructors - Destructors - Operator Overloading (K2, K3, K6)

2.3 Inheritance: Introduction – Types - Virtual Base Classes (K3, K4, K5, K6)

2.4 Abstract Classes - Constructors in Inheritance (K2, K4)

2.5 Virtual functions and Polymorphism (K2, K6)

2.6 Pointers to Objects - this Pointer (K2, K6)

Unit III (Hour 11)

3.1 Virtual functions and Polymorphism: Pointers to Objects - this Pointer(K2, K6)

3.2 Pointers to Derived Classes - Virtual Functions- Pure Virtual Functions. (K2, K4)

3.3 Mapping Console I/O Operations - File File streams (K2, K5, K6)

3.4 File operations - File pointers (K2)

3.5 Command Line Arguments (K4, K6)

3.6 Exception handling. (K2, K4, K5, K6)

Unit IV (Hour 13)

4.1 Introduction - Basic Terminology - Data structures - Data structure operation (K2)

4.3 Traversing Linear Arrays - Inserting and Deleting – Searching - Linear Search - Binary Search - Multidimensional Arrays – Pointers - Pointer Arrays(K2)

4.4 Introduction- Linked list - Traversing a linked list - Searching a linked list (K3)

4.5 Single Linked List - Doubly Linked List – Stacks - Arithmetic Expression- Polish Notation – Recursion - Queues. (K2, K3)

4.6 Trees – Introduction - Binary Trees - Traversing Binary Trees – Preorder - In order - Post order. (K3)

Unit V   **(Hour 12)**

5.1 Graphs - Warshall Algorithm Shortest paths. (K2)

5.2 Adjacency - First Search - Depth First Search. (K3, K4)

5.4 Warshall Algorithm Matrix - Path Matrix - Heap Sort. (K2)

5.3 Traversing on Graphs - Breadth Shortest paths - Linked Representation of Graphs. (K3)

5.5 Hashing- Hash Function - Collision Resolution. (K2)

5.6 Open Addressing: Linear Probing and Modifications – Chaining. (K3)

Text Book

1. Balagurusamy E., "Object Oriented Programming with C++", Sixth Edition, Tata McGraw Hill Publication, 2014.

2. Seymour Lipschutz, "Data Structure Schaum's Outline Series", Revised Edition,McGraw Hill Publication, 2011.

Reference Books

1. Herbert Schildt, "The complete Reference C++", 4th Edition, Tata McGraw Hill Publication, 2015.

2. Yashawant P. Kanetkar," Let Us C++", 2nd Edition, BPB Publication, 2003.

3. John R. Hubbard, "Programming with C++", 2nd EditionI, Schaum's Outlines, Tata McGraw Hill Publication, 2009.

4. Ellis Horowitz, Sartaj Sahni, Susan Andeson Freed, "Fundamentals of Data Structures in C&quot, 2nd Edition, Universities Press Pvt Ltd, 2018.

5. YashavantP.Kanetkar," Data Structures through C" , 2nd Edition, BPB Publications, 2003.

6. Alfred V.Aho, John E.Hopcroft, Jeffrey D.Ullman , "Data Structures and Algorithms", 1st Edition, Pearson Education, 2004.

Open Educational Resources (OER)

1.http//beginnersbook.com/2017/08/cpp-oops-concepts/

2.http//www.tutorialspoint.com/cplusplus/cpp_object_oriented.htm

3. http//www.youtube.com/watch?v=h4kUiFOb_v0

4. http://www.ddegjust.ac.in/studymaterial/mca-3/ms-17.pdf

SEMESTER II
UCCSE20- PRACTICAL III: DATA STRUCTURES WITH C++

Year: I	Course Code:	Title of the	Course Type:	Course Category:	H/W	Credits	Marks
SEM: II	UCCSE20	Course: Practical III: Data Structures with C++	Practical	Core	2	2	40+60

Course Learning Objectives (CLO)

1. To build an understanding of basic concepts of object-oriented programming techniques.
2. To develop programming skills in programming language.
3. To write a program to solve various problems.
4. To implement object-oriented techniques using C++ language features.
5. To develop software using object-oriented programming paradigms.

Course Outcomes (COs)

1. Identify the appropriate data structure and algorithm for solving the real world problems.
2. Implement stack and queue techniques using arrays and pointers.
3. Implement the data structure algorithm for polynomial addition.
4. To know the concept of singly linked list.
5. To implement the concept of tree traversals using the algorithm.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	L	H
CO2	L	M	L	M	M	M
CO3	H	L	M	H	M	L
CO4	H	H	H	H	M	H
CO5	H	M	M	M	M	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	L
CO2	M	H	H	M	H	M
CO3	L	M	M	H	H	L
CO4	H	H	H	H	H	H
CO5	M	M	M	L	H	M

(Low -L, Medium -M, High-H)

Practical Programs (K6)   **(Hour 30)**

1. Stack using Array in C++.
2. Queue using Array in C++.
3. Stack using pointers in C++.
4. Queue using pointers in C++.
5. Polynomial Addition using Array in C++.
6. Singly Linked List in C++.
7. Depth First Search for Graph in C++.
8. Binary Tree Traversal using Recursion in C++.

UCCSF20 - PRACTICAL IV: MICROPROCESSOR

Year: I	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: II	UCCSF20	Practical IV: Microprocessor	Practical	Core	3	2	40+60

Course Learning Objectives (CLO)
 1. To develop background knowledge and core expertise of microprocessor.
 2. To know the importance of different peripheral devices and addressing modes.
 3. To know the design aspects of Instruction Set.
 4. To know the concept of Data Manipulation.
 5. To understand and implement the concept of Assembly Code.

Course Outcomes (COs)
The Learners will be able to
 1. Understand the Architecture of a typical microprocessor.
 2. Understand different addressing modes and instructions of 8086 design and to develop assembly language programs using software interrupts.
 3. Understand the concepts of Instruction sets.
 4. Write the assembly code for 8 bit and 16 bit data manipulation.
 5. Write the assembly code for Sorting and reversing elements.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	M	M	L	H
CO2	L	M	L	M	M	M
CO3	M	L	M	H	L	L
CO4	M	M	H	H	M	M
CO5	H	M	M	M	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	M	H	H	H	M	M
CO2	H	H	H	H	M	L
CO3	H	H	M	M	M	M
CO4	H	H	H	H	H	L
CO5	H	H	H	H	H	M

Unit I   **(Hour 9)**

1.1 Introduction – Introduction to Intel processors. (K2,K4)

1.2 Minimum mode. (K2,K4)

1.3 Maximum mode. (K2,K4)

1.4 Pin layouts of 8086. (K2,K4)

1.5 Pin functions of 8086. (K2,K4)

1.6 8086 Architecture. (K2,K4)

Unit II   **(Hour 9)**

2.1 Machine language and Assembly language. (K1,K2)

2.2 Programmer's model of 8086 – The 8086 addressing modes. (K1,K2)

2.3 Data transfer instructions. (K1,K2)

2.4 Arithmetic instructions. (K1,K2)

2.5 Logic Instructions - Shift Instructions. (K1,K2)

2.6 Rotate Instructions. (K1,K2)

Unit III   **(Hour 9)**

3.1 Compare instructions. (K2)

3.2 Jump instructions. (K2)

3.3 Loop Instructions. (K2)

3.4 Loop Instructions. (K2)

3.5 String Instructions. (K2)

3.6 String Instructions. (K2)

Unit IV   **(Hour 9)**

1. Write the assembly code in Data Manipulation using 8 Bit. (K2,K3)
2. Write the assembly code in Data Manipulation using 16 Bit. (K2,K3)
3. Write the assembly code to find the largest number in an array. (K2,K3)

Unit V (Hour 9)

4. Write the assembly code to sort the data in ascending order. (K2,K3)
5. Write the assembly code for Block Move. (K2,K3)
6. Write the assembly code to reverse array elements. (K2,K3)

Text Books

1. V.Viyaendran, "Fundamentals of Microprocessor 8086: Architecture, Programming and Interfacing", Viswanathan, S., Printers & Publishers Pvt Ltd, 2009.
2. Ramesh Gaonkar, "Microprocessor Architecture: Programming and Applications with 8085" – 6th Edition –Penram International Publishing Limited, 2013.

Reference Books

1. Dr. D. K. Kaushik, "An Introduction to Microprocessor 8085" – DhanpatRai Publishing Company, 2014.
2. Nagoor Kani, "Microprocessor 8086 Programming & Interfacing" – RBA Publications, 2004.

Open Educational Resources (OER)

1. http//www.pdfdrive.com/the-intel-microprocessors-80868088-8018680188-80286-80386-80486-pentium-pentium-pro-e89806753.html
2. http//www.slideshare.net/gpkm/microprocessor-8086
3. http//vardhaman.org/wp-content/uploads/2018/03/Unit-1%20MPMC.pdf
4. http://gbcramgarh.in/e-learning-study-materials/BCA/computer/THE%208086%20MICROPROCESSOR/9780198079064.pdf

UCCSG20 - JAVA PROGRAMMING

Year: II	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: III	UCCSG20	Java Programming	Theory	Core	4	4	40+60

Course Learning Objectives (CLO)

1. To give the knowledge of the structure and model of the Java programming language.
2. Use the Java programming language for various programming technology.
3. To develop software in the Java programming.
4. Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirement.
5. To decide whether the Java programming language provides the required solutions.

Course Outcomes (COs)

The Learners will be able to

1. Able to understand the use of OOPs concepts.
2. Able to solve real world problems using OOP techniques and to understand the use of polymorphism and Inheritance.
3. Able to understand the use of Packages and Interface in Java.
4. Able to develop and understand exception handling, multithreaded applications with synchronization.
5. Able to design GUI based applications and develop AWT and applets for web applications.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	M	H
CO2	L	M	L	M	M	M
CO3	M	L	L	M	L	M
CO4	L	L	M	H	M	L
CO5	H	M	M	M	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	M	L	M	M
CO3	L	L	H	H	H	H
CO4	H	H	H	L	H	H
CO5	L	L	H	M	H	H

Unit I (Hour 12)

1.1 Introduction to Java (K2)

1.2 Features of Java (K4)

1.3 Lexical issues (K2, K5)

1.4 Data types – Variables (K2)

1.5 Operators - Type conversion and casting (K2, K3, K4)

1.6 Control Statements (K2, K4)

Unit II (Hour 12)

2.1 Arrays – Strings (K2, K4)

2.2 Classes and Objects – Constructors (K2, K3, K4)

2.3 Overloading method – Access Control - Static and Fixed method (K2, K4)

2.4 Inner Class - String class (K2, K3, K4)

2.5 Inheritance (K2, K3)

2.6 Overriding Method - Using Super Class. (K2, K3, K6)

Unit III (Hour 12)

3.1 Input/Output: Exploring Java I/O: The Java I/O classes and Interfaces (K2, K3, K5)

3.2 File (K2, K4, K6)

3.3 The Stream Classes (K2, K4)

3.4 Packages - Access Protection (K2, K3, K4)

3.5 Importing Packages (K2, K4)

3.6 Interfaces. (K2, K4, K5)

Unit IV (Hour 12)

4.1 Exception Handling: try, catch (K2, K4)

4.2 Throw and Throws (K2, K4)

4.3 Finally (K2, K4)

4.4 Thread (K2, K3, K6)

4.5 Multithreading: Creating a Thread. (K2, K3, K6)

4.6 Executing threads (K5)

Unit V (Hour 12)

5.1 The Java Applet and Interface (K2)

5.2 HTML Interface (K2)

5.3 getDocumentBase() and getCodeBase() (K4)

5.4 Event Handling (K4, K6)

5.5 Working with Windows (K4)

5.6 AWT Classes. (K5, K6)

Text Book

    1. Herbert Schildt (2018). The Complete Reference: Java 2, Tata McGraw Hill Publication, 10th Edition.

Reference Books

    1. C. Muthu, "Programming with Java", 2nd Edition, Tata McGraw Hill Publishing, 2015.

    2. E.Balagurusamy, "Programming with Java: A Primer", 4th Edition, Tata McGraw Hill Publication, 2015.

Open Educational Resources (OER)

    1. http//www.tutorialspoint.com/java/index.htm

    2. http//www.geeksforgeeks.org/java-programming-basics/

    3. http//www.youtube.com/watch?v=eIrMbAQSU34

SEMESTER III

UCCSH20 – PRACTICAL -V: PROGRAMMING IN JAVA

Year: II	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem:III	UCCSH20	Practical - V: programming in Java	Practical	Core	2	2	100

Course Learning Objectives (CLO)

1. To introduce the object-oriented programming concepts.
2. To understand object-oriented programming concepts and apply them in solving problems.
3. To introduce the principles of inheritance and polymorphism and demonstrate how they relate to the design of abstract classes.
4. To introduce the concept of exception handling and multi-threading.
5. To introduce the design of graphical user interface using applets and AWT controls.

Course Outcomes (COs)

The Learners will be able to

1. Explain about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.
2. Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods and I/O Streams.
3. Demonstrate the concepts of Packages and Interface.
4. Evaluate the Java programs to implement error handling techniques using exception handling.
5. Design GUI based applications and develop applets for web applications.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	M	M	M	H
CO2	L	M	L	M	M	M
CO3	M	H	L	H	L	H
CO4	L	L	M	H	M	L
CO5	H	H	M	M	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	H	M	M
CO2	L	H	M	M	H	H
CO3	M	H	H	M	H	H
CO4	M	M	H	H	M	M
CO5	L	M	M	H	M	M

Practical Programs   **(Hour 30)**

1. Implementing String manipulation using character Array. (K1, K3, K5)

2. Implementing Input and Output Stream. (K1, K3, K5)

3. Implementing Packages and Interface. (K3, K5)

4. Implementing Exception handling. (K3, K5)

5. Implementing Real time application using multithread. (K3, K5)

6. Implementing Applet using Graphics class. (K3, K5)

7. Implementing AWT controls. (K3, K5)

8. Implementing Colors and fonts. (K3, K5)

9. To create any applications using Applets and AWT. (K5)

UCCSI20 – PRACTICAL-VI: WINDOWS PROGRAMMING WITH VB.NET

Year: II	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: III	UCCSI20	Practical VI: Windows Programming with VB.NET	Practical	Core	4	2	40+60

Course Learning Objectives (CLO)
1. To understand the concepts of Windows Programming.
2. To understand VB.NET syntax, program structure, properties and modules.
3. Prepare students theoretically and practically to apply acquired knowledge and skills in producing programs in VB.NET.
4. Prepare students to create applications using GUI concepts.
5. To create simple applications.

Course Outcomes (COs)

The Learners will be able to
1. Explain the concepts of windows programming.
2. Create windows by using different basic elements and resources.
3. Develop real time applications using VB.NET.
4. Understand the impact of VB.NET on business.
5. Create a user interface following good GUI design guidelines.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	M	M	M	H
CO2	L	L	L	M	M	M
CO3	M	M	M	L	H	H
CO4	L	L	M	M	M	L
CO5	H	H	M	M	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	H	M	M
CO2	H	H	M	M	H	H
CO3	H	H	H	M	H	H
CO4	M	M	H	H	M	M
CO5	M	M	M	H	M	M

Unit I (Hour 10)

1.1 Introduction about the .NET Framework. (K1,K2)

1.2 Visual Studio Integrated Development Environment – Introduction to VB.NET. (K1,K2)

1.3 VB.NET Fundamentals – Variables – Data Types. (K1,K2)

1.4 Arrays – Control Flow Statements. (K1,K2)

1.5 Function and Procedures. (K1,K2)

Unit II (Hour 10)

2.1 Implementing OOPS in VB.NET – Classes. (K2,K6)

2.2 Constructors – Inheritance – Static classes. (K2,K6)

2.3 Interfaces - Exception Handling – Collections. (K2,K6)

2.4 Arrays – Array list Collection. (K2,K6)

2.5 Handling Characters, Strings and Dates. (K2,K6)

2.6 File I/O Operations. (K2,K6)

Unit III (Hour 10)

3.1 Overview of Windows Programming. (K2)

3.2 Event driven programming – GUI concepts. (K2)

3.3 Data Types – Resources – Windows Messages. (K2)

3.4 Basic Drawing GDI – Device Context. (K2)

3.5 Dots and Lines - Creating the window – Displaying the window. (K2)

3.6 Text Output – Scroll Bars – Keyboard– Mouse – Menus. (K2)

Unit IV (Hour 15)

1. Write a VB.NET program to accept a character from keyboard and check whether it is vowel or not. Also display the case of that character. (K1,K6)
2. Write a Vb.net program to add the elements of an array. (K1,K6)
3. Design a form and event handler for keyboard and mouse events. (K1,K6)
4. Console Application to handle exceptions. (K1,K6)

Unit V (Hour 15)

5. Window Application to use various controls in VB.NET. (K1,K6)
6. Window Application to create Notepad using Menu. (K1,K6)
7. Window Application to perform file operations. (K1,K6)
8. Design Digital Clock in VB.NET. (K1,K6)

J) Text Book

1. Steven Holzner, "Visual Basic.Net, Black Book Series", Dreamtech Press, 1st Edition, 2005.
2. Charles Petzold, "Programming Windows", 6th Edition, 2012, Microsoft Press.

K) Reference Books
1. David I. Schneider , "Introduction to Programming Using Visual Basic", University of Maryland, Pearson, 10th Edition, 2017
2. Jeffery R. Shapiro, "The Complete Reference Visual Basic .NET", Tata McGraw Hills, 1st Edition, 2002.
3. Evangelos Petroutsos, Ali Bilgin, "Mastering Visual Basic. NET Database Programming", BPB Publications, 1st Edition, 2002.

UCCSJ20 – OPERATING SYSTEM

Year: II	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: IV	UCCSJ20	Operating system	Theory	Core	4	4	40+60

Course Learning Objectives (CLO)
1. To describe basic components of operating system.
2. To understand basic principles used in the design of modern operating systems.
3. To illustrate the general architecture of computers.
4. To Understand and analyze theory.
5. To analyze, processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O.

Course Outcomes (COs)

The Learners will be able to
1. Acquire the Knowledge of important computer system resources and the role of operating system in their management policies and algorithms.
2. Understand the process management policies and scheduling of processes by CPU.
3. Evaluate the requirement for process synchronization and coordination handled by operating system.
4. Describe and analyze the memory management and its allocation policies.
5. Edify and evaluate the storage management policies with respect to different storage management technologies.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	M	M	M	H
CO2	H	L	L	M	L	M
CO3	M	L	L	L	H	L
CO4	L	L	M	H	M	L
CO5	H	H	M	M	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	M	L	H	H	L
CO2	L	M	M	H	L	M
CO3	M	L	H	M	M	H
CO4	M	M	L	M	L	M
CO5	M	L	H	M	H	L

(**Low -L, Medium -M, High-H**)

Course Syllabus

Unit I (**Hour 12**)

1.1 Linux**:** Introduction, Brief history. Unix Components/Architecture - Features of Unix. (K1)

1.2 Basic Command Directory and File. (K1)

1.3 Command pwd, ls, cd, cp, mv, rm, mkdir, rmdir, chmod. (K1)

1.4 Full and Relative Pathnames, File and Directory Naming Conventions. (K1)

1.5 Wildcard Characters (K1)

1.6 Ownership and Permission: chmod, chgrp, chown. (K1)

Unit II (**Hour 12**)

2.1 Shell Programming Language: Naming Shell Programs. (K2)

2.2 Shell Variables and Arguments. (K2)

2.3 Command Line Arguments. (K2)

2.4 Looping and Conditional Execution: if..then..else..elseif..fi. (K2)

2.5 while...do, for..do..done, for, while, until and case statements. (K2)

2.6 break and continue, true and false commands. (K2)

Unit III (**Hour 12**)

3.1 System calls - Types of System calls (K5)

3.2 Process Management: Process Concepts - Inter Process Communication (K5)

3.3 Multithreaded Programming: Multithreading Models. (K5)

3.4 Process Scheduling: Basic Concepts. (K5)

3.5 Scheduling Criteria - Scheduling Algorithms. (K5)

3.6 Deadlock: Deadlock Characterization - Deadlock Avoidance. (K5)

Unit IV (**Hour 12**)

4.1 Memory Management: Background. (K4)

4.2 Swapping - Contiguous Memory Allocation. (K4)

4.3 Paging - Structure of the Page Table. (K4)

4.4 Segmentation. (K4)

4.5 Virtual Memory Management: Demand Paging. (K4)

4.6 Page Replacement - Thrashing. (K4)

Unit V   (**Hour 12**)
5.1 File System: File Concept. (K1, K2, K4)
5.2 Access methods - Directory Structure. (K1, K2, K4)
5.3 Implementing File System File System Structure and Implementation. (K1, K2, K4)
5.4 Allocation Methods. (K1, K2, K4)
5.5 Free Space Management. (K1, K2, K4)
5.6 Secondary Storage Structure Disk Structure - Disk Scheduling. (K1, K2, K4)

J) Text Books
1. Behrouz A. Forouzan, Richard F. Gilberg.Thomson, "Unix and shell Programming", 1st Edition, 2002.
2. Silberschatz Galvin Gagne, "Operating System Principles", 7th Edition, Prentice Hall, 2011.

K) Reference Books
1. Sumitabha Das, "Your UNIX the ultimate guide", 2nd Edition, TMH, 2007.
2. Graham Glass, King Ables, "UNIX for programmers and users", 3rd edition, Pearson Education.
3. Richard Rosinski, Douglas Host, Kenneth Rosen, Rachel Klee, "UNIX: The Complete Reference", 2nd Edition, 2007.
4. Andrew S. Tanenbaum, "Operating Systems, Design and Implementation", 2nd Edition, Prentice Hall of India, 2012.

Open Educational Resources (OER)
1. http//www.amazon.in/UNIX-Shell-Programming-Behrouz-Forouzan/dp/8131503259/ref=asc_df_8131503259/?tag=googleshopdes-21&linkCode=df0&hvadid=413541290540&hvpos=&hvnetw=g&hvrand=10951669279431710762&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=20469&hvtargid=pla-870900476121&psc=1&ext_vrnc=hi
2. http//www.amazon.in/Operating-Systems-Implementation-Prentice-Hall-Software/dp/0136374069
3. https://www.youtube.com/watch?v=vBURTt97EkA&list=PLBlnK6fEyqRiVhbXDGLXDk_OQAeuVcp2O

UCCSK20 – PRACTICAL VII: LINUX

Year: II Sem: IV	Course Code: UCCSK20	Title of the Course: Practical VII: Linux	Course Type: Practical	Course Category: Core	H/W 2	Credits 2	Marks 40+60

Course Learning Objectives (CLO)
1. To provide the skills in Linux Shell Script.
2. To learn programmatically to implement simple OS mechanisms.
3. To understand shell script in files.
4. To learn about standard I/O and system calls.
5. To learn suspending and resuming process.

Course Outcomes (COs)

 The Learners will be able to
1. Get familiar with the GCC compiler and files.
2. Understand the high-level structure of the Linux kernel both in concept and source code.
3. Acquire a detailed understanding of one aspect (the scheduler) of the Linux kernel.
4. Learn to develop software for Linux systems.
5. Obtain a foundation for an advanced course in operating systems.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	M	M	M	H
CO2	L	L	L	M	H	M
CO3	M	M	L	L	H	L
CO4	L	L	M	H	M	H
CO5	H	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	L	L	M
CO2	H	M	M	L	L	M
CO3	M	H	M	M	L	L
CO4	L	M	L	M	L	M
CO5	M	L	H	M	H	L

(Low -L, Medium -M, High-H)

Practical Programs (K6**)** (Hour 30)

1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
2. Write a shell script that displays a list of all files in the current directory to which the user has read, write and execute permissions.
3. Write a shell script to find the factorial of a given number.
4. Write a C program that makes a copy of a file using standard I/O and system calls.
5. Implement in C the following Linux commands using system call
    (a) cat   (b) ls   (c) mv.
6. Write a C program to list every file in a directory, its inode number and file name.
7. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex: ls -l | sort.
8. Write a C program that illustrates suspending and resuming processes using signals.
9. Write a C program that implements a producer-consumer system with two processes (using semaphores).
10. Write a C program that illustrates two processes communicating using shared memory.

UCCSL20 – PRACTICAL VIII: PYTHON PROGRAMMING

Year: II Sem: IV	Course Code: UCCSL20	Title of the Course: Practical VIII: Python Programming	Course Type: Practical	Course Category: Core	H/W 3	Credits 2	Marks 40+60

Course Learning Objectives (CLO)

1. To Learn Syntax and Semantics and create Functions in Python.
2. To Handle Strings and Files in Python.
3. To Understand Lists, Dictionaries in Python.
4. To Implement Object Oriented Programming concepts in Python.
5. To Build GUI applications.

Course Outcomes (COs)

The Learners will be able to

1. Understand and comprehend the basics of python programming.
2. Understand and implement modular approach using Python.
3. Learn and implement various data structures provided by python library including string, list, dictionary and its operations etc.
4. Understand about files and its applications.
5. Develop real-world applications using oops, files and exception handling provided by python.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	M	H
CO2	L	L	L	M	H	L
CO3	M	L	M	H	H	L
CO4	M	L	M	H	L	H
CO5	H	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	H	H	L
CO2	H	M	M	L	H	M
CO3	M	H	M	M	M	L
CO4	L	H	L	M	L	L
CO5	H	L	H	M	H	L

(Low -L, Medium -M, High-H)

Course Syllabus

Unit I **(Hour 9)**

1.1 Introduction - Numbers and Expression Large Integers – Hexadecimals and Octal. (K1)

1.2 Variables – Statements – Functions - Modules, List and Tuples. (K1)

1.3 Working with String Single - Quoted Strings and Escaping Quotes. (K1)

1.4 Concatenating Strings - String Representations, str and repr. (K1)

1.5 input vs. raw_input - Long Strings. (K1)

1.6 Raw Strings, and Unicode String Operations, String Methods. (K1)

Unit II **(Hour 9)**

2.1 Dictionary: Dictionary Uses - Creating and Using Dictionaries. (K1)

2.2 The dict Function - Basic Dictionary Operations. (K1)

2.3 String Formatting with Dictionaries - Dictionary Methods Conditionals. (K1)

2.4 Loop while Loops - for Loops - Treating Over Dictionaries - Some Iteration. (K1)

2.5 Utilities - Breaking Out of Loops. (K1)

2.6 else Clauses in Loops Abstraction: Abstraction, Object Classes, and Exceptions. (K1)

Unit III **(Hour 9)**

3.1 Files and Staff: Opening Files - File Modes – Buffering. (K1)

3.2 Basic File Method Reading and Writing - Piping Output. (K1)

3.3 Reading and Writing Lines - Closing Files - Using the Basic File Methods. (K1)

3.4 Iteration over file content Doing It Byte by Byte - One Line at a Time. (K1)

3.5 Reading Everything - Lazy Line Iteration with fileinput - File Iterators. (K1)

3.6: Graphical user Interface Basic concepts. (K1)

Unit IV **(Hour 9)**

1. Write a Program to implement Calendar, Date and Time. **(**K6)

2. Write a Program to accept the User's first and last name and prints them in reverse order with a space between them. **(**K6)

3. Write a program to iterate over dictionary. **(**K6)

   a) Write a program to count the numbers of characters in the string and store them in a dictionary data structure. **(**K6)

   b) Write a program to use split and join methods in the string and trace a birthday with a dictionary data structure. **(**K6)

c) Write a program combine lists that combines these lists into a dictionary. **(**K6)

4. Write a unique function to find all the unique elements of a list. **(**K6)

Unit V **(Hour 9)**

5. Write a program read first n lines of a file. (K6)

6. Write a program using class variables and instance variable and illustration of the self-variable. (K6)

   a) Robot. b) ATM.

7. Write a program for Graphical user Interfaces. (K6)

    a) Write a GUI for an Expression Calculator using tk.

    b) Write a program to implement the following figures using turtle.

Text Book

1. Ljubomir Perkovic, "Introduction to Computing Using Python: An Application Development Focus", John Wiley & Sons, 2012.

Reference Books

1. Martin C. Brown, "Python: The Complete Reference" , McGraw Hill Education, 4th edition March 2018.
2. N. Ryan Marvin, Amo S. Omondi , "http//www.packtpub.com/in/tech/python
3. Magnus Lie Hetland , "Beginning Python from Novice to professional", A press Publishers, 3rd Edition, 2008.

Open Educational Resources (OER)

1. http//www.amazon.in/Introduction-Computing-Using-Python-Application/dp/0470618469.
2. http//www.amazon.in/Python-Complete-Reference-Martin-Brown/dp/9387572943.
3. http//www.packtpub.com/in/tech/python.

UCCSM20 -RELATIONAL DATABASE MANAGEMENT SYSTEMS

Year: III	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: V	UCCSM20	Relational Database Management Systems	Theory	Core	5	4	40+60

Course Learning Objectives (CLO)
1. The objective of this course is to expose the students to the fundamentals and basic concepts in relational Data Base Management Systems.
2. This course discusses architecture of Database Systems with concept of relational model and ER model.
3. This course explains techniques for database design, normalization and database recovery and protection.
4. To understand and apply database normalization principles.
5. To analyze the database transaction management, database recovery, security.

Course Outcomes (COs)
The Learners will be able to
1. Demonstrate an understanding of the elementary and advanced features of RDBMS.
2. Apply the SQL commands to create tables and Triggers, insert/update/delete data, and query data in a relational DBMS.
3. Analyze and Design a database based on a data model considering the normalization to a specified level.
4. Apply the storage size of the database and design appropriate storage techniques.
5. Analyze the requirements of transaction processing, concurrency control and avoid redundancy.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	M	H
CO2	M	L	L	M	H	L
CO3	M	M	H	H	H	M
CO4	M	L	M	M	M	H
CO5	H	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	M	M	M	M	M	L
CO2	H	H	H	M	M	M
CO3	H	H	H	H	H	L
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	L

(Low -L, Medium -M, High-H)

Course Syllabus

Unit I (Hour 15)

1.1 File System vs. DBMS Database System Application View of Data Database language. (K1, K4)

1.2 Data Storage & Querying Data Architecture. (K3)

1.3 Database Users and Administrators. (K2)

1.4 Relational Model - Structure of Relational Databases. (K3)

1.5 Database Schemas -Relational Query Languages. (K4)

1.6 Relational Operations. (K3)

Unit II (Hour 15)

2.1 Introduction to SQL: SQL Data Definition Basic Structure. (K1, K2)

2.2 Additional Basic Operations - Set Operations. (K3)

2.3 Aggregate Functions - Null Values - Nested Sub queries. (K2, K3)

2.4 Modification of the Database; Intermediate SQL Join Expressions. (K6)

2.5 Views Transactions - Integrity Constraints SQL Data Types and Schemas. (K3, K4)

2.6 Advanced SQL Triggers. (K4)

Unit III (Hour 15)

3.1 Database Design and the E_R Model: Entity Relationship Model. (K1, K6)

3.2 Constraints Removing - Redundant Attributes ER Diagrams - Reduction to Relational Schemas. (K3. K4)

3.3 ER Design Issues - Extended ER Features Alternative Notations for Modeling Data. (K6)

3.4 Functional Dependencies - Features of Relational designs. (K5, K6)

3.5 Decomposition. (K4, K5)

3.6 Normalization. (K4, K5)

Unit IV (Hour 15)

4.1 Storage and File Structure: Overview of Physical Storage Media. (K2, K3)

4.2 Magnetic disks. (K3)

4.3 RAID Tertiary Storage. (K3, K4)

4.4 File Organization - Organization of records in Files. (K6)

4.5 Data Dictionary. (K1, K3)

4.6 Storage Ordered Indices. (K3)

Unit V   **(Hour 15)**

5.1 Distributed Database Homogeneous and Heterogeneous Databases. (K1, K3)

5.2 Distributed Data Storage - Distributed Transactions – Commit. (K3)

5.3 Protocols - Concurrency Control. (K1, K2)

5.4 Object Based Databases - Complex Data types. (K3)

5.5 Structured Types and Inheritance in SQL. (K2)

5.6 Object identity and Reference types in SQL. (K1)

Text Book

1. Abraham Silberschatz, Henry F.Korth and S.Sundarshan - "Database System Concepts", 6th Edition, McGraw Hill, 2010.

Reference Books

1. R Elmasri, S.B. Navathe - "Fundamentals of Database Systems", 7th Edition - Pearson Education, Addison Wesley, 2011.
2. C.J.Date, A. Kannan and S.Swamynathan - "An Introduction to Database System", 8th Edition - Pearson Education, 2006.

Open Educational Resources (OER)

1. http//itbook.download/topic/database_system_concepts_7th_edition_Oi
2. http//beginnersbook.com/2015/04/rdbms-concepts/
3. http//www.youtube.com/watch?v=KaIRmVD-v3U
4. http//www.youtube.com/watch?v=hIh5-Y1QwFw
5. http//www.youtube.com/watch?v=obb7SlUmKQE
6. http//www.youtube.com/watch?v=aUyqZxn12sY

UCCSN20 .NET PROGRAMMING IN C#

Year: III Sem: V	Course Code: UCCSN20	Title of the Course: .NET Programming in C#	Course Type: Theory	Course Category: Core	H/W 5	Credits 4	Marks 40+60

Course Learning Objectives (CLO)

1. Understand code solutions and compile C# projects within the .NET framework.
2. Design and develop professional Console and Window based .NET application.
3. Demonstrate knowledge of object-oriented concepts design user experience and functional requirements C#.NET application.
4. Understand and implement string manipulation, events and exception handling within .NET application environment.
5. Identify and resolve problems in C#.NET window based application.

Course Outcomes (COs)

The Learners will be able to

1. Understand the concepts of .NET Framework and C#.
2. Apply the usage of Methods, Arrays and Strings.
3. Interpret the concepts of Constructors, Inheritance and Interfaces.
4. Analyze Operator Overloading, Delegates, Events and Exceptions.
5. Create Windows Applications and Web - based Applications.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	M	M	M	H
CO2	M	H	L	M	H	L
CO3	H	M	L	L	H	L
CO4	M	L	M	M	M	M
CO5	H	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	M	M	H	H	H	M
CO3	M	H	M	M	M	M
CO4	M	M	H	M	H	L
CO5	M	M	H	H	H	L

Course Syllabus

Unit I (Hour15)

1.1 Introduction – Evolution of C# – Characteristics of C# – Applications of C#. (K2)

1.2 Origins of .NET Technology – .NET Framework – Common Language Runtime. (K2)

1.3 User and Program Interfaces – .NET Languages. (K2)

1.4 Benefits of the .NET Approach – Simple C# Program(K6)

1.5 Namespaces – Providing Interactive Input. (K2)

1.6 Literals, Variables and Data Types – Decision Making and Branching Statements. (K1)

Unit II (Hour 15)

1.1 Decision Making and Looping Statements – Methods in C#. (K1, K2)

2.2 Declaring Methods – Invoking Methods – Nesting of Methods. (K2)

2.3 Method Parameters-Pass by Value – Pass by Reference – Output Parameters – Method Overloading. (K2)

2.4 One Dimensional Arrays – Creating an Array – Two Dimensional Arrays. (K1)

2.5 Array List Class –Manipulating Strings – Creating Strings – String Methods. (K2,K3)

2.6 Inserting strings – Comparing Strings – Finding Substrings – Array of Strings. (K2,K3)

Unit III (Hour 15)

3.1 Classes and Objects – Defining a Class – Adding variables and methods. (K2).

3.2 Creating objects – Constructors – Member Initialization – this Reference. (K2)

3.3 Nesting of Classes – Indexers – Classical Inheritance – Containment Inheritance. (K1.K2)

3.4 Defining a subclass – Defining Subclass Constructors – Multilevel Inheritance – Hierarchical Inheritance (K1.K2)

3.5 Overriding Methods – Defining an interface – Implementing interfaces. (K3)

3.6 Interfaces and Inheritance – Explicit interface implementation. (K2)

Unit IV (Hour 15)

4.1 Need for Operator Overloading – Defining Operator Overloading. K2)

4.2 Overloading Binary Operators Overloading Comparison Operators – Delegate Declaration Delegate Methods. (K3)

4.3 Delegate Instantiation – Delegate Invocation. (K3)

4.4 Using Delegate - Events – Exceptions. (K3,K4)

4.5 Types of errors – Multiple Catch Statements – Exception Hierarchy. (K2)

4.6 General Catch Handler – Using Finally Statement. (K2)

Unit V (Hour15)

5.1 Creating Window Forms. (K6)

5.2 Customizing a Form. (K6)

5.3 Creating a Windows Application. (K6)

5.4 Running a Windows Application. (K6)

5.5 Creating Web – based Application on .NET. (K6)
5.6 Creating a .NET application to send SMS to mobile phones. (K6)

Text Book
1. E. Balagurusamy, "Programming in C#", 4th Edition, Tata McGraw Hill Education, 2017.

Reference Books
1. Herbert Schildt, "Complete Reference C#", Tata McGraw-Hill, 2010.
2. John Sharp, "Microsoft Visual C# Step by Step", 8th Edition, PHI Publications, 2016.
3. Harsh Bhasin, "Programming in C#", 1st Edition, Oxford University Press, 2014.

Open Educational Resources (OER)

1. https://www.youtube.com/watch?v=SXmVym6L8dw&list=PLAC325451207E3105
2. https://learn.microsoft.com/en-us/dotnet/csharp/
3. https://www.tutorialspoint.com/csharp/index.htm

UCCSO20 - DATA COMMUNICATION AND NETWORKING

Year: III	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: V	UCCSO20	Data Communication and Networking	Theory	Core	5	4	40+60

Course Learning Objectives (CLO)
1. To discuss and explain about basics of data communication and networking concepts.
2. To introduce analysis and design of computer and communication networks.
3. Understand the network layered architecture and the protocol stack.
4. Design the basic configuration of routers and switches.
5. Resource sharing in the computer network to provide high Reliability.

Course Outcomes (COs)

The Learners will be able to
1. To gain expertise in some specific areas of networking such as the design and maintenance of individual networks.
2. Explain the types of Transmission Media with Real-Time Applications.
3. Apply Time and Frequency concept of analysis.
4. Manage Network functions for an Organization.
5. Analyze various Routing Algorithms and Protocols.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	M	H
CO2	M	H	M	M	H	L
CO3	M	L	L	L	M	M
CO4	M	H	M	M	M	M
CO5	H	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	H	H	L
CO2	H	H	H	L	L	M
CO3	M	H	H	M	M	L
CO4	H	M	L	M	M	H
CO5	H	L	L	M	H	L

Course Syllabus

Unit I   (**Hour14**)

1.1 Data Communication Data Networking and the Internet - Data Communications and Networking for Today's Enterprise. (K1, K2)

1.2 Communications Model - Data Communications Networks. (K1, K2)

1.3 The Internet Protocol Architecture - TCP/IP and Internet Based Applications the Need for a Protocol Architecture - The TCP/IP Protocol Architecture. (K1, K2)

1.4 The OSI Model Standardization within Protocol Architecture - Traditional Internet Based Applications. (K1, K2)

1.5 Multimedia Data Transmission - Concepts and Terminology. (K1, K2)

1.6 Analog and Digital Data Transmission -Transmission Impairments - Channel Capacity. (K1, K2)

Unit II   (**Hour16**)

2.1 Transmission Media - Guided Transmission Media. (K2, K3)

2.2 Wireless Transmission - Wireless Propagation. (K2, K3)

2.3 Line of Sight Transmission - Signal Encoding Techniques. (K2, K3)

2.4 Digital Data Digital Signals - Digital Data Analog Signals – Analog Data Digital Signals – Analog Data Analog Signals. (K2, K3)

2.5 Digital Data Communication Techniques - Asynchronous and Synchronous Transmission. (K2, K3)

2.6 Types of Errors - Error Detection - Error Correction - Line Configurations. (K2, K3)

Unit III   (**Hour14**)

3.1 Data Link Control Protocols - Flow Control Error Control. (K3, K4, K5)

3.2 High Level Data Link Control (HDLC) - Multiplexing. (K3, K4, K5)

3.3 Frequency Division Multiplexing - Synchronous Time Division Multiplexing. (K3, K4, K5)

3.4 Statistical Time Division Multiplexing - Asymmetric Digital Subscriber Line – xDSL. (K3, K4, K5)

3.5 Spread Spectrum - The Concept of Spread Spectrum - Frequency Hopping. (K3, K4, K5)

3.6 Spread Spectrum - Direct Sequence Spread Spectrum – Code Division Multiple Access. (K3, K4, K5)

Unit IV   (**Hour16**)

4.1 Circuit Switching and Packet Switching - Switched Communications Networks. (K5, K6)

4.2 Circuit Switching Networks - Circuit Switching Concepts. (K5, K6)

4.3 Soft switch Architecture - Packet Switching Principles - X.25 - Frame Relay. (K5, K6)

4.4 Asynchronous Transfer Mode - Protocol Architecture. (K5, K6)

4.5 ATM Logical Connections - ATM Cells. (K5, K6)

4.6 Transmission of ATM Cells - ATM Service Categories. (K5, K6)

Unit V   (**Hour15**)

5.1 Routing in Switched Networks - Routing in Packet Switching Networks. (K4, K5, K6)

5.2 Example Routing in ARPANET. (K4, K5, K6)

5.3 Least Cost Algorithms - Congestion Control in Data Networks. (K4, K5, K6)

5.4 Effects of Congestion - Congestion Control – Traffic Management. (K4, K5, K6)

5.5 Congestion Control in Packet Switching Networks - Frame Relay Congestion Control.
     (K4, K5, K6)

5.6 ATM Traffic Management-ATMGFR Traffic Management. (K4, K5, K6)

Text Book

1. William Stallings, "Data and Computer Communications", 8th Edition, Pearson Education, Inc., 2016.

Reference Books

1. Andrews S. Tanenbaum, "Computer Networks", 4th Edition, Prentice Hall of India Private Limited, 2011

2. Leon Garcia and Widjaja, "Communication Networks, Fundamental Concepts and Key Architecture", 2nd Edition, Tata McGraw Hill, 2001.

3. Behrouz A. Forouzan, "Data Communications and Networking", 4th Edition, Tata McGraw Hill, 2017.

Open Educational Resources (OER)

1. http//www.amazon.in/Computer-Communications-William-Stallings Books/dp/0133506487.

2. http//theswissbay.ch/pdf/Gentoomen%20Library/Networking/Prentice%20Hall%20-%20Computer%20Networks%20Tanenbaum%204ed.pdf

3. https://www.youtube.com/watch?v=-HlJ4psu5aU

UECSA20 - ELECTIVE - I A: SOFTWARE ENGINEERING

Year: III	Course Code: UECSA20	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: V		Elective - I A:Software Engineering	Theory	Elective	5	5	40+60

Course Learning Objectives (CLO)

1. On learning this paper students will gain the knowledge of developing software with its techniques.
2. Be successful professionals in the field with solid fundamental knowledge of software engineering.
3. Capable of team and organizational leadership in computing project settings and have a broad understanding of ethical application of computing-based solutions to societal and organizational problems.
4. Be agile software developers with a comprehensive set of skills appropriate to the needs of the dynamic global computing-based society.
5. Acquire skills and knowledge to advance their career, including continually upgrading professional, communication, analytic and technical skills.

Course Outcomes (COs)

The Learners will be able to

1. Apply the software engineering life cycle by demonstrating competence in communication, planning, analysis, design, construction and deployment.
2. Discuss the function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives.
3. Manage the time, processes and resources effectively by prioritizing competing demands to achieve personal and team goals Identify and analyzes the common threats in each domain
4. Understand architectural design in order to minimize the risks and errors.
5. Test the techniques for ensuring high quality software and understand the capabilities of cost estimation.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	M	M	M	H
CO2	M	H	M	M	H	L
CO3	M	L	L	H	M	M
CO4	L	L	M	M	M	M
CO5	H	M	L	H	M	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	M	L	H	H	L
CO2	H	M	M	L	L	M
CO3	M	H	M	M	M	L
CO4	L	M	L	M	M	M
CO5	M	L	H	M	H	L

(Low -L, Medium -M, High-H)

Course Syllabus

Unit I (**Hour 15)**

1.1 Introduction - Computer Based System Engineering - Emergent System Properties.
(K3, K4, K5)

1.2 System and Their Environment - System Modeling. (K3, K4, K5)

1.3 System Engineering Process - System Procurement. (K3, K4, K5)

1.4 Software Process - Software Process Models. (K3, K4, K5)

1.5 Process Iteration Software Design and Implementation-Software Validation.
      (K3, K4, K5)

1.6 Software Evolution- Automated Process Support. (K3, K4, K5)

Unit II (**Hour 15)**

2.1 Project Management: Management Activities. (K2)

2.2 Project Planning. (K2)

2.3 Project Scheduling - Risk Management. (K2)

2.4 Software Requirement: Functional and Non_Functional. (K2)

2.5 Functional Requirements. (K2)

2.6 User Requirements - System Requirements Software Requirements Documents. (K2)

Unit III (**Hour 15)**

3.1 Requirement Engineering Processes - Feasibility Study. (K4)

3.2 Requirement Elicitation and Analysis. (K4)

3.3 Requirement Validation - Requirements Management. (K4)

3.4 System Model: Context Models. (K4)

3.5 Behavioural Models. (K4)

3.6 Data Models – Object Models. (K4)

Unit IV (**Hour15)**

4.1 Architectural Design: Architectural Design Decisions. (K2)

4.2 System Organization - Modular Decomposition Styles.

4.3 Control Styles - User Interface Design. (K2)

4.4 Design Issues-User Interface Design Process. (K2)
4.5 User Analysis. (K2)
4.6 User Interface Prototyping. (K2)

Unit V (**Hour15**)
5.1 Software Testing: System Testing - Component Testing. (K2, K6)
5.2 Test Case Design - Test Automation. (K2, K6)
5.3 Software Cos Estimation: Productivity. (K2, K6)
5.4 Estimation Techniques. (K2, K6)
5.5 Algorithmic Cost Modelling. (K2, K6)
5.6 Project Duration and Staffing. (K2, K6)

Text Book
1. Ian Sommerville, "Software Engineering", 10th Edition, Pearson Education, 2011.

Reference Books
1. Roger S. Pressman, "Software Engineering: A Practitioner's Approach", 7th Edition, McGraw Hill, New York, 2016.
2. Pankaj Jalote, "An Integrated Approach to Software Engineering", 3rd Edition, Narosa Publication, 2018.

Open Educational Resources (OER)
1. http//ff.tusofia.bg/~bogi/knigi/SE/Software%20Engineering%209th%20ed%20(intro%20txt)%20-%20I.%20Sommerville%20(Pearson,%202011)%20BBS.pdf.
2. http//inspirit.net.in/books/academic/Ian%20Sommerville%20Software%20Engineering,%20 9th%20Edition%20%20%20%202011.pdf.
3. http//www.amazon.in/Integrated-Approach-Software-Engineering/dp/8173197024.

UECSB20- ELECTIVE I B: DATA MINING

Year: III	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: V	UECSB20	Elective I B: Data Mining	Theory	Elective	5	5	40+60

Course Objectives

1. To study the methodology of engineering legacy databases for data warehouse and data mining to derive business rules for decision support systems.
2. To analyze the data, identify the problems, and choose the relevant models and algorithms to apply.
3. To develop research interest towards advances in data mining.
4. To impart the knowledge of how Data Mining could be used to solve scientific and social problems.
5. To expose to various Data Mining techniques.

Course Outcomes (COs)

The Learners will be able to

1. Understand Data Warehouse fundamentals and Data Mining Principles
2. Understand and implement classical algorithms in data mining and identify the application area of algorithms.
3. Compare and evaluate different data mining techniques like, prediction, clustering and association rule mining.
4. Describe complex data types with respect to spatial and web mining.
5. Analyze the temporal mining techniques to detect patterns in the e-world.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	M	H
CO2	M	M	M	M	H	M
CO3	M	L	M	L	M	M
CO4	L	L	M	M	M	M
CO5	H	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	M	M	M	M	M	L
CO2	M	M	M	M	M	L
CO3	H	H	H	H	H	H
CO4	H	H	H	H	M	L
CO5	M	M	M	M	M	M

(Low – L, Medium – M, High – H)

Course Syllabus

Unit I (Hour 14)

1.1 Basic Data Mining Tasks – Data Mining Versus Knowledge Discovery In Databases.
(K1, K2)

1.2 Data Mining Issues – Social Implications of Data Mining. (K2)

1.3 Data Mining from A Database Perspective. Data Mining Technique Introduction – A Statistical Perspective on Data Mining. (K2, K3)

1.4 Similarity Measures. (K1, K2, K3)

1.5 Decision Trees. (K2, K3)

1.6 Neural Networks – Genetic Algorithms. (K1, K2, K3)

Unit II (Hour 16)

2.1 Classification: Introduction. (K1, K2, K3)

2.2 Statistical Based Algorithms. (K2, K3, K5)

2.3 Distance Based Algorithms. (K2, K3, K5)

2.4 Decision Tree Based Algorithms. (K2, K3, K5)

2.5 Neural Network Based Algorithms. (K2, K3, K5)

2.6 Rule Based Algorithms. (K2, K3, K5)

Unit III (Hour 15)

3.1 Clustering: Introduction – Similarity and Distance Measures – Outliers. (K2, K3, K5)

3.2 Hierarchical Algorithms – Partitional Algorithms. (K3, K4, K5)

3.3 Association Rule Introduction - Large Item Sets – Basic Algorithms. (K2, K3, K5)

3.4 Parallel and Distributed Algorithms. (K2, K3, K5)

3.5 Comparing Approaches – Incremental Rules. (K3,K5,K6)

3.6 Advanced Association Rules Techniques – Measuring the quality of Rules. (K3,K5,K6)

Unit IV (Hour 15)

4.1 Web mining: Introduction – Web content Mining Crawlers. (K2, K3)

4.2 Web Structure Mining. (K2, K3)

4.3 Web Usage Mining. (K2, K3)

4.4 Spatial Mining: Overview – Primitives. (K2, K3, K5)

4.5 Generalization and specialization. (K2, K3, K5)

4.6 Spatial Rules- Spatial Classification Algorithm. (K2, K3, K5)

Unit V   **(Hour 15)**

5.1 Temporal Mining: Introduction. (K2)

5.2 Modeling temporal events. (K2, K3)

5.3 Time series. (K2, K3, K5)

5.4 Pattern detection. (K2, K3, K4, K5, K6)

5.5 Sequences. (K2, K3, K5, K6)

5.6 Temporal Associations Rules. (K2, K3, K5)

Text Books

1. Margaret H. Dunham, "Data Mining: Introductory and Advanced Topics", 1st Edition, Pearson Education 2012.

2. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques" - Elsevier 5th Edition, 2009.

Reference Books

1. Soumendra Mohanty, "Data Warehousing DesignDevelopment and best practices", 1st Edition, TataMcGraw Hill, 2005.

2. William H. Inmon, "Building the Datas warehousing", 4th Edition, Wiley India.

3. Rajan Chattamvelli, "Data Mining Methods", 2nd Edition, Narosa Publishing House Pvt. Ltd. New Delhi, 2016 .

Open Educational Resources (OER)

1. http//www.slideshare.net/akannshat/data-mining-15329899

2. http://myweb.sabanciuniv.edu/rdehkharghani/files/2016/02/The-Morgan-Kaufmann-Series-in-Data-Management-Systems-Jiawei-Han-Micheline-Kamber-Jian-Pei-Data-Mining.-Concepts-and-Techniques-3rd-Edition-Morgan-Kaufmann-2011.pdf

3. http//www.youtube.com/watch?v=f7NfO16l04U&list=PL8eNk_zTBST-gN6Y5E-5FZdARXjglYpyT

UCCSP20 - PRACTICAL - IX: RDBMS

Year: III	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: V	UCCSP20	Practical - IX: RDBMS	Practical	Core	2	2	40+60

Course Learning Objectives (CLO)

1. The objective of this course is to expose the students to the fundamentals and basic concepts in relational Data Base Management Systems.
2. To analyze various aggregate functions using SQL commands.
3. To use an SQL interface of a relational DBMS package to create, populate, maintain and query a database.
4. To apply relational database theory and be able to describe relational algebra expression, tuple and domain relation expression from queries.

Course Outcomes (COs)

The Learners will be able to

1. Understand, Appreciate and effectively explain the underlying concepts of Database technologies. Programming PL/SQL including stored procedures, stored functions, cursors, package.
2. Attain a good practical understanding of the Oracle.
3. Design and implement a database schema for a given problem-domain.
4. Prepare various database tables and joins them using SQL commands. Analyze various aggregate functions using SQL commands.
5. Design and develop forms to select, insert, delete and update using Data Source Binding with the front end tool VB .NET.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	M	H
CO2	M	M	M	M	H	M
CO3	M	L	M	L	M	M
CO4	L	L	M	M	M	M
CO5	H	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	L
CO4	H	H	H	H	H	L
CO5	H	H	H	H	H	L

(Low -L, Medium -M, High-H)

Practical Programs   **(Hour 30)**

1. Creating data base tables and using data types. Create table Modify table Drop table (K1, K6)
2. Practical Based on Data Manipulation Adding data with Insert Modify data with Update Deleting records with Delete. (K2, K5)
3. Practical Based on Implementing the Constraints NULL and NOT NULL Primary Key and Foreign Key Constraint Unique, Check and Default Constraint. (K1, K3)
4. Practical for Retrieving Data Using following clauses Simple select clause Accessing specific data with Where Ordered By Distinct and Group By. (K1, K3)
5. Practical Based on Aggregate Functions AVG -COUNT - MAX -MIN -SUM CUBE. (K2, K4)
6. Practical Based on implementing all String functions and Date and Time Functions, union, intersection, set difference. (K3)
7. Implement Nested Queries & JOIN operation. (K3, K6)
8. Practical Based on implementing use of triggers, cursors & procedures. (K1, K3)
9. Make Database connectivity with front end tool VB.NET and Oracle as back end and perform Insertion, Deletion and Updation for the following:
   - Staff Information System
   - Electricity Bill Processing System   (K3,K5)

UCCSQ20- PRACTICAL X: .NET PROGRAMMING IN C#

Year: III Sem: V	Course Code: UCCSQ20	Title of the Course: Practical X: .Net Programming in C#	Course Type: Practical	Course Category: Core	H/W 2	Credits 2	Marks 40+60

Course Learning Objectives (CLO)

1. Understand code solutions and compile C# projects within the .NET framework.
2. Design and develop professional Console and Window based .NET application.
3. Demonstrate knowledge of object-oriented concepts design user experience and functional requirements C#.NET application.
4. Understand and implement string manipulation, events and exception handling within .NET application environment.
5. Identify and resolve problems in C#.NET window based application.

Course Outcomes (COs)

The Learners will be able to

1. Create user interactive web pages using .NET. Understanding different types of AI Agents and its Environments.
2. Develop, implement and create applications with C#.
3. Debug, compile and run a simple application.
4. Create Mobile Application using .NET compact Framework.
5. Design and develop Web based applications on .NET.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	M	M	M	H
CO2	M	H	L	M	L	M
CO3	H	L	M	M	M	L
CO4	L	L	M	M	M	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	M	M	H	H	H	L
CO2	M	M	M	H	H	H
CO3	H	H	H	H	M	M
CO4	M	M	M	M	L	H
CO5	M	M	H	H	H	L

(**Low -L, Medium -M, High-H**)

Practical Programs (K6)   (Hour 30)

 1. Program using Decision Statements.
 2. Program using Iteration Statements.
 3. Program using Method Overloading.
 4. Program using One Dimensional and Two-Dimensional Arrays.
 5. Program using Strings.
 6. Program using Classes and Objects.
 7. Program using Constructors.
 8. Program using Inheritance.
 9. Program using Binary Operator Overloading.
 10. Program using Exception Handling with Multiple Catch Statements.
 11. Designing a Windows Application using Window Forms.
 12. Creating a .NET application to send SMS to Mobile Phones using Web.

UCCSR20-INTERNET AND WEB PROGRAMMING

Year: III Sem: VI	Course Code: UCCSR20	Title of the Course: Internet and Web Programming	Course Type: Theory	Course Category: Core	H/W 5	Credits 4	Marks 40+60

Course Objectives

1. Enhance the programming experience with the help of tools like editors and debuggers that makes JavaScript coding easier and more interactive.
2. Understand the concepts commonly used in dynamic language programming such as higher-order functions and closures.
3. Understand the server-side programming works on the web.
4. Develop dynamic and interactive web pages using the powerful tool and server scripting language like PHP.
5. Understanding File handling concepts to connect, access, and update a MySQL database.

Course Outcomes (COs)

The Learners will be able to

1. Acquire the basic concept of JavaScript.
2. Use operators, variables, arrays, control structures, functions and objects in JavaScript.
3. Create PHP programs that use various PHP library functions, and that manipulate files and directories.
4. Design a responsive web site using HTML, PHP, MySQL and Apache.
5. Build dynamic web pages using JavaScript (Client Side Programming) and apply their knowledge to create interactive websites.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	M	H
CO2	M	M	M	L	M	L
CO3	M	L	M	M	M	L
CO4	L	L	M	M	L	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	M	M	M	M	H
CO2	M	L	L	L	H	L
CO3	H	H	H	H	H	L
CO4	L	H	H	H	M	M
CO5	L	M	M	L	M	L

(Low -L, Medium -M, High-H)

Course Syllabus

Unit I (Hour 15)

1.1 JavaScript: Introduction - Values - Numbers - Strings - Unary Operators. (K1, K2)

1.2 Boolean Values - Empty Values - Automatic Type Conversion. (K2)

1.3 Program Structure: Expressions and Statements- Bindings - Binding Names - The Environment. (K2, K3)

1.4 Functions - The Console Log Function - Return Values - Control Flow - Conditional Execution - While and Do Loops. (K2, K3)

1.5 Indenting Code - For Loops - Breaking out of a Loop - Updating Bindings Succinctly. (K2, K3)

1.6 Dispatching on a Value with Switch – Capitalization – Comments. (K3)

Unit II (Hour 15)

2.1 Functions - Bindings and Scopes - Functions as Values. (K2)

2.2 Declaration Notation - Arrow Functions - The Call Stack. (K3)

2.3 Optional Arguments - Closure – Recursion - Growing Functions. (K3, K4)

2.4 Data Structure Objects and Array - The Were Squirrel - Data Sets – Properties – Methods Objects. (K3, K4)

2.5 Mutability - The Lycanthrope's Log - Computing Correlation - Array Loops - The Final Analysis - Further Arrayology - Strings and their Properties. (K5)

2.6 Rest Parameters - The Math Object - Destructuring – JSON. (K2, K3, K4)

Unit III (Hour 15)

3.1 PHP Programming: Web Server – Apache - PHP Introduction - PHP Install - PHP Syntax - PHP Variables. (K1, K2)

3.2 PHP Echo / Print - PHP Data Types - PHP Strings - PHP Constants - PHP Operators. (K1, K2)

3.3 Control Structures - PHP Functions - Directory Functions - File System Functions. (K2, K3)

3.4 PHP Arrays - PHP Sorting Arrays - PHP Super Global. (K3, K4)
3.5 String Functions - Date and Time Functions. (K4)
3.6 Mathematical Functions - Miscellaneous Functions. (K3, K4)

Unit IV   **(Hour 15)**
4.1 Basic Form Processing (GET And POST Method) - PHP Form Handling. (K1, K2)
4.2 PHP Form Validation - PHP Form Required– URL - E-Mail. (K1, K2)
4.3 PHP Form Complete PHP MYSQL Functions -Connect- Create DB. (K4, K6)
4.4 Create Table- Insert Data - Get Last ID - Insert Multiple. (K3, K4, K5)
4.5 Prepared-Select Data - Delete Data - Update Data - Limit Data. (K3, K4, K5)
4.6 Table Join - Database Driven Application. (K3, K4)

Unit V   **(Hour 15)**
 5.1 PHP Arrays Multi-PHP Date and Time - PHP Include. (K2, K3)
 5.2 PHP File Handling- PHP File Open/Read. (K3)
 5.3 PHP File Create/Write - PHP File Upload-PHP Cookies. (K4, K5)
 5.4 PHP Sessions-PHP Filters - PHP Filters Advanced. (K4)
 5.5 PHP Error Handling - PHP Exception. (K4, K5)
 5.6 COM-DOM-CURL-SOAP. (K5, K6)

Text Books
1. MarijiHaverbeke, "Eloquent Javascript, A Modern Introduction to Programming", 3rd Edition, Published by No Starch Press, 2018.
2. Julie C Meloni, Sams "Teach yourself PHP, MySQL and Apache", 6th edition, Sams Publishing, 2012.

Reference Books
1. Phil Ballard , JavaScript in 24 Hours, 6th Edition, Sams Teach Yourself, 2015.
2. Ed LeckyThompson Steven D. Nowicki Thomas Myer, "Professional PHP6", Wrox Press, Paperback Edition, 2011.

Open Educational Resources (OER)
1. http//www.google.com/url?sa=t&source=web&rct=j&url=http//eloquentjavascript.net/ Eloquent_JavaScript.pdf&ved=2ahUKEwjEhbu95qnrAhVo8XMBHb4VBXEQFjAQeg QIDBAB&usg=AOvVaw1_3Ap2aatDU0qxPmbiCRbI&cshid=1598184133112
2. http//youtu.be/W6NZfCO5SIk
3. http//youtu.be/ZK2UXl9_f54
4. http//youtu.be/5QHBj4brHNM

Year: III	Course Code: UCCSS20	Title of the Course: Cloud Computing	Course Type: Theory	Course Category: Core	H/W 5	Credits 4	Marks 40+60
Sem: VI							

Course Learning Objectives (CLO)

1. Discuss the fundamental concepts in cloud computing technologies.
2. Understand the various technologies.
3. Explain the architecture and concept of different cloud model IaaS, PaaS, SaaS
4. Analyze the fundamental and Cloud Deployment Models Course Outcomes.
5. Understand the concepts of Challenges in Cloud security.

Course Outcomes (COs)

The Learners will be able to

1. Understand the fundamental concepts in cloud computing technologies.
2. Analyze and integrate the cloud enabling services.
3. Analyze the architecture and concept of different cloud model IaaS, PaaS, SaaS.
4. Understand and familiar with the deployment models.
5. Comprehend the Cloud Data Security concepts and how they are addressed with the security mechanisms.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	H	M	M	M	H
CO2	M	M	H	L	M	L
CO3	M	L	M	L	L	H
CO4	L	M	M	M	L	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	M	H
CO2	M	H	H	H	H	M
CO3	L	H	M	H	H	M
CO4	H	L	L	M	L	L
CO5	M	H	H	H	H	L

(Low -L, Medium -M, High-H)

Course Syllabus

Unit I (Hour15)

1.1 Introduction to Cloud Computing: Cloud Computing in Nutt shell. (K2, K4)

1.2 Roots of Cloud Computing- Types of Clouds. (K4, K6)

1.3 Features of a Cloud. (K5)

1.4 Cloud Infrastructure Management. (K4, K6)

1.5 Challenges and Risks. (K4, K6)

1.6 Migrating in to a Cloud. (K4)

Unit II (Hour 15)

2.1 Integration as a Service-Introduction. (K2)

2.2 Onset of Knowledge Era- Evolution of SaaS. (K4, K5)

2.3 Challenges. (K4, K5)

2.4 Approaching the SaaS Integration- New Integration Scenarios. (K4)

2.5 Integration Methodologies-SaaS Integration Services. (K4, K5)

2.6 B2B Services. (K4, K6)

Unit III (Hour 15)

3.1 Cloud Service Model Infrastructure as a Service (IaaS): Introduction to IaaS, Resource Virtualization. (K2, K4)

3.2 Server, Storage, Network. (K2, K4)

3.3 Case studies. (K4, K5, K6)

3.4 Platform as a Service (PaaS): Introduction to PaaS. (K2, K4)

3.5 Cloud platform and Management, Computation, (K3, K4)

3.6 Storage. (K5)

Unit IV (Hour 15)

4.1 Cloud Deployment Model Introduction. (K2)

4.2 Public Deployment Model. (K2, K4, K5)

4.3 Private Deployment Model. (K2, K4, K5)

4.4 Virtual Private Deployment Model. (K4, K5)

4.5 Hybrid Deployment Model. (K4, K5)

4.6 Community Deployment Model. (K4, K5)

Unit V   **(Hour 15)**

5.1 Cloud Challenge. (K2, K4)

5.2 Organizational Readiness. (K2, K4)

5.3 Change management in cloud. (K2, K4)

5.4 Data Security in the Cloud. (K4, K5)

5.5 Legal Issues in Cloud Computing. (K4)

5.6 Production - Readiness for Cloud Services. (K4, K5)

Text Book

1. Rajkumar Buyya, James Broberg and AndrzejM.goscinski, "Cloud Computing: Principles and Paradigms", John Wiley & Sons, 2010.

Reference Books

1. Antony T.Ve1te, Toby J.Velte, Robert Elsen Peter, "Cloud Computing: A Practical Approach", Tata McGraw- Hill Pub, 2010.

2. Haley beard, "Cloud Computing best practices for managing and measuring processes for on-demand computing, applications and Data centers in the cloud with SLAs", Emereo Pvt.Limited,2009.

Open Educational Resources (OER)

1. http://www.mb.net/resources/cloud-computing- resources.aspx.

2. http://www.mastertheboss.com/cloud-computing/in-the-cloud-computing-a- beginners-tutorial.

3. http//www.tutorialspoint.com/cloud_computing/cloud_computing_tutorial.pdf.

Year: III	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: VI	UECSC20	Elective – II A: Software Testing	Theory	Core	5	5	40+60

Course Learning Objectives (CLO)

1. Define the characteristics of testing and software development life cycle models.
2. Recognize the facts of software development models to adopt with product characteristics.
3. Understand different types of testing, their objectives and challenges.
4. Interpret the software products to execute and report test cases.
5. Apply software testing methods and to perform various types of testing in a software project.

Course Outcomes (COs)

The Learners will be able to

1. Test various processes and continue quality improvement.
2. Verify types of errors and fault models.
3. Analyze methods of test generation from requirements.
4. Input space modeling using combinatorial designs.
5. Test adequacy assessment using control flow, data flow and program mutations.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	L	H	M	L	M	L
CO2	M	L	L	L	M	L
CO3	M	L	M	L	L	H
CO4	L	M	M	M	L	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	L
CO2	H	H	H	H	H	L
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	L
CO5	H	H	M	H	M	H

(Low -L, Medium -M, High-H)

Course Syllabus

Unit I   (Hours 15)
1.1 A Perspective on Testing **-** Basic Definitions. (K1)
1.2 Test Cases- Insights from a Venn Diagram. (K1, K2)
1.3 Identifying Test Cases – Specification - Based Testing - Code-Based Testing. (K2)
1.4 Fault Taxonomies- Levels of Testing – Examples - Generalized Pseudocode. (K1, K2, K3)
1.5 The Triangle Problem - Problem Statement- Discussion. (K2, K4)
1.6 Traditional Implementation - Structured Implementations. (K2)

Unit II   (Hours 15)
2.1 Role of Testing - Verification and Validation. (K1, K2)
2.2 Failure, Error, Fault, and Defect -Notion of Software Reliability. (K2, K3)
2.3 Objectives of Testing - What Is a Test Case? (K2)
2.4 Expected Outcome - Concept of Complete Testing. (K1,K2)
2.5 Central Issue in Testing - Testing Activities. (K2, K4)
2.6 Test Levels - Sources of Information for Test Case Selection. (K1, K2, K3)

Unit III   (Hours 15)
3.1 White-Box and Black-Box Testing - Test Planning and Design. (K1, K2)
3.2 Monitoring and Measuring Test Execution - Test Tools and Automation- Test Team Organization and Management. (K2, K3)
3.3 Unit Testing- Concept of Unit Testing - Static Unit Testing- Defect Prevention - Dynamic Unit Testing. (K1, K2)
3.4 Debugging- Tools for Unit Testing - Control Flow Testing. (K4, K5)
3.5 Basic Idea- Outline of Control Flow Testing - Control Flow Graph- Paths in a Control Flow Graph. (K2, K3)
3.6 Life Cycle Based Testing - Traditional Waterfall Testing- Waterfall Testing - Pros and Cons of the Waterfall Model. (K2, K6)

Unit IV   (Hours 15)
4.1 Integration Testing – Decomposition-Based Integration - Top–Down Integration - Bottom–Up Integration - Sandwich Integration - Pros and Cons. (K2,K4)
4.2 Data flow testing -System integration testing - Functional testing - Acceptance testing - Domain testing - Exploratory testing. (K4)
4.3 System Test Planning and Automation - Structure of a System Test Plan - Introduction and Feature Description. (K4)
4.4 Assumptions - Test Approach - Test Suite Structure - Test Environment - System Test Execution- Basic Ideas - Modeling Defects. (K4,K6)
4.5 Preparedness to Start System Testing - Metrics for Tracking System Test - Metrics for Monitoring Test Execution. (K6)
4.6 Test Execution Metric Examples - Metrics for Monitoring Defect Reports - Defect Report Metric Examples. (K4,K5)

Unit V   **(Hours 15)**

5.1 Software Reliability - What Is Reliability?(K1,K2)

5.2 Definitions of Software Reliability - Factors Influencing Software Reliability. (K2)

5.3 Applications of Software Reliability - Test Team Organization - Test Groups. (K1,K2)

5.4 Software Quality Assurance Group - System Test Team Hierarchy- Effective Staffing of Test Engineers. (K1,K2)

5.5 Recruiting Test Engineers - Retaining Test Engineers - Team Building. (K2,K4)

5.6 Software Testing Excellence – Craftsmanship - Best Practices of Software Testing. (K2,K5,K6)

Text Book

1. Kshirasagar Naik, Priyadarshi Tripathy,”Quality Assurance Theory and Practice” John Wiley & Sons, Inc., Publication, 2008.
2. Paul C.Jorgensen,”Software Testing A Craftsman’s Approach” CRC Press, 2014.

Reference Books

1. Srinivasan Desikan, Gopalaswamy Ramesh, “Software Testing Principles and Practice”, Dorling Kindersley (India), 2008, ISBN 9788177581218, 817758121X
2. Nageshwar Rao Pusuluri, “Software Testing Concepts And Tools”, Dreamtech Publishers, 2008.

Open Educational Resources (OER)

1. https://www.javatpoint.com/software-testing-tutorial
2. https://en.wikipedia.org/wiki/Software_testing
3. https://www.youtube.com/watch?v=sO8eGL6SFsA

Year: III	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: VI	UECSD20	Elective – II B: Data Science	Theory	Elective	5	5	40+60

Course Learning Objectives (CLO)

1. Understand the key concepts of data science and its applications.

2. Gain in-depth knowledge on data collection and management techniques.

3. Implement simple applications and analyze the results using relevant tools.

4. Apply the relevant techniques for implementing simple applications.

5. Critically evaluate data visualization based on their design and use for communication from data.

Course Outcomes (COs)

The Learners will be able to

1. Understand the key concepts in data science, its applications and the toolkit used by data scientists.

2. Explain how data is collected, managed and stored for data science.

3. Implement data collection and management.

4. Use visualization tools for data visualization.

5. Possess the required knowledge and expertise to become a proficient data scientist.

CO	PSO					
	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**
CO1	M	H	M	L	M	L
CO2	M	L	M	M	M	M
CO3	M	M	M	L	M	H
CO4	H	M	M	M	L	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	H	M	M	M	L
CO2	H	M	M	H	H	M
CO3	H	H	M	M	M	M
CO4	H	H	M	L	L	L
CO5	H	H	H	H	M	M

Course Syllabus

Unit I (Hour 15)

1.1 Basics of Data Science: Properties of Data. (K2, K3)

1.2 Structured Data - Unstructured Data. (K2)

1.3 Quantitative Data – Categorical Data. (K2)

1.4 Big Data – Little Data. (K2)

1.5 Data Visualization. (K2, K3)

1.6 Tool Boxes for Data Scientists. (K2, K3)

Unit II (Hour 15)

2.1 Introduction to core concepts and technologieIntroduction. (K2)

2.2 Terminology. (K2)

2.3 Data science process. (K2)

2.4 Data Science toolkits. (K2, K3)

2.5 Types of data. (K2)

2.6 Example applications. (K2)

Unit III (Hour 15)

3.1 Data collection and management: Introduction. (K2)

3.2 Sources of data. (K2)

3.3 Data collection and APIs. (K2)

3.4 Exploring and fixing data. (K2, K4)

3.5 Data storage and management. (K2)

3.6 Using multiple data sources. (K2)

Unit IV (Hour 15)

4.1 Data visualization: Introduction - Types of data visualization. (K2)

4.2 Data for visualization: Data types. (K2)

4.3 Data encodings. (K2, K3)

4.4 Retinal variables. (K2, K3)

4.5 Mapping variables to encodings. (K2)

4.6 Visual encodings. (K2)

Unit V (Hour 15)

5.1 Recent Technologies. (K2)

5.2 Recent trends in various data collection. (K2)

5.3 Recent trends in analysis techniques. (K2)

5.4 Various visualization techniques. (K2, K5)

5.5 Application development methods used in data science. (K2, K5)

Text Books

1. Laura Igual, SantiSeguí, "Introduction to Data Science: A Python Approach to Concepts, Techniques and Applications", 1st Edition, 2017, Springer, ISBN 978-3-319-50016-4e-ISBN 978-3-319-50017-1.
2. Davy Cielen. Arno D.B Meysman, Mohamed Ali, "Introducing Data Science", Dreamtech Press, 2016. ISBN: 978-93-5119-937-3

Reference Books

1. Cathy O'Neil and Rachel Schutt, Doing Data Science, Straight Talk from the Frontline.O'Reilly, 2014. ISBN: 978-1-449-35865-5.
2. Joel Grus, Data Science from Scratch, O'Reilly, 2015, ISBN: 978-1-491-90142-7
3. John W. Foreman, Using Data Science to Transform Information into Insight – Data Smart, Wiley, 2014. ISBN: 978-81-265-4614-5.

Open Educational Resources (OER)

1. https://en.wikipedia.org/wiki/Data_science
2. https://www.coursera.org/browse/data-science
3. https://www.youtube.com/watch?v=jtn-hRJjl68

SEMESTER VI
UECSE20- ELECTIVE – III A: ARTIFICIAL INTELLIGENCE

Year: III Sem: VI	Course Code: UECSE20	Title of the Course: Elective – III A: Artificial Intelligence	Course Type: Theory	Course Category: Elective	H/W 5	Credits 5	Marks 40+60

Course Learning Objectives (CLO)

1. Gain a historical perspective of AI and its foundations.
2. Become familiar with basic principles of AI toward problem solving inference, perception, knowledge representation, and learning.
3. Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
4. To understand the concept of learning techniques.
5. To know about Context Free Grammars.

Course Outcomes (COs)

The Learners will be able to

1. Understand different types of AI Agents and its Environments.
2. Know Various AI Search Algorithms (uninformed, informed, heuristic search).
3. Understand the fundamentals of Knowledge representation (logic based, frame based).
4. Understand the different types of Learning.
5. Ability to apply knowledge representation, reasoning, and machine learning Techniques.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	L	M	L
CO2	M	L	M	L	L	M
CO3	M	L	L	L	M	L
CO4	H	M	M	M	L	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	L
CO2	H	M	M	H	H	M
CO3	H	H	M	M	M	M
CO4	H	H	M	L	L	L
CO5	H	H	H	H	M	M

(Low -L, Medium -M, High-H)

Course Syllabus

Unit I (Hour 15)

1.1 Artificial Intelligence – Introduction - Foundation of Artificial Intelligence. (K2)
1.2 History of Artificial Intelligence - Intelligent Agents - Agents and Environment. (K1)
1.3 Good Behavior - The Concept of Rationality - Performance Measures- Rationality. (K1,K4)
1.4 Problem Solving- Solving Problem by searching - Problem Solve Agents. (K5)
1.5 Well Defined Problems and Solutions - Formulating Problems. (K5)
1.6 Uniformed Search Strategies - Breadth First Search - Depth First Search. (K3, K4)

Unit II   **(Hour 15)**

  2.1 Informed Search - Greedy Best First Search - A* Search Minimizing the total estimated Solution Cost. (K3, K4)

  2.2 Hill Climbing Search - Genetic Algorithm. (K3, K4)

  2.3 Local Search in Continuous space - Online Search Agents and Unknown environments - Online Search problems - Online Search Agents. (K5, K6)

  2.4 Online Local Search - Learning in Online Search. (K6)

  2.5 Constraint Satisfaction Problems - Backtracking Search for CSPS. (K4, K5)

  2.6 Backtracking and Local Search (K5, K6)

Unit III   **(Hour 15)**

  3.1 Logical Agents - Knowledge Based Agents. (K2, K3)

  3.2 Logic - Propositional Logic, a very simple logic. (K3)

  3.3 Reasoning Pattern in Propositional Logic - Resolution Forward and Backward Chaining. (K2)

  3.4 Syntax and Semantics of First order Logic - Models for First Order Logic. (K3)

  3.5 Symbol and Interpretations - Terms. (K2)

  3.6 First Order Logic - Assertions and queries in First order Logic. (K3)

Unit IV   **(Hour 15)**

  4.1 Learning from Observations - Forms of Learning. (K2)

  4.2 Inductive Learning - Knowledge in Learning- A logical Formulation of Learning. (K1, K2)

  4.3 Examples and hypotheses - Current best hypothesis search. (K3)

  4.4 Least Commitment Search - Explanation Based Learning - Extracting General rules from Examples. (K2)

  4.5 Improving Efficiency - Learning using Relevance Information. (K2)

  4.6 Inductive Logic Programming - An Example Top down inductive Learning Methods - Inductive learning with inverse deduction. (K1, K2)

Unit V   **(Hour 15)**

5.1 Communication – Communication as Action- Fundamentals of Language. (K2)

5.2 Formal Grammar for a Fragment of English - Lexicon of $\epsilon0$- Grammar of $\epsilon0$. (K3)

5.3 Syntactic Analysis Parsing - Efficient Parsing. (K3, K4)

5.4 Augmented Grammars - Semantic Interpretation. (K4)

5.5 The semantics of a English Fragment - Time and Tense - Quantification- Pragmatic Interpretation. (K5)

5.6 Languages and generation with DCG'S - Ambiguity and Disambiguation. (K5)

Text Book
 1. Stuart Russel Peter Norvig, "Artificial Intelligence- A Modern Approach" 2nd Edition Pearson Education/ Prentice Hall of India 2010.

Reference Books
 1. Nils J.Nilsson," Artificial Intelligence: A new Synthesis", 1st Edition, Harcourt Asia Pvt. Ltd., 1998.
 2. Elaine Rich and Kevin Knight, "Artificial Intelligence", 3rd Edition, Tata McGraw Hill, 2017.
 3. George F.Luger "Artificial Intelligence Structures and Strategies for Complex Problem solving", 3rd Edition, Pearson Education/PHI 1997.

Open Educational Resources (OER)
1. https://www.techtarget.com/searchenterpriseai/definition/AI-Artificial-Intelligence
2. https://github.com/touretzkyds/ai4k12/wiki/Book%3A-Artificial-Intelligence%3A-A-Modern-Approach
3. https://github.com/touretzkyds/ai4k12/wiki/Book%3A-Artificial-Intelligence%3A-A-Guide-For-Thinking-Humans
4. https://github.com/touretzkyds/ai4k12/wiki/Book%3A-The-Future-Computed%3A-Artificial-Intelligence-and-Its-Role-in-Society

Year: III	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: VI	UECSF20	Elective III B: Computer Graphics	Theory	Elective	5	5	40+60

Course Learning Objectives (CLO)
1. Understand two dimensional graphics and their transformations.
2. Gain knowledge about graphics hardware devices and software used.
3. Understand three dimensional graphics and their transformations and to become familiar with clipping techniques.
4. Extract scene with different clipping methods and its transformation to graphics display device.
5. Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.

Course Outcomes (COs)
The Learners will be able to
1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
2. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
3. Use of geometric transformations on graphics objects and their application in composite form.
4. Apply clipping methods and its transformation to graphics display device.
5. Use suitable projections and visible surface detection techniques for display of 3D scene on 2D screen.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	L	H	M	L	M	L
CO2	M	M	M	L	M	L
CO3	L	L	M	M	M	L
CO4	H	M	M	M	L	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	M	H	M	L	M	M
CO2	H	H	L	L	L	L
CO3	M	H	H	L	L	H
CO4	M	H	H	H	M	H
CO5	M	H	M	H	M	M

(Low -L, Medium -M, High-H)

Course Syllabus

Unit I (14 Hours)

1.1 Overview of graphics System Video Display Device. (K1)

1.2 Refresh Cathode-Ray tubes. (K1)

1.3 Raster - Scan Displays. (K1, K3)

1.4 Random - Scan Displays. (K1, K3)

1.5 Color CRT Monitors -Direct view Storage tubes Flat - Panel Displays. (K1, K3)

1.6 Three - Dimensional Viewing Devices - Stereoscopic and Virtual - Reality Systems.
    (K1, K2)

Unit II (16 Hours)

2.1 Raster - Scan Systems Video Controller. (K1, K3)

2.2 Random Scan Systems Video Controller. (K1, K3)

2.3 Random-Scan Systems. (K1, K3)

2.4 Input device - Keyboard Mouse - Trackball and Space ball-Joysticks - Data Glove –
    Digitizers - Image Scanners - Touch Panels - Light pens. Voice Systems – Hard – Copy
    Devices. (K1)

2.5 Line Drawing Algorithms DDA Algorithms. (K1, K3, K5)

2.6 Circle generating Algorithm Properties of Ellipses. (K1, K3, K5)

Unit III (14 Hours)

3.1Two Dimensional Geometric Transformation: Basic Transformations – Translation.
    (K1, K2, K3)

3.2 Rotation. (K1, K2, K3)

3.3 Scaling. (K1, K2, K3)

3.4 Matrix Representations and Homogeneous Coordinates. (K1,K3)

3.5 Other Transformations Reflections. (K1, K2, K3)

3.6 Two Dimensional Viewing. (K1)

Unit IV (16 Hours)

4.1 Three Dimensional Concept Three Dimensional Display method. (K1)

4.2 Parallel projection - Depth cueing visible line and surface. (K1, K3)

4.3 Three Dimensional Geometric and modeling Transformation Translation - Rotation – Scaling. (K1, K2, K3)

4.4 Composite Transformations. (K1, K3)

4.5 Three Dimensional Viewing: Viewing pipeline - Viewing Coordinates. (K1, K3)

4.6 Projections - Parallel Projections - Perspective Projections. (K2, K3)

Unit V (15 Hours)

5.1 Windows to view point coordinate Transformations. (K1, K2)

5.2 Clipping Operations - Point Clipping - Line Clipping - Curve Clipping - Text Clipping - Exterior Clipping. (K1, K3)

5.3 Visible Surface Detection Method Classification Visible Surface Detection Algorithms. (K1, K2)

5.4 Back Face Detection. (K1, K2)

5.5 Depth - Buffer Method - A-Buffer Method. (K1, K2)

5.6 Scan line method. (K1, K3)

Text Books

1. Donald Hearn, M. Pauline Baker, "Computer Graphics", 2nd Edition, Prentice Hall of India Publication, 2011.

2. Donald Hearn, M. Pauline Baker Warren Carithers, "Computer Graphics with Open GL", 4th Edition, Pearson Publication, 2014.

Reference Books

1. Apurva A. Desai - "Computer Graphics", 1st Edition, Prentice Hall of India Publication, 2008.

2. ISRD Group - "Computer Graphics", 2nd Edition, McGraw Hill Book Company, 2008.

Open Educational Resources (OER)

1. http//archive.org/details/DonaldHearnM.PaulineBakerComputerGraphicsBookFi.or g/page/n7/mode/2up

2. http//www.academia.edu/5750589/Computer_Graphics_C_Version_by_Donald_Hearn_and _M_Pauline_Baker_II_Edition

3. http//www.youtube.com/watch?v=xlFc0HFh_Wg

4. http//www.youtube.com/watch?v=sHsmE_5HPDY

5. http//www.youtube.com/watch?v=jQvRA-GiwwA

SEMESTER VI

UCCST20 - PRACTICAL XI: INTERNET AND WEB PROGRAMMING

Year: III Sem: VI	Course Code: UCCST20	Title of the Course: Practical XI: Internet and Web Programming	Course Type: Practical	Course Category: Core	H/W 2	Credits 2	Marks 40+60

Course Learning Objectives (CLO)
1. Comprehend the usage of PHP and JavaScript in dynamic web development.
2. Understand PHP language data types, logic controls, built-in and user-defined functions.
3. Describe Object oriented programming paradigm in PHP.
4. Understand user validation techniques and cookies.
5. Build a simple, yet functional web application using PHP/MySQL.

Course Outcomes (COs)
The Learners will be able to
1. Know variable naming rules and JavaScript data types.
2. Use operators, variables, arrays, control structures, functions and objects in JavaScript.
3. Demonstrate objects and arrays usage.
4. Create PHP programs that use various PHP library functions, and that manipulate files and directories.
5. Validate user input and create cookies in PHP.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	M	M	L
CO2	M	M	L	L	M	L
CO3	L	M	M	M	M	L
CO4	M	M	M	M	L	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	L	L	L
CO2	H	H	H	M	M	M
CO3	M	M	M	H	H	H
CO4	H	H	H	H	M	H
CO5	M	M	M	L	L	L

Practical Programs (K6) **(Hour 30)**

1. Implement factorial of a number in JavaScript. (K2, K3)
2. Animation in JavaScript. (K3, K4)
3. Addition and Multiplication of two numbers in JavaScript. (K1, K2)
4. Convert the first letter of each word of the sting to Uppercase in JavaScript. (K1, K2)
5. Implementing Arrays in JavaScript. (K4, K5)
6. Implementing Control Statements and Looping in PHP. (K3, K4)
7. Implementing Functions in PHP. (K4, K5)
8. Implementing Form Processing (GET & POST) in PHP. (K5, K6)
9. Implementing Validation in PHP. (K4)
10. Implementing Cookies in PHP. (K3, K4, K5)

UCCSU20 - PRACTICAL XII: PROJECT WORK

Year: III Sem: VI	Course Code: UCCSU20	Title of the Course: Practical XII: Project Work	Course Type: Practical	Course Category: Core	H/W 2	Credits 2	Marks 40+60

Course Learning Objectives (CLO)
1. Acquire practical knowledge on the implementation of the programming concepts learnt.
2. Motivate the Students to work in emerging/latest technologies.
3. Help the students to develop ability, to apply theoretical and practical tools/techniques.
4. To solve real life problems related to industry, academic institutions and research laboratories.
5. Help the students to gain Self-confidence.

GUIDELINES FOR PROJECT WORK

- Each student should carry out individually one project work and it may be a work using the software packages that they have learned or the implementation of concepts from the papers studied or implementation of any innovative idea focusing on application oriented concepts.

- The project work should be compulsorily done in the college only under the supervision of the department staff concerned.

- The project is of 3 hours/week for one (semester VI) semester duration and a student is expected to plan, analyze, design, code and implement the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

- For the project work, the guide(internal) will evaluate the work for 40 marks based on the performance of the candidates during the development of the project and the external examiner will evaluate the project work as follow

    Project Report -40 marks

    Viva Voce -20 marks

SEMESTER V/VI
USCSEn20 - SKILL BASED ELECTIVE: DATA ANALYTICS USING DATA VISUALIZATION TOOLS

Year: III/ V Sem: VI	Course Code: USCSEn20	Title of the Course: Data Analytics using Data Visualization Tools	Course Type: Practical	Course Category: Skill Based Elective	H/W 2	Credits 2	Marks 40+60

Course Learning Objectives (CLO)

1. Understand the behavior of data.

2. To extend the current state of the art in data visualization.

3. To present data effectively through chart, map and dashboard.

4. Represent data graphically.

5. To implement Data Analytics efficiently.

Course Outcomes (COs)

The learners will be able to

1. Identify the various data visualizations tools in the market and its features.

2. Understand the different data format and its graphical representation

3. Develop skills to present data effectively through chart, map and dashboard.

4. Demonstrate to design visual presentations of data for decision making.

5. Apply data visualizations on real-time data.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	H	M	M	M	L
CO2	M	L	L	L	M	M
CO3	L	L	M	L	L	M
CO4	M	M	M	M	L	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	L	M
CO2	H	H	H	H	L	M
CO3	H	H	H	H	M	L
CO4	H	H	H	H	H	M
CO5	H	M	H	H	H	M

Course Syllabus

Unit I (Hour 5)

1.1 Data Visualization: Introduction. (K1)

1.2 Benefits of Data Visualization. (K2)

1.3 Data Visualization Tools. (K2)

1.4 Features. (K2)

1.5 Data access from data sources. (K2)

Unit II (Hour 5)

2.1 Data Transformation. (K1, K2)

2.2 Types of charts. (K2)

2.3 Bar Chart. (K1, K2)

2.4 Pie Chart. (K2)

2.5 Data Tables. (K2)

2.6 Scatter Chart. (K2)

Unit III (Hour 5)

3.1 Time series Chart. (K2)

3.2 Score card. (K2)

3.3 Scatter Chart. (K2)

3.4 Bullet Chart. (K2)

3.5 Area Chart. (K2)

3.6 Heat Map(K2)

Unit IV (K6) (Hour 8)

1. Create a bar chart for the given data.

2. Create a pie chart for the given data.

3. Create a scatter chart for the given data.

4. Create a time series chart for the given data.

Unit V (K6) (Hour 7)

5. Create a bullet chart for the given data.

6. Create area chart for the given data.

7. Create a heat map for the given data.

Text Book

1. Nathan Yau Visualize Thi, "The Flowing Data Guide to Design, Visualization, and Statistics", Wiley, 1ˢᵗ Edition 2011.

Reference Books
1. Cole Nussbaumer Knaflic, "Storytelling with Data: A Data Visualization Guide for Business Professionals", John Wiley & Sons 2015.

Open Educational Resources (OER)
1.http//www.tutorialspoint.com/tableau/tableau_tutorial.pdf

2. http//www.pdfdrive.com/tableau-books.html

3.http://projanco.com/Library/Learning%20Tableau%202019%20Tools%20for%20Business%20Intelligence,%20data%20prep,%20and%20visual%20analytics.pdf

4. http//www.youtube.com/watch?v=Tc8VenUN4n8

SEMESTER V / VI
USCSFn20 - SKILL BASED ELECTIVE: R PROGRAMMING

Year: III/ V Sem: VI	Course Code: USCSFn20	Title of the Course: Skill Based Elective: R Programming	Course Type: Practical	Course Category: Skill Based Elective	H/W 2	Credits 2	Marks 40+60

Course Learning Objectives (CLO)

1. Understand the usage of R programming interactive environment.
2. Understand R programming language which includes functions, arrays and dataframes.
3. Describe statistical computing which includes programming in R, reading and accessing data in R.
4. Understand the concept of Meta Programming.
5. Build a simple sorting algorithm.

Course Outcomes (COs)

The Learners will be able to

1. Understand the basics in R and Studio Programming.
2. Use Vector, Arrays, Matrix and Data frames.
3. Demonstrate Math functions, Statistical functions and Family functions.
4. Create R programs that use various library functions, and that manipulate files and directories.
5. Learn to apply R programming for Text processing.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	M	M	L
CO2	M	L	L	L	M	M
CO3	L	M	M	L	M	M
CO4	M	M	M	M	L	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	M	L	M	M	M	L
CO2	M	M	L	L	L	M
CO3	L	M	H	H	H	H
CO4	H	M	H	H	H	M
CO5	L	M	M	M	L	M

Course Syllabus

Unit I   **(Hour 5)**
 1.1 Introduction to R and R Studio. (K1, K2)
 1.2 Basic Object Vector. (K2)
 1.3 Matrix, Array. (K2, K3)
 1.4 Lists. (K2)
 1.5 Data Frames. (K3)
 1.6 Functions. (K2, K3)

Unit II   **(Hour 5)**
 2.1 Basic Expression Assignment Expressions. (K1, K2)
 2.2 Conditional Expressions. (K3, K4)
 2.3 Loop Expressions. (K3, K4)
 2.4 Basic Object Functions - Logical Functions. (K2, K3)
 2.5 Math functions, Numeric Methods Statistical function - Apply. (K3, K5)
 2.6 Family Functions. (K3, K4)

Unit III   **(Hour 5)**
 3.1 Working with Strings. (K4, K5)
 3.2 Working with Data. (K4, K5)
 3.3 Meta programming. (K6)
 3.4 Object Oriented Programming. (K3, K4)

Unit IV   **(Hour 7)**
 4.1 Write a program that prints 'Hello World' to the screen. (K2)
 4.2 Write a program that asks the user for a number n and prints the sum of the numbers 1 to
        n. (K4, K5)
 4.3 Write a program that prints a multiplication table for numbers up to 12. (K4)
 4.4 Write a function that returns the largest element in a list. (K5)

Unit V   **(Hour 8)**
 5.1 Write a function that computes the running total of a list. (K5, K6)
 5.2 Write a function that tests whether a string is a palindrome. (K5)
 5.3 Implement the following sorting algorithm Selection sort, Insertion sort, Bubble Sort. (K3,
        K5, K6)
 5.4 Implement linear search. (K3, K4,)
 5.5 Implement binary search. (K3, K4)
 5.6 Implement Matrices Addition, Subtraction and Multiplication. (K3, K4)

Text Books
1. Kun Ren, "Learning R. Programming, Packt Publishing" - ebooks Account (October 28, 2016).
2. Dr. Mark Gardener, "Beginning R: The Statistical Programming Language", Paperback, 2013.

Reference Books
1. Colin Gillespie, Robin Lovelace, "Efficient R Programming: A Practical Guide to Smarter Programming", O'Reilly Media, 1st Edition (October 25, 2016); eBook (2017-04-10).
2. Daniel Navarro, "Learning Statistics with R", lulu.com (2015); eBook (University of Adelaide, 2018. Updated Continuously)

Open Educational Resources (OER)
1. https://www.tutorialspoint.com/r/index.htm
2. https://www.programiz.com/r
3. https://www.youtube.com/watch?v=Q5g6lYUn6Q4

SEMESTER III
USCSAn20 - SKILL BASED ELECTIVE: BASICS OF WEB DESIGN

Year: II	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: III	USCSAn20	SBE: Basics of Web Design	Practical	Skill Based Elective	2	2	40+60

Course Learning Objectives (CLO)

1.To impart knowledge in designing web pages with text and images.
2. Analyze a web page and identify its elements and attributes.
3. To learn and implement XML Concepts.
4. Write codes to create website.
5. Write programs in XML.

Course Outcomes (COs)
The Learners will be able to

1. Demonstrate competency in the use of common HTML code.
2. Support the development of web pages.
3. Create XML documents and Schemas.
4. Create website using HTML.
5. Write programs using XML.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	H	M	M	M	L
CO2	M	L	L	L	M	M
CO3	L	M	M	L	L	L
CO4	M	L	M	M	L	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	L	M
CO2	H	H	H	H	L	M
CO3	H	L	H	H	M	L
CO4	H	L	H	H	H	M
CO5	H	M	H	H	H	M

(Low -L, Medium -M, High-H)

Course Syllabus

Unit I   **(Hour 5)**

1.1 Introduction: HTML - Understanding HTML Tags. (K2)

1.2 Creating the HTML, Head, and Body Sections. (K6)

1.3 Creating Paragraphs and Line Breaks. (K6)

1.4 Formatting Text by Using Tags. (K6)

1.5 Creating Headings. (K6)

1.6 Applying Bold and Italic Formatting - Applying Superscript and Subscript Formatting. (K3)

Unit II   **(Hour 5)**

2.1 Using Lists and Backgrounds - Creating Bulleted and Numbered Lists. (K2)

2.2 Creating Definition Lists. (K6)

2.3 Choosing Background and Foreground Colors. (K6)

2.4 Creating Hyperlinks and Anchors–(K6)

2.5 Introduction to Style Sheets–(K6)

2.6 Creating tables. (K6)

Unit III   **(Hour 5)**

3.1 XML Overview: Working with Basics of XML- (K1)

3.2 XML Namespaces – XML Tree-XML Syntax- (K1)

3.3 XML Elements - DTD – (K1)

3.4 XML Schema – (K1)

3.5 Extensible Style Sheets (K1)

3.6 XSL Transformation. (K1)

Unit IV   **(K6)**   **(Hour 8)**

1. Write a program to change the Font style, Font colour, Font Sizes and Background Image.
2. Write a program to design Bio-data using Basic HTML tags.
3. Write a program in HTML to develop a College Website.
4. Write a HTML program to create Time Table preparation using HTML tags.
5. Write a HTML program using links.

Unit V   **(K6)**   **(Hour 7)**

6. Write a HTML program for Lists.
7. Write a program to apply Style Sheet in a webpage.
8. Write a program to flip the text using XML.
9. Write a XML program using elements.
10. Write a XML program using DTD.

Text Books

1. Faithe Wempen, "Step by Step HTML5", Published with the O'Reilly Media, Inc. 2012.
2. Kogent Learning Solutions Inc,"Html5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and jQuery", Dreamtech Press, 2011.

Books for Reference

1. HTML by Tutorials point, Published by Tutorials Point Pvt. Ltd, 2015.
2. Heather Williamson, "XML: The Complete reference", Indian Edition, Tata McGraw Hill Pub, 2001.
3. Deitel, Nieto, Lin, Sadhu, "XML HOW TO PROGRAM", 1st Edition, Pearson Education, 2002.

Open Educational Resources (OER)

1. https://www.tutorialspoint.com/html/index.htm
2. https://www.javatpoint.com/html-tutorial
3. https://www.youtube.com/watch?v=qz0aGYrrlhU

USCSBn20 - SKILL BASED ELECTIVE: DESIGN AND ANIMATION

Year: II	Course Code: USCSBn20	Title of the Course: Skill Based Elective: Design and Animation	Course Type: Practical	Course Category: Skill Based Elective	H/W 2	Credits 2	Marks 40+60
Sem: IV							

Course Learning Objectives (CLO)

 1. To learn the basics and fundamentals of Multimedia.

 2. To introduce Multimedia components and tools.

 3. To understand how multimedia can be incorporated.

 4. To study the various applications of design techniques.

 5. Demonstrate in depth knowledge of multimedia development tools.

Course Outcomes (COs)

The Learners will be able to

 1. Understand Multimedia components using various tools and techniques.

 2. Analyze and Interpret Multimedia Data.

 3. Discuss about different types of media format and their properties.

 4. Understand and apply principles of design into given projects.

 5. Acquire and analyze different ideas about designs and its implementation.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	M	M	L
CO2	M	L	L	L	H	H
CO3	L	M	M	L	L	L
CO4	M	L	M	M	M	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	L
CO2	H	H	M	M	M	M
CO3	H	H	H	M	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	L

Course Syllabus

Unit I (Hour 5)

1.1 Introduction to Multimedia – The Elements of Multimedia System. (K2)

1.2 Using Multimedia: Benefits of using Multimedia. (K1, K2)

1.3 Multimedia Platform Multimedia Hardware. (K2, K3)

1.4 System Software. (K2, K3)

1.5 Future Directions. (K2)

1.6 Storage for Multimedia: Choice of Storage – Magnetic Media – Optical Media. (K2)

Unit II (Hour 5)

2.1 Introduction – Bitmaps and Vectors Toolbox. (K2)

2.2 Selection tools – Painting tools – Editing tools – Retouching Tool(K2)

2.3 Colors setting. (K1, K2)

2.4 Layer Working with Layers. (K1, K2)

2.5 Layer Styles – Locking Layers. (K2)

2.6 Merging Layers – Managing Layers Components – Palette. (K3)

Unit II (Hour 5)

3.1 Introduction flash – Basics. (K2)

3.2 Creating objects – Editing objects. (K3, K6)

3.3 Color and text – Symbols and instances. (K2)

3.4 Library – Text Animation – Motion Tweening. (K2, K3)

3.5 Shape Tweening – Motion Guide. (K3)

3.6 Movie Clip – Working with Action Script. (K3)

Unit IV (K6) (Hour 8)

1. Create an Action in Photoshop.

2. Color Transformation Using Photoshop.

3. Design a Book Cover in Photoshop.

4. Create an Animation using Photoshop.

Unit V (K6) (Hour 7)

5. Traffic Light Control Using Action Script in Flash.

6. Create a Slide Show Presentation in Flash.

7. Design a Greeting Card Using Button in Flash.

8. Create a Public Service Awareness Using Action Script in Flash.

Text Books

1. "Photoshop CS6 in Simple Steps", Paperback, Kogent Learning Solutions Inc., 2012.

2. "Flash CS5 in Simple Steps", Kogent Learning Solutions Inc., Dreamtech Press Publication, 2011.

Books for Reference

1. Chris Grover with E.A.Vander Veer, "Flash CS4", Pogue Press O'Reilly,2008.
2. Jeffcoate Judith, "Multimedia in Practice", Pearson Education, 2009.

Open Educational Resources (OER)

1. https://www.javatpoint.com/what-is-multimedia
2. https://users.cs.cf.ac.uk/dave/Multimedia/node10.html
3. https://www.youtube.com/watch?v=Syeu_l3sAJE&pp=ygUJbXVsdGltZWlh

SEMESTER V/VI
UGCSAn20: NON MAJOR ELECTIVE: STATISTICAL PACKAGE FOR SOCIAL SICENCE

Year: III Sem: V/VI	Course Code: UGCSAn20	Title of the Course: Non Major Elective: Statistical Package For Social Science	Course Type: Practical	Course Category: Non Major Elective	H/W 3	Credits 2	Marks 40+60

Course Learning Objectives (CLO)
1. The students will understand the data analysis, define variables and perform variable manipulation and transformation.
2. Understand the basic workings of SPSS and perform basic statistical analysis.
3. To perform a wide range of data management in SPSS.
4. To introduce the basic practice of statistics by using SPSS statistics.
5. To perform advanced analysis of SPSS.

Course Outcomes (COs)
The Learners will be able to
1. Understand the basic workings of SPSS software using menus and buttons and perform basic statistical analysis.
2. Analyze data and create simple tables, charts and frequencies.
3. Introduce data analysis and perform basic statistical analysis.
4. Analyze data for reporting descriptive statistics, graphics and correlations
5. Perform simple analysis of Two way sample and Chi-square tests.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	M	M	M	L
CO2	M	L	L	L	H	H
CO3	L	M	H	L	M	L
CO4	M	L	M	M	M	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	M	M	M	M	M	L
CO2	M	M	M	M	M	L
CO3	H	H	H	H	H	L
CO4	H	H	H	H	M	L
CO5	H	H	H	H	M	L

(Low -L, Medium -M, High-H)

Course Syllabus

Unit I (Hour 10)

 1.1 SPSS Introduction (K1)
 1.2 Task Bar and Start Menu (K2)
 1.3 Common Buttons – Commonly used Windows (K2)
 1.4 Creating and Editing a Data File (K6)
 1.5 Select Case – Sort Case – Merging Files (K5)
 1.6 Painting Results. (K5)

Unit II (Hour 10)

 2.1 Graphs and Chart Producing Graphs and Charts (K6)
2.2 Bar Charts – Line Graphs (K6)
 2.3 Pie Chart – Box Plots (K6)
 2.4 Error Bar Charts (K1, K6)
 2.5 Histograms – Scatter Plots (K1.K6)
 2.6 Understanding Frequencies. (K2)

Unit III (Hour 10)

 3.1 Descriptive Statistic Normal Distribution Mean, Median, Mode (K2. K6)
 3.2 Variance & Standard Deviation (K1.K6)
 3.3 Skewness (K2. K6)
 3.4 Kurtosis (K2. K6)
 3.5 Maximum, Minimum, Range and Sum (K2. K6)
 3.6 Standard Error. (K2)

Unit IV (Hour 8)

 1. Creating data file, assigning names and value to variables and saving it.(K1,K6)
 2. Creating data file and find the percentage of subjects in each group. (K2, K6)
 3. Running a simple analysis to create a frequency table. (K4)
 4. Creating a new variable based on an existing variable. (K6)
 5. Creating charts for different Variables. (K2, K5)

Unit V (Hour 7)

6. Statistical application to obtain central tendency or dispersion values. (K3)
7. Editing of tables & charts, fixing tables and charts in word document. (K5)
8. Running a simple analysis to create different correlation   (K5, K6)
9. Running a simple analysis to create different 't' tests.   (K5, K6)
10. Creating two-way tables and to obtain Chi – Square values. (K6)

Text Book

1. Darren George & Paul Mallery, "SPSS for Windows step by step", Pearson Education in South Asia, 8th Edition.

Books for Reference

1. Sabine Landau & Brain S.Everitt, "'A Handbook of Statistical Analyses using SPSS", A CRC Press Company, 2004
2. Jesus Salcedo, Keith McCormick, "SPSS Statistics for Data Analysis and Visualization", 2017.

Open Educational Resources (OER)

1. https://lo.unisa.edu.au/mod/book/view.php?id=646443&chapterid=106605
2. https://fac.ksu.edu.sa/sites/default/files/spss_beginners_0.ppt
3. https://slideplayer.com/slide/13316515/

UGCSBn20 - NON-MAJOR ELECTIVE: WEB DESIGNING USING DREAMWEAVER

Year: III	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: V/VI	UGCSBn20	Non-Major Elective : Web Designing Using Dreamweaver	Practical	Non Major Elective	3	2	40+60

Course Learning Objectives (CLO)
 1. To build an understanding of basic concepts of web site.
 2. To develop programming skills in analyzing the usability of a web site.
 3. Learn techniques of responsive web design software.
 4. To be able to create different kind of web page based on the user requirements.
 5. To implement text based, audio and video based object techniques using Dreamweaver software.
  6. To develop software using different kind of web page based on the user requirements.

Course Outcomes (COs)
The Learners will be able to
1. Understand the basic concept of Web designing using Dreamweaver software.
2. Creating the web pages using background colors, property inspector tools in HTML.
3. Develop how to create web page links.
4. Create tables, frames and frameset using Dreamweaver tools.
5. Apply style sheet, adding forms to a web page.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	M	L
CO2	M	H	L	L	H	H
CO3	L	M	H	L	H	M
CO4	M	L	M	M	M	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	L
CO3	H	H	M	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	M	L	M	M

(Low -L, Medium -M, High-H)

Course Syllabus

Unit I (Hour 10)

1.1 Opening the Document Window – Locating the Little Bar (K2)

1.2 Menu Bar Components – Menu Bar – Toolbar – Status Bar (K2)

1.3 Design View – Object Panel – Launchers (K2, K4)

1.4 Property Inspector – Creating a New Site (K4, K6)

1.5 Local Vs. Remote Site – Designing a Local Site (K2, K4)

1.6 Creating and Opening a Site – Setting up the Sitting Window – Accessing the Site. (K5, K6)

Unit II (Hour 10)

2.1 Working with HTML Tags - Code Inspector (K2, K4)

2.2 Quick Tag Editor – Importing HTML (K2, K5)

2.3 Creating Web Page Opening and Closing Pages – Copying and Pasting Test (K4, K6)

2.4 Working with Text and Property Inspector – Working with Background Colors (K3,K4)

2.5 Leaving Links – Working with Anchors (K4, K5)

2.6 Working with Image Link – Creating an Email Links. (K5, K6)

Unit III (Hour 10)

3.1 Definition of Tables – Creating and Editing Tables – Preformatted Tables (K2, K4)

3.2 Frames and Frameset: Creating and Editing Frames (K4, K6)

3.3 Adding Multimedia to a Website - CSS (K3, K5)

3.4 Applying Style Sheet to a Webpage – CGI (K3, K5)

3.5 Form – Adding Form in the Project (K2, K3)

3.6 Creating Layers – Customizing Dreamweaver. (K6)

Unit IV (Hour 8)

Practical Programs (K3, K4, K5, K6)

1. Create and design a webpage for Clipart Gallery.

2. Create a webpage for online shopping.

3. Create a banner using various tools (College day, Graduate day).

4. Create a webpage for sports day.

Unit V   **(Hour 7)**

Practical Programs   (K3, K4, K5, K6)

5. Create a web page for Class time tables using table properties.
6. Design an E-Book with appropriate navigation.
7. Create a webpage for advertising a product using rollover image.
8. Create a webpage using layers.

Text Books

1. Candace Garrod, "Dreamweaver Rapid Web Design", Prentice Hall of India, 2001.
2. Jim Maivald Publisher, "Adobe Dreamweaver CC Classroom in a Book", (2019 Release), 1st Edition, Adobe Press, 2018.

Books for Reference

1. Hirdesh Bhardwaj, "Web Designing", 1st Edition, Pothi.com, 2016.

Open Educational Resources (OER)

1. http//makeawebsitehub.com/dreamweaver-tutorial/
2. http//www.uis.edu/informationtechnologyservices/wp-content/uploads/sites/106/2013/04/DWIntro.pdf
3. http//www.egr.msu.edu/classes/ece480/capstone/fall12/group05/Documents/Application%20Note%20-%20Nan%20Xia.pdf