

J.J COLLEGE OF ARTS AND SCIENCE(AUTONOMOUS)

DEPARTMENT OF COMPUTER APPLICATIONS

B.C.A. (For the Students admitted during the Academic year 2023 - 24)

(Based on U.G.C. - LOCF and TANSCHÉ – CBCS)

SEMESTER – I									
Sl. No.	Part	Course code	Title of the Course	Hrs / Week	Credits	Exam Hours	Marks		Total
							CIA	ESE	
1	I	U1R3TL1/HL1/FL1	Language – I (Tamil/Hindi/French)	6	3	3	25	75	100
2	II	U1R3EL1	Language – II (English)	6	3	3	25	75	100
	III	U1R3CACC1	Python Programming	5	5	3	25	75	100
		U1R3CACC2P	Python Programming Practical	5	5	3	40	60	100
		U1R3CADSE1:1 / 1:2/1:3	1:1 Discrete Mathematics – I 1:2 Statistical methods and its applications – I 1:3 Numerical methods	4	3	3	25	75	100
	IV	U1R3MASEC1	1.Quantitative aptitude – I	2	2	3	25	75	100
		U1R3CAFC	Structured Programming Language in C	2	2	3	25	75	100
Total				30	23				700
SEMESTER – II									
Sl. No	Part	Course Code	Title of the Course	Hrs / Week	Credits	Exam Hours	Marks		
							CIA	ESE	Total
1	I	U2R3TL2/HL2/FL2	Language – I (Tamil/Hindi/French)	6	3	3	25	75	100
2	II	U2R3EL2	Language – II (English)	6	3	3	25	75	100
3		U2R3CACC3	Object Oriented Programming concepts using C++	5	5	3	25	75	100
4		U2R3CACC4P	C++ Programming Practical	5	5	3	40	60	100

5	III	U2R3CADSE2:1 / 2:2 / 2:3	2:1 Discrete Mathematics – II 2:2 Statistical methods and its Applications-II 2:3 Graph theory and its Applications	4	3	3	25	75	100
6	IV	U2R3CASEC2 (NME2)	2:1 Managerial Skill Development 2:2 Quantitative Aptitude-II	2	2	3	25	75	100
7		U2R3CASEC 3:1 / 3:2	3:1 Fundamentals of Information Technology 3:2 Understanding Internet	2	2	3	25	75	100
			Total	30	23				700

SEMESTER – III

Sl. No	Part	Course Code	Title of the Course	Hrs / Week	Credits	Exam Hours	Marks		
							CIA	ESE	Total
1	I	U3R3TL3/ HL3/FL3	Language – I (Tamil/Hindi/French)	5	3	3	25	75	100
2	II	U3R3EL3	Language – II (English)	5	3	3	25	75	100
3	III	U3R3CACC5	Relational Database Mgmt System	6	5	3	25	75	100
4		U3R3CACC6P	SQL and PL/SQL Practical	5	5	3	40	60	100
5		U3R3CADSE3:1 / 3:2	3:1 Organizational Behavior 3:2 Financial Accounting	4	3	3	25	75	100
6	IV	U3R3VE	Value Education	2	2	3	25	75	100
7		U3R3CASEC4:1 / 4:2	4:1 Data Structures and Algorithms 4:2 Data Mining and Warehousing	3	2	3	25	75	100
			Total	30	23				700

SEMESTER – IV

Sl. No	Part	Course Code	Title of the Course	Hrs / Week	Credits	Exam Hours	Marks		
							CIA	ESE	Total
1	I	U4R3TL4/ HL4/FL4	Language – I (Tamil/Hindi/French)	5	3	3	25	75	100
2	II	U4R3EL4	Language– II (English)	5	3	3	25	75	100
3		U4R3CACC7	Programming in Java	5	5	3	25	75	100

4	III	U4R3CACCC8P	Programming in Java Practical	5	5	3	40	60	100
5		U4R3CADSE4:1 / 4:2	4:1 Human Computer Interaction 4:2 Natural Language Processing	3	3	3	25	75	100
6	IV	U4R3CASEC5:1 / 5:2	5:1 Multimedia Systems 5:2 Enterprise Resource Planning	2	2	3	25	75	100
7		U4R3CASEC6:1 / 6:2	6:1 Web Design 6:2 Introduction to HTML	3	2	3	25	75	100
8		U4R3EVS	Environmental Studies	2	2	3	25	75	100
			Total	30	25				800

SEMESTER – V									
Sl. No	Part	Course Code	Title of the Course	Hrs / Week	Credits	Exam Hours	Marks		
							CIA	ESE	Total
1	I	U5R3CACC9	Operating Systems	5	5	3	25	75	100
2	II	U5R3CACC10	Computer Networks	5	4	3	25	75	100
3	III	U5R3CACC11	ASP.NET Programming	5	4	3	25	75	100
4		U5R3CACC12P	ASP.NET Programming Practical	5	4	3	40	60	100
5		U5R3CADSE 5:1/ 5:2	5:1 Software Engineering 5:2 Software Project Management	5	3	3	25	75	100
6		U5R3CADSE 6:1/ 6:2	6:1 Internet of Things 6:2 Mobile Computing	5	3	3	25	75	100
7	IV	U5R3CAINT	Internship* Semester –IV Summer Vacation	-	2	-	-	100	100
			Total	30	25				700
SEMESTER – VI									
Sl.No	Part	Course Code	Title of the Course	Hrs / Week	Credits	Exam Hours	Marks		
							CIA	ESE	Total
1	I	U6R3CACC13	Web Technology	5	4	3	25	75	100
2	II	U6R3CACC14P	Web Technology Practical	5	4	3	40	60	100
3	III	U6R3CACC15PW	Software Application Project	5	4	3	-	100	100
4		U6R3CADSE7:1 / 7:2	7:1 Artificial Intelligence 7:2 Cloud Computing	5	3	3	25	75	100
5		U6R3CADSE8:1 / 8:2	8:1 Internet Programming 8:2 E-Commerce Technologies	5	3	3	25	75	100
6		U6R3CASEC7:1 / 7:2	7:1 Software Testing 7:2 Wireless Network	3	2	3	25	75	100

7		U6R3GS	Gender Studies	2	1	3	25	75	100
8			Extension Activity	-	1	-			
			Total	30	22				700
		Grand Total	43 – Courses		141				4300

Title of the Course : PYTHON PROGRAMMING

Category of the Course : Core Course

Course Code : U1R3CACC1

Nature of the Course : Employability

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week: 05

Credits: 05

Total Inst. Hours: 75

COURSE OBJECTIVES:

1. To make students understand the concepts of Python programming
2. To apply the OOPs concept in PYTHON programming.
3. To impart knowledge on demand and supply concepts
4. To make the students learn best practices in PYTHON programming
5. To know the costs and profit maximization

Unit-I: BASICS OF PYTHON PROGRAMMING

(Inst.Hours:15)

History of Python – Features of Python – Literal – Constants – Variables – Identifiers –Keywords - Built-in Data Types – Output Statements – Input Statements - Comments –Indentation-Operators-Expressions-Type conversions. Python **Arrays:** Defining and Processing Arrays – Array methods.

Unit – II: CONTROL STATEMENTS

(Inst.Hours:15)

Selection/Conditional Branching statements: if, if-else, nested if and if-elif-else statements. Iterative statements: while loop, for loop, else suite in loop and nested loops. Jump statements: break, continue and pass statements.

Unit-III: FUNCTIONS

(Inst.Hours:15)

Function Definition – Function Call – Variable Scope and its Life time – Return Statement. Function Arguments: Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments -Recursion. Python Strings: String operations - Immutable Strings - Built-in String Methods and Functions - String Comparison. Modules: import statement - The Python module – dir() function – Modules and Namespace–Defining our own modules.

Unit-IV: LISTS

(Inst.Hours:15)

Creating a list – Access values in List - Updating values in Lists – Nested lists –Basic list operations – List Methods. Tuples: Creating, Accessing, Updating and Deleting Elements in a tuple – Nested tuples –Difference between lists and tuples. **Dictionaries:** Creating, Accessing, Updating and Deleting Elements in a Dictionary –Dictionary Functions and Methods-Difference between Lists and Dictionaries.

Unit-V: PYTHON FILE HANDLING**(Inst.Hours:15)**

Types of files in Python -Opening and Closing files - Reading and Writing files: write () and writelines () methods- append () method – read () and readlines () methods–with keyword – Splitting words –File Methods-File Positions-Renaming and deleting files.

TEXT BOOK (S):

1. Reema Thareja,–”Python Programming using problem solving approach,”-First Edition, 2017,Oxford University Press.
2. Dr.R.Nageswara Rao, – Core Python Programming , First Edition, 2017, Dreamtech Publishers.

REFERENCE BOOK (S):

1. Vamsi Kurama–Python Programming: A Modern Approach, Pearson Education.
2. Mark Lutz, Learning Python, Orielly.
3. Adam Stewarts, – Python Programming -Online.
4. Fabio Nelli – Python Data Analytics, A Press.
5. Kenneth A.Lambert ,– Fundamentals of Python –First Programs, CENGAGE Publication.

ONLINE RESOURCE (S):

1. <https://www.programiz.com/python-programming>
2. <https://www.guru99.com/python-tutorials.html>
3. https://www.w3schools.com/python/python_intro.asp

COURSE OUTCOMES:

On completion of this course, students will	
CO1	Learn the basics of python, Do simple programs on python – K3
CO2	Develop program using selection statement, Work with Loops – K4
CO3	Concept of function, function arguments – K3, K5
CO4	Work with List, tuples and dictionary, Write program using list, Tuples and dictionary – K3, K4
CO5	Usage of File handlings in python, Concept of reading and writing files, Do programs using files – K2, K4

MAPPING WITH PROGRAMME OUTCOMES:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	3	3	3
CO2	3	2	2	3	2	3
CO3	3	2	2	3	2	2
CO4	3	2	2	3	2	3
CO5	3	2	2	3	3	3

Mean Overall Relationship is 2.53 which is HIGH

Title of the Course : PYTHON PROGRAMMING PRACTICAL

Category of the Course : Core Course

Course Code : U1R3CACC2P

Nature of the Course : Employability

Marks : CIA : 40 + Ext: 60 = 100

Hrs / Week: 05

Credit: 05

Total Inst. Hours: 75

COURSE OBJECTIVES:

1. Be able to design and program Python applications.
2. Be able to create loops and decision statements in Python.
3. Be able to work with functions and pass arguments in Python.
4. Be able to build and package Python modules for reusability.
5. Be able to read and write files in Python.

LIST OF PRACTICALS:

1. Program using variables, constants, I/O statements in Python.
2. Program using Operators in Python.
3. Program using Conditional Statements.
4. Program using Loops.
5. Program using Jump Statements.
6. Program using Functions.
7. Program using Recursion.
8. Program using Arrays.
9. Program using Strings.
10. Program using Modules.
11. Program using Lists.
12. Program using Tuples.
13. Program using Dictionaries.
14. Program for File Handling.

COURSE OUTCOMES	
On completion of this course, students will	
CO1	Demonstrate the understanding of syntax and semantics of – K3
CO2	Identify the problem and solve using PYTHON programming techniques – K3
CO3	Identify suitable programming constructs for problem solving – K3
CO4	Analyze various concepts of PYTHON language to solve the problem in an efficient way – K5
CO5	Develop a PYTHON program for a given problem and test for its correctness – K5

MAPPING WITH PROGRAMME OUTCOMES:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	2	3	2
CO2	2	1	3	2	2	2
CO3	3	3	1	3	1	2
CO4	2	3	3	2	3	1
CO5	3	2	3	1	1	2

Mean Overall Relationship is 2.13 which is HIGH

Title of the Course : STRUCTURED PROGRAMMING LANGUAGE IN C

Category of the Course : FOUNDATION COURSE

Course Code : U1R3CAFC

Nature of the Course : EMPLOYABILITY

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week: 02

Credit: 02

Total Inst. Hours: 30

COURSE OBJECTIVES:

1. To familiarize the students with the Programming basics and the fundamentals of C
2. To understand the concept using if statements and loops
3. To understand the concept of Arrays
4. To understand the concept of Functions
5. To understand the concept of implementing pointers.

Unit- I: Overview of C

(Inst.Hrs:06)

Importance of C, sample C program, C program structure, executing C program. Constants, Variables, and Data Types: Character set, C tokens, keywords and identifiers, constants, variables, data types, declaration of variables, assigning values to variables---Assignment statement, declaring a variable as constant, Operators and Expression.

Unit –II: Decision Making and Branching:

(Inst.Hrs:06)

Decision making with If, simple IF, IF ELSE, nested IF ELSE, ELSE IF ladder, switch, GOTO statement. Decision Making and Looping: While, Do-While, For, Jumps in loops.

Unit – III: Arrays:

(Inst.Hrs:06)

Declaration and accessing of one & two-dimensional arrays, initializing two-dimensional arrays, multidimensional arrays.

Unit- IV: Functions:

(Inst.Hrs:06)

The form of C functions, return values and types, calling a function, categories of functions, Nested functions, Recursion, functions with arrays, call by value, call by reference.

Unit-V: Structures and Pointers

(Inst.Hrs:06)

Structures - Definition and declaration – Pointers – Definition - declaring and initializing pointers, accessing a variable through address and through pointer

TEXT BOOK (S):

1. E.Balagurusamy, "Programming in ANSI C", Fifth Edition, Tata McGraw-Hill, 2010.

REFERENCE BOOK (S):

1. Byron Gottfried, Schaum's Outline Programming with C, Fourth Edition, Tata McGraw-Hill, 2018.
2. Kernigh and Ritchie, The C Programming Language, Second Edition, Prentice Hall, 1998
3. Yashavant Kanetkar, Let Us C, Eighteenth Edition, BPB Publications, 2021.

ONLINE RESOURCE (S):

1. <https://www.tutorialspoint.com/c programming>

COURSE OUTCOMES:

COURSE OUTCOMES	
On completion of this course, students will	
CO1	Know the purpose of C and Structure of C – K1
CO2	Identify the types of Branching statements in C – K3
CO3	Know the concepts of Arrays – K3
CO4	Know the concepts of Functions – K3
CO5	Develop a C program using Structures and Pointers – K5

MAPPING WITH PROGRAMME OUTCOMES:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	2	2	2
CO2	2	2	2	2	3	2
CO3	3	2	2	3	2	3
CO4	3	2	2	2	3	1
CO5	2	2	2	2	2	3

Mean Overall Relationship is **2.16** which is **HIGH**

Title of the Course : COMPUTER SKILL DEVELOPMENT COURSE

Category of the Course : SKILL ENHANCEMENT COURSE

Course Code : U1R3CASEC1:1

Nature of the Skill : Employability

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 02

Credits : 02

Total Inst. Hrs : 30

COURSE OBJECTIVES

1. To understand the basics of computer.
2. To understand the concept of computer component.
3. To get the knowledge about programming languages.
4. To understand the concept of computer networks.
5. To get the knowledge about applications of computer.

UNIT - I: Introduction to Computer

(Inst Hrs: 06)

Generations of Computer - Types of Computers (**ICT**) - Characteristics of Computers - Purpose of Computer – Limitations of Computer - Classification of Digital Computer Systems - Functions and Components of a Computer (**Assignment**).

UNIT - II: Computer Components

(Inst Hrs: 06)

Memory Units - Main and Auxiliary Storage Devices (**Seminar**) - Input Devices - Output Devices - Classification and Characteristics of Output Devices - Introduction to Computer Software: System Software and Application Software.

UNIT - III: Programming languages

(Inst Hrs: 06)

Types of Programming Languages - General Software Features and Trends - Data Processing - Introduction to Database Management Systems (**Assignment**) - Introduction to Telecommunications.

UNIT - IV: Computer Networks

(Inst Hrs: 06)

Types of Networks - Network Topologies - Network Protocols - Network Architecture - Communication Systems (**ICT**) - Internet and World Wide Web: Internet Access and Basics - Internet Protocols - Internet Addressing – WWW – HTML (**Seminar**) - E-mail (**Seminar**) - Introduction to Multimedia

UNIT - V: Applications of Computers

(Inst Hrs: 06)

Computers in Business and Industry- Computers in Home- Computers in Education and Training- Computers in Entertainment, Science, Medicine and Engineering (**ICT**).

TEXTBOOK (S):

1. Alexis Leon, Mathews Leon “Fundamentals of Information Technology”, Vikas Publications, 1999.

REFERENCE BOOK (S):

1. Dennis P.Curtin, Kim Foley, Kunal Sen, Cathleen Morin “Information Technology the breaking wave”, TATA-McGRAW-HILL 2007.
2. V.Rajaraman, “Introduction to Information Technology”, PHI Learning Private Limited, 2003.

ONLINE RESOURCE (S):

1. https://www.tutorialspoint.com/data_communication_computer_network

COURSE OUTCOMES:

After the successful completion of the Course the Students shall be able to,

1. Summarize the knowledge about computers and its types - K2
2. Exploit the skills about Input, Output and Memory Units - K3
3. Acquire the competence of computers and its applications - K3
4. Apply the knowledge about various types of programming language - K3
5. Show the insight about role of computers in human life - K2

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	3	2	2	3	2	3	3	3	3	3
CO-2	3	2	3	1	2	3	2	2	2	3
CO-3	3	1	2	1	2	2	2	2	3	3
CO-4	3	3	1	2	3	2	3	2	2	2
CO-5	3	3	2	1	2	2	2	2	2	2

Mean Overall Relationship is **2.28** which is **HIGH**

Title of the Course : INTERNET SKILL DEVELOPMENT COURSE

Category of the Course : SKILL ENHANCEMENT COURSE

Course Code : U1R3CASEC1:2

Nature of the Skill : Employability and Skill development

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 02

Credits : 02

Total Inst. Hrs : 30

COURSE OBJECTIVES

1. To understand the basics of Internet concepts.
2. To understand the web servers, browsers, security.
3. To get the knowledge about creating websites and markup languages.
4. To get the knowledge about searching and web casting techniques.
5. To get the knowledge about network and security programming.

UNIT - I: Introduction to Network and Internet

(Inst Hrs: 06)

Basics of Networks – Topologies of Networks - Layering in Networks – Switching in the Network – Bridges, Routers and Gateways – Types of Networks (**ICT**). Internet: Basics of Internet – Addresses and Names for the Internet, Web Objects and Sites – E Mail (**Seminar**) - WWW – FTP - Telnet.

UNIT - II: Web Servers, Browsers and Security

(Inst Hrs: 06)

The Web Server – Proxy Server – The Fast Ready Connection on the Web – Web Browsers – Netscape Communication Suite – Microsoft Internet Explorer (**Seminar**) – The Virus Menace in the Internet – Firewalls – Data Security.

UNIT - III: Creating Websites and Markup Language

(Inst Hrs: 06)

The Art of Creating a Web Site – Hypertext and HTML – HTML Document Features – Document Structuring Tags in HTML – Special Tags in HTML (**Assignment**) – Dynamic HTML – XML for Universal Format for the Data on the web – Microsoft Front Page

UNIT - IV: Searching and Web Casting Techniques

(Inst Hrs: 06)

Introduction – Search – Subscription – Web Casting (**Assignment**) – Web Casting Channel Push Technology Mode – Search Alerts – Searching Citation – Search Engines – Search Tools (**ICT**) – Using Navigator, Using Internet Explorer, Saving Search Results – Subscribing – Channels.

UNIT - V: Network and Security Programming (Inst Hrs: 06)

Network Programming (**Seminar**) – URL Classes – Socket Classes – Programming for Security – CGI – Four Steps for CGI Script – CGI Script Language (**ICT**) – Scripting Language “Java Script” – Dynamic Page Functionality using Servlets and JSPs – Using ASP, COMs, DCOMs.

TEXTBOOK (S):

1. Raj Kamal, “Internet and Web Technologies” Tata McGraw- Hill Publishing company limited, New Delhi

REFERENCE BOOK (S):

1. K.L.James ,“The Internet - A User’s Guide”, PHI Learning Private Limited 2010.

ONLINE RESOURCE (S):

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

COURSE OUTCOMES:

After the successful completion of the Course the Students shall be able to,

1. Outline about the Internet and its Applications - K2
2. List the skills of Servers, Browsers and Security - K1
3. Make use of HTML and XML in designing web pages - K3
4. Chose opt words for Searching and utilize web search engine - K5
5. Know where to apply the knowledge about network and security programming – K1, K3

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	3	1	1	2	3	3	2	2	3	3
CO-2	3	3	2	2	2	3	2	2	2	3
CO-3	2	2	1	2	2	2	3	2	2	3
CO-4	3	2	1	2	2	2	2	3	3	3
CO-5	3	2	2	2	3	3	3	3	3	3

Mean Overall Relationship is **2.36** which is **HIGH**

Title of the Course : COMPUTER APPLICATIONS IN CHEMISTRY

Category of the Course : SKILL ENHANCEMENT COURSE

Course Code : U1R3CASEC1:3

Nature of the Skill : Employability

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 02

Credits : 02

Total Inst. Hrs : 30

COURSE OBJECTIVES

1. To enable the students to learn the basics of computer.
2. To understand the concept of operating systems and its types.
3. To learn computer network basics.
4. To introduce the concept of C programming to the learners.
5. To enable them to apply the concept of Programming in the field of Chemistry.

UNIT - I: Introduction to Computer

(Inst Hrs: 06)

Characteristics of Computers – Organization of A Computer – Secondary Storage Devices – Computer Languages – Low Level, Assembly and High Level Languages – Software – System and Application Software – Applications of Computer (ICT) – Algorithms and Flow Charts.

UNIT - II: Operating system

(Inst Hrs: 06)

MS-DOS, Simple DOS Commands – MS-Windows - Components of Windows – Desktop, My Computer, Recycle Bin, Taskbar, My Briefcase and Network Neighborhood – Windows Accessories – Calculator, Games, Windows Media Player, Notepad and Imaging – Windows Explorer. Power Point – Creating a Presentation – Slide Preparation (Seminar).

UNIT - III: Fundamentals of Computer Networks

(Inst Hrs: 06)

Importance – Mode of Connections – Protocol – Network Topologies – Bus, Ring And Star Topologies – Network Architecture – Network Components – Hubs, Cables, Repeaters, Routers and Bridges, Internet and its Application: Internet – Meaning – Importance – WWW (Assignment) – Browsing the Internet – Browsing Software – URL Addresses, Search Engines, Exploring Websites and Downloading Materials from Websites, E-Mail – Sending, Receiving and Storing Mail and Chatting.

UNIT - IV: Fundamentals of C

(Inst Hrs: 06)

Character Set – Identifiers – Keywords – Data Types – Constants – Variables – Symbolic Constants – Operators – Expressions – Evaluation of Expressions. Input and Output Functions - getchar – putchar – scanf – printf – gets and puts Functions (ICT).

UNIT – V: Applications of C - Programming:

(Inst Hrs: 04)

Basic Structure of C – Programming - Conversion of temperature from Kelvin to Celsius- Calculation of rate constant using first order rate equation- Calculation of root mean square, average and most probable velocities of molecules- Calculation of Bohr radius- pH determination using Henderson equation- Determination of vander Waals constants (ICT)

TEXT BOOK (S):

1. E. Balagurusamy “Programming in ANSI C” 6th Ed., Tata McGraw-Hill – New Delhi.
2. Pundir Ansu Bansal “Computers for Chemists” 9th Ed., Pragati Prakashan Publication, 2011.
3. Andrews Tenenbaum “Computer Networks” 4th Ed., Prentice-Hall of India Pvt.Ltd. New Delhi -110 001.

REFERENCE BOOK (S):

1. Kishor Arora “Computer Application in Chemistry” 1st Ed., Anmol Publications Pvt. Ltd. 2004.
2. K.V.Raman “Computer Chemistry” Tata Mc Graw Hill 2003.

ONLINE RESOURCE (S):

1. https://www.tutorialspoint.com/data_communication_computer_network

COURSE OUTCOMES:

After the successful completion of the Course the Students shall be able to,

1. Apply the knowledge about computer in real life - K3
2. Understand the need for operating system - K2
3. Understand the fundamentals of computer networks - K2
4. Understand the basics of the programming language C - K2
5. Make use of the applications of ‘C’ in Chemistry - K3

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	3	2	2	1	2	3	2	3	2	2
CO-2	3	1	2	1	2	2	3	3	2	2
CO-3	3	3	3	3	3	3	3	3	3	3
CO-4	3	1	1	1	2	2	1	2	1	2
CO-5	3	2	1	1	3	2	2	2	3	3

Mean Overall Relationship is 2.22 which is HIGH

SEMESTER II

Title of the Course : OBJECT ORIENTED PROGRAMMING CONCEPTS USING C++

Category of the Course : CORE COURSE

Course Code : U2R3CACCC3

Nature of the Skill : Employability

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 05

Credits : 05

Total Inst. Hrs : 75

Course Objectives:

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.
3. Describe the concept of function overloading, operator overloading, virtual functions and Polymorphism.
4. Classify inheritance with the understand in go fearly and late binding, usage of exception handling.
5. Demonstrate the use of various OOPs concepts with the help of programs.

UNIT-I

(Inst Hrs : 15)

Introduction to C++ - Basic concepts of Object-Oriented Programming -- Benefits of OOP – Object Oriented Languages – I/O in C++ - C++Declarations – Structure of C++ Program – Tokens, Keywords, Identifiers, Constants.

UNIT-II

(Inst Hrs : 15)

Control Structures:- Decision Making and Statements: If..else, jump, goto, break, continue, Switch case statements - Loops in C++ :for, while, do. Functions in C++ - inline functions – Function Overloading.

UNIT-III

(Inst Hrs : 15)

Classes and Objects: Declaring Objects – Defining Member Functions –Static Member variables and functions–array of objects – friend functions – Overloading member functions – Constructor and Destructor.

UNIT-IV

(Inst Hrs : 15)

Operator Overloading: Unary, binary operators–Overloading Friend functions –type conversion – Inheritance: Types of Inheritance – Single, Multilevel, Multiple, Hierarchal, Hybrid, Multipath inheritance – Virtual base Classes – Abstract Classes.

UNIT-V

(Inst Hrs : 15)

Pointers–Declaration – Arrays – Characteristics – array of classes - Files –File stream classes – file modes – Sequential Read /Write operations

Text Book:

E.Balagurusamy,–Object-OrientedProgrammingwithC++II, TMH2013, 7thEdition.

Reference Books:

1. Ashok N Kamthane – Object Oriented Programming with ANSI and Turbo C++, Pearson Education, 2003.
2. Maria Litvin & Gray Litvin – C++ for you, Vikas publication 2002.

Web Resources:

<https://alison.com/course/introduction-to-c-plus-plus-programming>

Course Outcomes:

Course Outcomes		Programme Outcome
CO	Upon completion of the course the students would be able to:	
1	Remember the program structure of C with its syntax and semantics	PO1,PO6
2	Understand the programming principles in C (datatypes, operators, branching and looping, arrays, functions,structures, pointers and files)	PO2
3	Apply the programming principles learnt in real- Time problems	PO4,PO7
4	Analyze the various methods of solving a problem and choose the best method	PO6
5	Code, debug and test the programs with appropriate test Cases	PO7, PO8

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	-	-	1
CO2	2	2	2	1	-	-
CO3	3	1	1	-	1	-
CO4	1	2	1	2	2	1
CO5	3	2	1	2	3	2
Weightage of course contributed to each PSO	12	9	6	5	6	4

S-Strong-3 M-Medium-2 L-Low-1

Title of the Course : C++ PROGRAMMING PRACTICAL

Category of the Course : CORE COURSE

Course Code : U2R3CACC4P

Nature of the Skill : Employability

Marks : CIA : 40 + Ext: 60 = 100

Hrs / Week : 05

Credits : 05

Total Inst. Hrs : 75

Course Objectives:

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.
3. Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.
4. Classify inheritance with the understand in go early and late binding, usage of exception handling.
5. Demonstrate the use of various OOPs concepts with the help of programs.

LIST OF PRACTICALS

- 1 Write a C++ program to demonstrate function overloading
- 2 Write a C++ program to demonstrate Class and Objects
- 3 Write a C++ program to demonstrate the concept of Passing Objects to Functions
- 4 Write a C++ program to demonstrate the Friend Functions.
- 5 Write a C++ program to demonstrate Constructor and Destructor
- 6 Write a C++ program to demonstrate Binary Operator Overloading
- 7 Write a C++ program to demonstrate Hierarchical Inheritance
- 8 Write a C++ program to perform Sequential I/O Operations on a file.
- 9 Write a C++ program to find the Biggest Number using Command Line Arguments

Course Outcomes:

Course Outcomes		Programme Outcome
CO	Upon completion of the course the students would be Able to:	
1	Remember the program structure of C with its syntax and semantics	PO1,PO6
2	Understand the programming principles in C (data types, operators, branching and looping, arrays, functions, structures, pointers and files)	PO2
3	Apply the programming principles learnt in real- Time problems	PO4, PO7
4	Analyze the various methods of solving a problem and choose the best method	PO6
5	Code, debug and test the programs with appropriate test Cases	PO7, PO8

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	-	-	1
CO2	2	2	2	1	-	-
CO3	3	1	1	-	1	-
CO4	1	2	1	2	2	1
CO5	3	2	1	2	3	2
Weightage of course contributed to each PSO	12	9	6	5	6	4

S-Strong-3 M-Medium-2 L-Low-1

Title of the Course : FUNDAMENTALS OF INFORMATION TECHNOLOGY

Category of the Course : SKILL ENHANCEMENT COURSE

Course Code : U2R3CASEC3:1

Nature of the Skill : Employability

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 02

Credits : 02

Total Inst. Hrs : 30

Course Objectives:

LO1. Understand basic concepts and terminology of information technology.

LO2. Have a basic understanding of personal computers and their operation.

LO3. Be able to identify data storage and its usage.

LO4. Get great knowledge of software and its functionalities.

LO5. Understand about operating system and their uses.

UNIT-I

(Inst Hrs : 06)

Introduction to Computers- Generations of Computer – Data and Information – Components of Computer – Software – Hardware – Input Devices – Output Devices –Types of Operating System.

UNIT-II

(Inst Hrs : 06)

MS Word : Introduction – Elements of Window – Files, Folders and Directories – Text Manipulating: Cut, Copy, Paste, Drag and Drop – Text Formatting: Font – Style, Size, Face and Colors (Both foreground and background) – Alignment – Bullets and Numbering – Header and footer – watermark – inserting objects (images, other application document) - Table creation – Mail merge.

UNIT-III

(Inst Hrs : 06)

MS Excel : Introduction – Inserting rows and columns – Sizing rows and columns – Implementing formulas – Generating series – Functions in excel – Creation of Chart –Inserting objects – Filter – Sorting – Inserting worksheet.

UNIT-IV

(Inst Hrs : 06)

MS PowerPoint: Introduction – Slides Manipulation (Inserting new, Copy, paste, delete and duplicate slides) – Slide show– Types of Views – Types of Animations – Inserting Objects – Implementing multimedia (Video and Audio) – Templates (Built-in and User-Defined).

UNIT-V

(Inst Hrs : 06)

Internet: Introduction to Internet and Intranet – Services of Internet - Domain Name – URL – Browser – Types of Browsers – Search Engine -E-Mail – Basic Components of E-Mail –.How to send group mail. **E-Commerce:** Digital Signature – Digital Currency – Online shopping and transaction.

Text books:

1. Anoop Mathew, S.Kavitha Murugesan (2009), -Fundamentals of Information Technology, Majestic Books.
2. Alexis Leon, Mathews Leon, Fundamentals of Information Technology, 2nd Edition.
3. S.K Bansal -Fundamentals of Information Technology.

Reference Books:

1. Bhardwaj Sushil Puneet Kumar –Fundamentals of Information Technology.
2. G G WILKINSON –Fundamentals of Information Technology, Wiley-Blackwell.
3. A Ravichandran – Fundamentals of Information Technology, Khanna Book Publishing.

Web Resources:

<https://testbook.com/learn/computer-fundamentals>

<https://www.tutorialsmate.com/2020/04/computer-fundamentals-tutorial.html>

<https://www.javatpoint.com/computer-fundamentals-tutorial>

https://www.tutorialspoint.com/computer_fundamentals/index.htm

<https://www.nios.ac.in/media/documents/sec229new/Lesson1.pdf>

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
CO1	Learn the basics of computer, Construct the structure of the required things in computer, learn how to use it.	PO1, PO2, PO3, PO4, PO5, PO6
CO2	Develop organizational structure using for the devices currently under input or output unit.	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Concept of storing data in computer using two header namely RAM and ROM with different types of ROM with advancement in storage basis.	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Work with different software, Write program in the software and Applications of software.	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Usage of Operating system in information technology which really acts As a interpreter between software and hardware.	PO1,PO2,PO3, PO4,PO5,PO6

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	2	2	1	1
CO2	3	2	3	2	3	3
CO3	3	2	2	2	2	3
CO4	2	3	3	3	3	1
CO5	3	3	3	3	3	2
Weightage of course Contributed to each PSO	13	13	13	12	12	10

S-Strong-3 M-Medium-2L-Low – 1

Title of the Course : UNDERSTANDING INTERNET

Category of the Course : SKILL ENHANCEMENT COURSE

Course Code : U2R3CASEC3:2

Nature of the Skill : Employability

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 02

Credits : 02

Total Inst. Hrs : 30

Learning Objectives:

LO1. Knowledge of Internet medium.

LO2. Internet as a mass medium.

LO3. Features of Internet Technology.

LO4. Internet as source of infotainment.

LO5. Study of internet audiences and about cybercrime.

UNIT-I (Inst Hrs : 06)

The emergence of internet as a mass medium – the world of world wide web.

UNIT-II (Inst Hrs : 06)

Features of internet as a technology.

UNIT-III (Inst Hrs : 06)

Internet as a source of infotainment – classification based on content and style.

UNIT-IV (Inst Hrs : 06)

Demographic and psychographic descriptions of internet audiences – effect
Of internet on the values and life-styles.

UNIT-V (Inst Hrs : 06)

Present issues such as cybercrime and future possibilities.

Textbooks:

1. Barnouw,E and Krishnaswamy S [1990] Indian Film. New York, OUP.
2. Kumar, Keval [1999] Mass Communication in India. Mumbai, Jaico.
3. Srivastava,KM [1992] Media Issues. Sterling Publishers Pvt. Ltd.

Reference Book:

1. Acharya,RN [1987] Television in India. Manas Publications, New Delhi.
2. Barnouw,E [1974] Documentary– A History of Nonfiction. Oxford, OUP
3. Luthra,HR [1986] Indian Broadcasting. Ministry of I & B, New Delhi.
4. Vasudev, Aruna [1986] The New Indian Cinema. Macmillan India, New Delhi.

Web Resources:

<https://www.teachucomp.com/samples/html/5/manuals/Mastering-HTML5-CSS3.pdf>
<https://www.w3schools.com/html/default.asp>

Course Outcomes

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
CO1	Knows the basic concept in internet Concept of mass medium and world wide web	PO1, PO2, PO3, PO4, PO5, PO6
CO2	Knows the concept of internet as a technology.	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Understand the concept of infotainment and classification based on Content And style	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Can be able to know about Demographic and psychographic description of Internet	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Understand the concept of cybercrime and future possibilities	PO1, PO2, PO3, PO4, PO5, PO6

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	2	3	3	3
CO3	2	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	2	3	3
Weightage of course contributed to each PSO	14	15	14	14	15	15

S-Strong-3 M-Medium-2 L-Low-1

SEMESTER – III

Title of the Course : RDBMS

Category of the Course : Core Course

Course Code : U3R3CACCS

Nature of the Skill : EMPLOYABILITY

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 06

Credits : 05

Total Inst. Hrs : 90

COURSE OBJECTIVES

1. To understand the various RDBMS Models.
2. To impart knowledge on SQL and Data Definition Language
3. To acquire Knowledge on Integrity and Security of SQL
4. To be effective in Relational Data Base Design using various Normal Forms
5. To impart knowledge on Transaction and its Management

UNIT – I: **Introduction to DBMS**

(Inst Hrs:18)

Database System Applications-DBMS Vs. File System - View of Data-Data Model Database Languages - Database users and Administrators (**ICT**) - Transaction Management - Database System Structure - Application Architecture. Data Models: Basic Concepts - Constraint- Keys- ER Diagram (**Seminar**) - Weak Entity - Extended ER Features (**Assignment**) - UML; Relational Model: Structure of Relational Databases - Relational Algebra - Views.

UNIT – II: **SQL**

(Inst Hrs:18)

Background-Basic Structure-Set Operation-Aggregate Function-Null Values-Nested Sub Queries – Views (**ICT**) - Modification of the Database - Data Definition Language - Embedded SQL - Dynamic SQL.

UNIT-III : **Advanced SQL**

(Inst Hrs:20)

Integrity and Security: Domain - Constraint - Referential Integrity - assertions - Triggers - Security and Authorization - Authorization in SQL (**ICT**) - Encryption and Authentication.

UNIT – IV :**Normalization**

(Inst Hrs:18)

Relational Database Design: First Normal Form (**Seminar**) - Pitfalls in Relational Database Design- Functional Dependencies (Second Normal Form) - Boyce-Codd Normal Form - Third Normal Form - Fourth Normal Form - Overall Database Design Process.

UNIT-V : **Transaction Management**

(Inst Hrs:16)

Transaction concepts (**Assignment**) - States - Serializability. Lock based concurrency control: Locks (**Seminar**) - Granting - Two-Phase Locking protocol. Time stamp based protocol: Timestamps - Timestamp ordering protocol - Dead lock handling.

TEXT BOOK (S):

1. A Silberschatz, H Korth, S Sudarshan, "Database System and Concepts", 5th Edition McGraw-Hill, 2005.

REFERENCE BOOK (S):

1. Alexis Leon & Mathews Leon, "Essential of DBMS", 2nd reprint, Vijay Nicole Publications, 2009.
2. Alexis Leon & Mathews Leon, "Fundamentals of DBMS", 2nd Edition, Vijay Nicole Publications, 2014.

ONLINE RESOURCE (S):

1. <https://www.tutorialspoint.com/sql/sql-rdbms-concepts.htm>
2. <https://www.oracle.com/in/database/what-is-a-relational-database/>

COURSE OUTCOMES

After the successful completion of the Course the Students shall be able to,

CO - 1. Gain knowledge in the concepts of DBMS and their models – **K3**

CO - 2. Apply Set operations and aggregate function in queries – **K3**

CO - 3. Evaluating Integrity and Security Constraints – **K5**

CO - 4. Create a Normalized data by Applying the Normalization techniques – **K6**

CO - 5. Have a career in the field of Data Science as a Data Base Administrator – **K3**

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	2	2	3	1	2	3	2	1	2	2
CO-2	3	3	2	2	2	2	3	3	1	3
CO-3	2	1	3	2	3	3	3	2	2	2
CO-4	1	3	2	2	3	2	2	3	3	2
CO-5	2	2	3	2	1	2	3	2	3	2

Mean Overall Relationship is **2.24** which is **HIGH**

Title of the Course : SQL AND PL/SQL PRACTICAL

Category of the Course : Core Course

Course Code : U3R3CACC6P

Nature of the Skill : EMPLOYABILITY

Marks : CIA :40 + Ext: 60= 100

Hrs / Week : 05

Credits :05

Total Prac. Hrs : 75

COURSE OBJECTIVES

1. To understand the various RDBMS Models.
2. To impart knowledge on SQL and Data Definition Language
3. To acquire Knowledge on Integrity and Security of SQL
4. To be effective in Relational Data Base Design using various Normal Forms
5. To impart knowledge on Transaction and its Management

LIST OF PRACTICAL PROGRAMS

1. Create a table with 5 fields.
2. Create a table with Primary key constraints.
3. Create a table with all possible constraints by insert command.
4. Create tables and do Data Manipulation of Base Tables and Views.
5. Demonstrate the Query commands.
6. Write a PL/SQL code block that will accept an account number from the user and debit an amount of Rs.2000 from the account if the account has a minimum balance of 500 after the amount is debited. The Process is to be fired on the Accounts table.
7. Write a PL/SQL code block to calculate the area of the circle for a value of radius varying from 3 to 7 . Store the radius and the corresponding values of calculated area in a table Areas.
8. Write a PL/SQL block of code for reversing a number. (Example: 1234 as 4321).
9. Create a transparent audit system for a table Client_master (client_no, name, address, Bal_due). The system must keep track of the records that are being deleted or updated. The functionality being when a record is deleted or modified the original record details and the date of operation are stored in the audit client (client_no, name, bal_due, operation, userid, update) table, then the delete or update is allowed to go through.

Title of the Course : DATA STRUCTURES AND ALGORITHMS

Category of the Course : SKILL ENHANCEMENT COURSE

Course Code : U3R3CASEC4:1

Nature of the Skill : SKILL DEVELOPMENT

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 03

Credits : 02

Total Inst. Hrs : 45

COURSE OBJECTIVE

1. To understand the concepts of ADTs.
2. To learn linear data structures-lists, stacks, queues.
3. To learn Tree structures and application of trees.
4. To learn graph structures and application of graphs.
5. To understand various sorting and searching.

UNIT – I: ADT and Linked list

(Inst.Hrs:10)

Abstract Data Types (ADTs) - List ADT – array - based implementation - linked list implementation: singly linked lists - circular linked lists - doubly-linked lists - applications of lists.

UNIT – II: Stack and Queue

(Inst.Hrs:10)

Stack ADT – Operations – Applications - Evaluating arithmetic expressions - Conversion of infix to postfix expression - Queue ADT – Operations - Circular Queue.

UNIT – III: Trees

(Inst.Hrs:10)

Tree ADT - tree traversals - Binary Tree ADT - expression trees - applications of trees - binary search tree ADT - Threaded Binary Trees - AVL Trees.

UNIT – IV: Graphs

(Inst.Hrs:08)

Definition - Representation of Graph - Types of graph - Breadth first traversal – Depth first traversal - Topological sort - Applications of graphs.

UNIT – V: Sorting Algorithms

(Inst.Hrs:07)

Searching - Linear search - Binary search – Sorting - Bubble sort - Selection sort - Insertion sort - Shell sort - Radix sort – Hashing - Hash functions.

TEXT BOOK (S):

1. Mark Allen Weiss – “Data Structures and Algorithm Analysis in C++”, Pearson Education 2014, 4th Edition.
2. Reema Thareja, – “Data Structures Using C”, Oxford Universities Press 2014, 2nd Edition

REFERENCE BOOK (S):

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein – “Introduction to Algorithms,” McGraw Hill 2009, 3rd Edition.
2. Aho, Hopcroft and Ullman – “Data Structures and Algorithms”, Pearson Education 2003.

ONLINE RESOURCE (S):

1. NPTEL & MOOC courses titled Data Structures.
2. <https://nptel.ac.in/courses/106106127/>

Course Outcomes

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
1	Understand the concept of Dynamic memory management, datatypes, algorithms, Big Oh notation	PO1,PO6
2	Understand basic data structures such as arrays, linked lists, stacks and queues	PO2
3	Describe the hash function and concepts of collision and Its resolution methods	PO2,PO4
4	Solve problem involving graphs, trees and heaps	PO6,PO8
5	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data	PO7

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	-	1	-
CO2	1	2	1	-	-	-
CO3	3	1	2	1	-	-
CO4	2	2	1	-	-	1
CO5	3	1	1	-	-	-
Weightage of course Contributed to each PSO	12	9	8	1	1	1

S-Strong-3 M-Medium-2L-Low-1

Title of the Course : DATA MINING AND WAREHOUSING

Category of the Course : SKILL ENHANCEMENT COURSE

Course Code : U3R3CASEC4:2

Nature of the Skill : SKILL DEVELOPMENT

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 03

Credits : 02

Total Inst. Hrs : 45

COURSE OBJECTIVES

1. To know the basic concepts of Data Mining.
2. To learn about handling unprocessed data.
3. To know about how to handle data in Data Warehousing.
4. To introduce the basics of Clustering and Classification.
5. To understand various Cluster Analysis techniques.

UNIT –I: Introduction

(Inst Hrs:10)

Introduction: Data mining – Functionalities – Classification – Introduction to Data Warehousing – Data Preprocessing: Preprocessing the Data – Data cleaning – Data Integration and Transformation – Data Reduction.

UNIT – II: Data Mining

(Inst Hrs:10)

Data Mining- Primitives- Languages and System Architecture: Data Mining – Primitives – Data Mining Query Language (**Assignment**) - Architecture of Data Mining Systems. Concept Description- Characterization and Comparison (**ICT**): Concept Description- Data Generalization and Summarization (**Seminar**) - Analytical Characterization- Mining Class Comparison – Statistical Measures.

UNIT – III: Mining Association

(Inst Hrs:10)

Mining Association Rules: Basic Concepts – Single Dimensional Boolean Association Rules from Transaction Databases (**ICT**) - Multilevel Association Rules from transaction databases – Multi dimension Association Rules from Relational Database and Data Warehouses.

UNIT – IV: Classification and Prediction

(Inst Hrs:08)

Classification and Prediction: Introduction – Issues – Decision Tree Induction – Bayesian Classification (**ICT**) – Classification of Back Propagation. Classification based on Concepts from Association Rule Mining – Other Methods. Prediction (**Seminar**) – Introduction – Classifier Accuracy.

UNIT – V: Cluster Analysis

(Inst Hrs:07)

Cluster Analysis: Introduction – Types of Data in Cluster Analysis (**Assignment**) - Partitioning Methods – Hierarchical Methods-Density Based Methods – GRID Based Method – Model based Clustering Method.

TEXT BOOK (S):

1. J.Han and M. Kamber, “Data Mining Concepts and Techniques”, 2001, Harcourt India Pvt. Ltd, New Delhi.

REFERENCE BOOK (S):

1. K.P. Soman, Shyam Diwakar, V.Ajay “Insight into Data Mining Theory and Practice”, Prentice Hall of India Pvt. Ltd, New Delhi.

ONLINE RESOURCE (S):

1. <https://www.javatpoint.com/data-mining>
2. <https://www.geeksforgeeks.org/kdd-process-in-data-mining/>

COURSE OUTCOMES

After the successful completion of the Course the Students shall be to able to,

CO - 1. Build an own Data Warehousing for KDD process – **K6**

CO - 2. Illustrate Data mining concepts – **K2**

CO - 3. Elaborate on Association mining rules – **K6**

CO - 4. Analyze the cluster – **K4**

CO - 5. Solve the Cluster analysis issues using different analysis methods – **K3**

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	3	1	2	3	2	3	3	3	3	3
CO-2	3	2	3	1	2	3	2	2	2	3
CO-3	3	1	2	1	2	2	2	2	3	3
CO-4	3	3	1	2	3	2	3	2	2	2
CO-5	3	3	2	1	2	2	2	2	2	2

Mean Overall Relationship is **2.28** which is **HIGH**

SEMESTER – IV

Title of the Course : PROGRAMMING IN JAVA

Category of the Course : Core Course

Course Code : U4R3CACC7

Nature of the Skill : Skill Development and Employability

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 05

Credits : 05

Total Inst. Hrs : 75

COURSE OBJECTIVES

1. To Write Java application programs using OOP principles
2. To Understand defining classes, objects, invoking methods
3. To Understand the principles of inheritance, packages and Exceptions
4. To Develop Java program using applets
5. To Develop Graphical User Interface using AWT.

UNIT –I: **The Java Language**

(Inst Hrs:15)

The Genesis of Java: The Creation of Java – Why java is important to the Internet – The Java Buzzwords – An overview of Java: Object Oriented Programming(**ICT**)- Data types, Variables and Arrays – Type conversion and casting – Automatic type Promotion in Expressions – Arrays Packages & Interface (**ICT**): One Dimensional Array – Multi Dimensional Arrays – Operators – Control Statements.

UNIT – II: **Introducing classes**

(Inst Hrs:15)

Class Fundamentals(**ICT**) – Declaring objects – Assigning object Reference variables– Introducing Methods – Constructors – Garbage Collection – Finalize() Method– A Stack class- A Closer Look at Methods and classes: Overloading Methods – A closer look at Argument Passing – Introducing Nested and Inner classes – Exploring the String class – Using Command-Line Arguments- Inheritance Basics - Method Overriding (**Seminar**) – Dynamic Method Dispatch – Using Abstract classes – Using final with Inheritance.

UNIT – III: **Packages and Interfaces**

(Inst Hrs:15)

Packages and Interfaces - Exception Handling(**Seminar**) - Creating your own Exception Subclasses- Multithreaded Programming: Java Thread Model – Main Thread (**Seminar**) – Creating a Thread - Creating Multiple Threads–Using isAlive() and join() – Thread priorities – Synchronization – Interthread Communication.

UNIT – IV: I/O, Applets

(Inst Hrs:15)

I/O Basics - Reading console Input – Writing console output – The Print Writer Class – Reading and Writing Files- The Applet class(**Assignment**): - Applet Architecture – Applet Skeleton – Simple Applet Display methods – RequestingRepainting – HTML APPLET tag- Passing Parameters to Applet – AudioClip Interface- Event Handling Mechanisms – Delegation Event Model – Event classes – Sources of Events – Event Listener Interfaces – Adapter Classes.

UNIT – V: Introducing the AWT

(Inst Hrs:15)

AWT Classes(**Assignment**)– Window fundamentals – working with Frame Windows - working with Graphics- Using AWT controls: Controls fundamentals – Labels – using Buttons – Applying check Boxes – Check Box group – Choice controls – Using a Textfield – Using a TextArea – Understanding Layout Managers(Flow Layout only) – Menu Bars and Menus.

TEXT BOOK (S):

1. Herbert Schildt, “Java - The Complete Reference”, Ninth Edition, McGraw-Hill Education, 2014

REFERENCE BOOK (S):

1. E.Balagurusamy, “Programming with Java”, Tata McGraw-Hill EducationIndia, 2014

ONLINE RESOURCE (S):

1. <https://www.simplilearn.com/resources-to-learn-java-programming-article>
2. <https://stackify.com/java-tutorials/>

COURSE OUTCOMES

After the successful completion of the Course the Students shall be to able to,

- | | |
|--|------|
| CO - 1. Recall to write, compile, run, and test simple object-oriented Java programs | – K1 |
| CO - 2. Outline classes, objects, members of a class and relationships among them. | – K2 |
| CO - 3. Make use of Java programs using OOP principles. | – K3 |
| CO - 4. Analyze the concepts of polymorphism and inheritance | – K4 |
| CO - 5. Build Java programs to implement AWT | – K6 |

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	2	2	2	3	2	2	3	2	3	1
CO-2	3	2	2	3	2	3	2	2	3	2
CO-3	3	2	2	1	3	2	3	3	2	2
CO-4	2	3	2	3	2	3	2	3	2	2
CO-5	3	2	2	3	2	2	3	2	2	3

Mean Overall Relationship is 2.32 which is HIGH

Title of the Course : PROGRAMMING IN JAVA PRACTICAL

Category of the Course : Core Course

Course Code : U4R3CACC8P

Nature of the Skill : Skill Development and Employability

Marks : CIA : 40 + Ext: 60 = 100

Hrs / Week : 05

Credits : 05

Total Inst. Hrs : 75

COURSE OBJECTIVES

1. To gain knowledge about basic Java language syntax and semantics.
2. To implement constructors, inheritance, threads, exception handling, AWT

LIST OF PRACTICAL PROGRAMS

1. Define a class called Student with the attributes name, reg_number and marks obtained in four subjects (m1, m2, m3, m4). Write suitable constructor and methods to find the total mark obtained by the student and display the details of the student.
2. Write a Java program to find the area of a square, rectangle and triangle by (i) Overloading Constructor (ii) Overloading Method.
3. Write a java program to add two complex numbers. [Use passing object as argument and return object].
4. Define a class called Student_super with data members name, roll number and age. Write a suitable constructor and a method output() to display the details.
5. Derive another class Student from Student_super with data members height and weight. Write a constructor and a method output() to display the details which overrides the super class method output().[Apply method Overriding concept].
6. Write a java program to create an interface called Demo, which contains a double type constant, and a method called area() with one double type argument. Implement the interface to find the area of a circle.
7. Write a java program to create a thread using Thread class.
8. Demonstrate Java inheritance using extends keyword.
9. Create an applet with four Checkboxes with labels MARUTI-800, ZEN, ALTO and ESTEEM and a Text area object. The program must display the details of the car while clicking a particular Checkbox.
10. Write a Java program to throw the following exception,
 - 1) Negative Array Size
 - 2) Array Index out of Bounds
11. Write a java program to create a file menu with option New, Save and Close, Edit menu with option cut, copy, and paste.
12. Write a java programming to illustrate Mouse Event Handling.

Title of the Course : HUMAN COMPUTER INTERACTION

Category of the Course : DSE

Course Code : U4R3CADSE4:1

Nature of the Skill : Skill Development and Employability

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 03

Credits : 03

Total Inst. Hrs : 45

COURSE OBJECTIVE

1. To learn about the foundations of Human Computer Interaction.
2. To learn the design and software process technologies.
3. To learn HCI models and theories.
4. To learn Mobile Ecosystem.
5. To learn the various types of Web Interface Design.

UNIT – I: FOUNDATIONS OF HCI (Inst.Hrs:10)

The Human: I/O channels – Memory Reasoning and problem solving; The Computer: Devices – Memory – processing and networks. Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity.

UNIT – II: DESIGN&SOFTWAREPROCESS (Inst.Hrs:10)

Interactive Design: Basics – process – scenarios Navigation: screen design Iteration and prototyping. HCI in software process: Software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules: principles, standards, guidelines, rules. Evaluation Techniques – Universal Design.

UNIT – III: MODELS AND THEORIES (Inst.Hrs:10)

HCI Models : Cognitive models:- Socio - Organizational issues and stakeholder requirements Communication and collaboration models - Hypertext, Multimedia and WWW.

UNIT – IV: MOBILE HCI: (Inst.Hrs:08)

Mobile Ecosystem: Platforms, Application. frameworks. Types of Mobile Applications: Widgets, Applications, Games, Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design.

UNIT – V: WEB INTERFACE DESIGN (Inst.Hrs:07)

Designing Web Interfaces – Drag Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow –Case Studies

TEXT BOOK (S):

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, “Human – Computer Interaction”, III Edition, Pearson Education, 2004 (UNIT I, II & III).
2. Brian Fling — Mobile Design and Development, I Edition, O_Reilly Media Inc., 2009 (UNIT–IV).
3. Bill Scott and Theresa Neil — ”Designing Web Interfaces”, First Edition, O_Reilly, 2009.(UNIT-V)

REFERENCE BOOK (S):

1. Shneiderman,–Designing the User Interface: Strategies for Effective Human-Computer Interaction, V Edition, Pearson Education.

ONLINE RESOURCE (S):

1. <https://www.interaction-design.org/literature/topics/human-computer-interaction>
2. https://link.springer.com/10.1007/978-0-387-39940-9_192
3. https://en.wikipedia.org/wiki/Human%E2%80%93computer_interaction

Course Outcomes

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
1	Understand the fundamentals of HCI.	PO1
2	Understand the design and of software process technologies.	PO1, PO2
3	Understand HCI models and theories.	PO4, PO6
4	Understand Mobile Ecosystem, types of Mobile Applications ,mobile Architecture and design.	PO4, PO5, PO6
5	Understand the various types of Web Interface Design.	PO3, PO8

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	-	1	2	1	2
CO2	2	1	2	1	3	1
CO3	3	2	1	1	-	1
CO4	2	-	3	2	1	3
CO5	2	3	-	2	3	2
Weightage of course contributed to each PSO	11	6	7	8	8	9

S-Strong-3 M-Medium-2L-Low-1

Title of the Course : NATURAL LANGUAGE PROCESSING

Category of the Course : DSE

Course Code : U4R3CADSE4:2

Nature of the Skill : Skill Development and Employability

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 03

Credits : 03

Total Inst. Hrs : 45

COURSE OBJECTIVE

1. To understand approaches to syntax and semantics in NLP.
2. To learn natural language processing and to learn how to apply basic algorithms in this field.
3. To understand approaches to discourse, generation, dialogue and summarization within NLP.
4. To get acquainted with the algorithmic description of the main language levels: morphology, syntax, semantics, pragmatics etc.
5. To understand current methods for statistical approaches to machine translation.

UNIT – I: INTRODUCTION

(Inst.Hrs:10)

Natural Language Processing tasks in syntax, semantics, and pragmatics – Issue- Applications – The role of machine learning –Probability Basics –Information theory – Collocations -N-gram Language Models – Estimating parameters and smoothing – Evaluating language models.

UNIT –II: WORD LEVEL AND SYNTACTIC ANALYSIS

(Inst.Hrs:10)

Word Level Analysis: Regular Expressions – Finite - State Automata - Morphological Parsing - Spelling Error Detection and correction - Words and Word classes - Part-of Speech Tagging. Syntactic Analysis: Context-free Grammar – Constituency – Parsing - Probabilistic Parsing.

UNIT –III: SEMANTIC ANALYSIS AND DISCOURSE PROCESSING

(Inst.Hrs:10)

Semantic Analysis: Meaning Representation – Lexical Semantics – Ambiguity – Word Sense Disambiguation. Discourse Processing: cohesion-Reference Resolution - Discourse Coherence and Structure.

UNIT –IV: NATURAL LANGUAGE GENERATION:

(Inst.Hrs:08)

Architecture of NLG Systems - Generation Tasks and Representations - Application of NLG. Machine Translation: Problems in Machine Translation. Characteristics of Indian Languages - Machine Translation Approaches - Translation involving Indian Languages.

UNIT –V: INFORMATION RETRIEVAL AND LEXICAL RESOURCES: (Inst.Hrs:07)

Design features of Information Retrieval Systems - Classical, Non-classical, Alternative Models of Information Retrieval – valuation Lexical Resources: WorldNet – FrameNet Stemmers – POSTagger – Research CorporaSSAS.

TEXT BOOK (S):

1. Daniel Jurafsky, James H.Martin,– Speech & language processing, Pearson publications.
2. Allen, James. Natural language understanding. Pearson, 1995.

REFERENCE BOOK (S):

1. PierreM. Nugues,– An Introduction to Language Processing with Perl and Prolog, Springer

ONLINE RESOURCE (S):

1. https://en.wikipedia.org/wiki/Natural_language_processing
2. <https://www.techtarget.com/searchenterpriseai/definition/natural-language-processing-NLP>

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
CO1	Describe the fundamental concepts and techniques of natural language processing. Explain the advantages and disadvantages of different NLP Technologies and their applicability in different business situations.	PO1, PO2, PO3, PO4, PO5, PO6
CO2	Distinguish among the various techniques, taking into account the assumptions, strengths, and weaknesses of each Use NLP technologies to explore and gain a broad understanding of text data.	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Use appropriate descriptions, visualizations, and statistics to communicate the problems and their solutions. Use NLP methods to analyse sentiment of a text document.	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Analyze large volume text data generated from a range of real-world applications. Use NLP methods to perform topic modelling.	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Develop robotic process automation to manage business processes and to increase and monitor the inefficiency and effectiveness. Determine the framework in which artificial intelligence and the Internet of things may function, including interactions with people, enterprise functions, and environments.	PO1, PO2, PO3, PO4, PO5, PO6

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	1
CO2	2	3	3	3	2	3
CO3	1	3	3	3	1	3
CO4	3	2	1	3	2	3
CO5	3	3	3	3	3	3
Weightage of course contributed to each PSO	12	14	13	15	11	13

S-Strong-3 M-Medium-2 L-Low-1

Title of the Course : MULTIMEDIA SYSTEMS

Category of the Course : SKILL ENHANCEMENT COURSE

Course Code : U4R3CASEC5:1

Nature of the Skill : Skill Development

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 02

Credits : 02

Total Inst. Hrs : 30

COURSE OBJECTIVES

1. To understand basic concepts of Multimedia.
2. To have keen knowledge in handling the media files.
3. To acquire knowledge on animation.
4. To learn about making Multimedia.
5. To have an idea about planning and costing of Multimedia.

UNIT –I: Introduction

(Inst Hrs: 06)

Multimedia Definition - Use Of Multimedia - Delivering Multimedia - Text: About Fonts and Faces - Using Text in Multimedia **(ICT)** - Computers and Text - Font Editing and Design Tools - Hypermedia and Hypertext.

UNIT – II: Image and Audio

(Inst Hrs: 06)

Images: Plan Approach - Organize Tools - Configure Computer Workspace - Making Still Images - Color - Image File Formats **(Seminar)**. Sound: The Power of Sound - Digital Audio - Midi Audio - Midi vs. Digital Audio **(Assignment)** - Multimedia System Sounds- Audio File Formats -Vaughan's Law of Multimedia Minimums - Adding Sound to Multimedia Project.

UNIT – III: Animation and Video

(Inst Hrs: 06)

Animation: The Power of Motion - Principles of Animation **(Seminar)** - Animation by Computer - Making Animations that Work. Video: Using Video - Working with Video and Displays **(ICT)** - Digital Video Containers - Obtaining Video Clips - Shooting and Editing Video.

UNIT – IV: Multimedia

(Inst Hrs: 06)

Making Multimedia: The Stage of Multimedia Project - The Intangible Needs - The Hardware Needs **(ICT)** - The Software Needs - An Authoring Systems Needs- Multimedia Production Team.

UNIT – V: Planning and Costing

(Inst Hrs: 06)

Planning and Costing: The Process of Making Multimedia **(Assignment)** - Scheduling - Estimating - RFPs and Bid Proposals. Designing and Producing - Content and Talent: Acquiring Content - Ownership of Content Created for Project - Acquiring Talent.

TEXT BOOK (S):

1. Tay Vaughan, "Multimedia: Making It Work", 8th Edition, Osborne/McGraw- Hill, 2001.

REFERENCE BOOK (S):

1. Ralf Steinmetz & Klara Nahrstedt "Multimedia Computing, Communication & Applications", Pearson Education, 2012.

ONLINE RESOURCE (S):

1. <https://www.geeksforgeeks.org/what-is-multimedia/>
2. <https://www.tutorialspoint.com/multimedia/index.htm>

COURSE OUTCOMES

After the successful completion of the Course the Students shall be able to,

CO - 1. Summarize multimedia to potential clients – K2

CO - 2. Identify the function of the general skill sets in the multimedia industry – K3

CO - 3. Outline the basic components of a multimedia project – K2

CO - 4. Identify the hardware and software requirements for multimedia development - K3

CO - 5. Assess the cost to make the multimedia for the client – K5

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	3	1	2	3	3	3	1	1	3	3
CO-2	3	1	1	2	2	3	2	2	3	3
CO-3	2	1	2	1	2	3	1	2	3	3
CO-4	3	1	3	1	1	3	3	3	3	3
CO-5	2	1	2	2	2	3	3	3	1	3

Mean Overall Relationship is **2.22** which is **HIGH**

Title of the Course : ENTERPRISE RESOURCE PLANNING

Category of the Course : SKILL ENHANCEMENT COURSE

Course Code : U4R3CASEC5:2

Nature of the Skill : Skill Development

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 02

Credits : 02

Total Inst. Hrs : 30

COURSE OBJECTIVE

1. To understand the basic concepts, Evolution and Benefits of ERP.
2. To know the need and Role of ERP in logical and Physical Integration.
3. Identify the important business functions provided by typical business software such as enterprise resource planning and customer relationship management
4. To train the students to develop the basic understanding of how ERP enriches the business organizations in achieving a multidimensional growth
5. To aim at preparing the students technological competitive and make them ready to self-upgrade with the higher technical skills

UNIT – I: ERP Introduction

(Inst.Hrs:06)

ERP Introduction, Benefits, Origin, Evolution and Structure: Conceptual Model of ERP, the Evolution of ERP, the Structure of ERP, Components and needs of ERP, ERP Vendors; Benefits & Limitations of ERP Packages.

UNIT – II: ERP and Data Mining and Warehousing

(Inst.Hrs:06)

Need to focus on Enterprise Integration / ERP; Information mapping; Role of common shared Enterprise database; System Integration, Logical vs. Physical System Integration, Benefits & limitations of System Integration, ERP's Role in Logical and Physical Integration. Business Process Reengineering, Data warehousing, Data Mining, Online Analytic Processing(OLAP), Product Life Cycle Management(PLM), LAP, Supply chain Management.

UNIT – III: SCM and CRM

(Inst.Hrs:06)

ERP Market place and Market place Dynamics: Market Overview, Market place Dynamics, the Changing ERP Market. ERP - Functional Modules: Introduction, Functional Modules of ERP Software, Integration of ERP, Supply chain and Customer Relationship Applications. Cloud and Open Source, Quality Management, Material Management, Financial Module, CRM and Case Study.

UNIT –IV: ERP Life Cycle and Object Oriented Architecture

(Inst.Hrs:06)

ERP Implementation Basics, ERP implementation Strategy, ERP Implementation Life Cycle, Pre-Implementation task, Role of SDLC / SSAD, Object Oriented Architecture, Consultants, Vendors and Employees.

UNIT- V: ERP and E-Commerce

(Inst.Hrs:06)

ERP & E-Commerce, Future Directives – in ERP, ERP and Internet, Critical success and failure factors, Integrating ERP into organizational culture. Using ERP tool: either SAP or ORACLE format to case study.

TEXT BOOK (S):

1. Enterprise Resource Planning – Alexis Leon, Tata McGraw Hill.

REFERENCE BOOK (S):

1. Enterprise Resource Planning – Diversified by Alexis Leon, TMH.
2. Enterprise Resource Planning – Ravi Shankar & S. Jaiswal, Galgotia.

ONLINE RESOURCE (S):

1. https://www.tutorialspoint.com/management_concepts/enterprise_resource_planning.htm
2. <https://www.saponlinetutorials.com/what-is-erp-systems-enterprise-resource-planning/>
3. <https://www.guru99.com/erp-full-form.html>

Course Outcomes

Course Outcomes	On completion of this course, students will;	
CO1	Understand the basic concepts of ERP.	PO1, PO2, PO6
CO2	Identify different technologies used in ERP	PO2, PO3, PO8
CO3	Understand and apply the concepts of ERP Manufacturing Perspective and ERP Modules	PO1, PO3, PO7
CO4	Discuss the benefits of ERP	PO2, PO6
CO5	Apply different tools used in ERP	PO1, PO3, PO8

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	3	2	1	3	2
CO2	3	2	-	1	2	-
CO3	2	3	2	2	3	2
CO4	1	-	2	1	-	2
CO5	3	3	-	1	3	-
Weightage of course contributed to each PSO	10	11	6	7	11	6

S-Strong-3 M-Medium-2L-Low-1

Title of the Course : WEB DESIGN

Category of the Course : SKILL ENHANCEMENT COURSE

Course Code : U4R3CASEC6:1

Nature of the Skill : Skill Development

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 03

Credits : 02

Total Inst. Hrs : 45

COURSE OBJECTIVE

1. Understand the basics of HTML and its components
2. To study about the Graphics in HTML.
3. Understand and apply the concepts of XML and DHTML
4. Understand the concept of Java Script
5. To identify and understand the goals and objectives of the Ajax

UNIT – I: Introduction to HTML

(Inst.Hrs:10)

HTML: HTML Introduction - tag basics - page structure - adding comments working with texts, paragraphs and line break. Emphasizing text - heading and horizontal rules – list - font size, face and color - Alignment links – tables - frames.

UNIT – II: Forms and Images Using HTML

(Inst.Hrs:10)

Forms & Images Using Html: Graphics: Introduction-How to work efficiently with images in web pages, image maps, GIF animation, adding multimedia, data collection with html forms textbox, password, list box, combo box, text area, tools for building web page front page.

UNIT – III: XML and DHTML

(Inst.Hrs:10)

XML & DHTML: Cascading style sheet (CSS) - what is CSS - Why we use CSS - adding CSS to your webpages - Grouping styles – extensible markup language(XML).

UNIT – IV: DCOM and CSS

(Inst.Hrs:10)

Dynamic HTML: Document object model (DCOM) - Accessing HTML & CSS through DCOM, Dynamic content styles & positioning - Event bubbling - data binding.

JavaScript: Client-side scripting, What is JavaScript, How to develop Java Script, simple JavaScript, variables, functions, conditions, loops and repetition

UNIT- V: Java Script

(Inst.Hrs:05)

Advance script, Java Script and objects, Java Script own objects, the DOM and web browser environments, forms and validations.

TEXT BOOK (S):

1. Pankaj Sharma –Web Technology, S k Kataria & Sons Bangalore 2011.
2. Mike Mcgrath, – JavaScript, DreamTech Press 2006, 1st Edition.
3. Achyut S Godbole & Atul Kahate, – Web Technologies, 2002, 2nd Edition.

REFERENCE BOOK (S):

1. Laura Lemay, Rafe Colburn, Jennifer Kyrnin, – Mastering HTML, CSS & Javascript, Web Publishing, 2016.
2. DT Editorial Services (Author) – HTML5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery), Paper back 2016, 2nd Edition.

ONLINE RESOURCE (S):

1. NPTEL & MOOC courses titled Web Design and Development.
2. <https://www.geeksforgeeks.org>

Course Outcomes

CO	On completion of this course, students will	Programme Outcomes
1	Develop working knowledge of HTML	PO1, PO3, PO6, PO8
2	Ability to Develop and publish Webpages using Hypertext Markup Language (HTML).	PO1, PO2, PO3, PO6
3	Ability to optimize page styles and layout with Cascading Style Sheets (CSS).	PO3, PO5
4	Ability to develop a java script	PO1, PO2, PO3, PO7
5	An ability to develop web application using Ajax.	PO2, PO6, PO7

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	-	2	1	1
CO2	3	3	-	2	-	1
CO3	3	3	-	2	2	1
CO4	3	3	-	2	-	1
CO5	3	3	3	2	-	1
Weightage of course contributed to each PSO	15	15	3	10	3	4

S-Strong-3 M-Medium-2**L-Low-1**

Title of the Course : INTRODUCTION TO HTML

Category of the Course : SKILL ENHANCEMENT COURSE

Course Code : U4R3CASEC6:2

Nature of the Skill : Skill Development

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 03

Credits : 02

Total Inst. Hrs : 45

COURSE OBJECTIVE

1. To Insert a graphic with in a webpage.
2. To Create a link with in a webpage.
3. To Create a table with in a webpage.
4. To Insert heading levels within a webpage.
5. To Insert ordered and unordered lists with in a web page. Create a webpage.

UNIT – I: Introduction to Web

(Inst.Hrs:10)

Introduction: Web Basics: What is Internet – Web browsers – What is Web page – HTML Basics: Understanding tags.

UNIT – II: HTML tags

(Inst.Hrs:10)

Tags for Document structure (HTML, Head, Body Tag). Block level text elements: Headings paragraph(<p>tag) – Font style elements: (bold, italic, font, small, strong, strike, big tags)

UNIT – III: Lists

(Inst.Hrs:10)

Lists: Types of lists: Ordered, Unordered – Nesting Lists – Other tags: Marquee, HR, BR-Using Images –Creating Hyperlinks.

UNIT – IV: Tables and Images

(Inst.Hrs:10)

Tables: Creating basic Table, Table elements, Caption – Table and cell alignment – Rowspan, Colspan – Cell padding.

UNIT – V: Frames

(Inst.Hrs:05)

Frames: Frame set – Targeted Links – No frame – Forms: Input, Text area, Select, Option.

TEXT BOOK (S):

1. Mastering HTML5 and CSS3 Made Easy, Teach U CompInc.,2014.

REFERENCE BOOK (S):

1. Thomas Michaud, “Foundations of Web Design: Introduction to HTML&CSS”

ONLINE RESOURCE (S):

1. <https://www.teachucomp.com/samples/html/5/manuals/Mastering-HTML5-CSS3.pdf>
2. <https://www.w3schools.com/html/default.asp>

Course Outcomes

Course Outcomes	Programme Outcomes
On completion of this course, students will	
Knows the basic concept in HTML Concept of resources in HTML	PO1, PO2, PO3, PO4, PO5, PO6
Knows Design concept. Concept of Meta Data Understand the concept of save the files.	PO1, PO2, PO3, PO4, PO5, PO6
Understand the page formatting. Concept of list	PO1, PO2, PO3, PO4, PO5, PO6
Creating Links. Know the concept of creating link to email address	PO1, PO2, PO3, PO4, PO5, PO6
Concept of adding images Understand the table creation.	PO1, PO2, PO3, PO4, PO5, PO6

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	2	3	3	3
CO3	2	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	2	3	3
Weightage of course Contributed to each PSO	14	15	14	14	15	15

S-Strong-3 M-Medium-2 L-Low-1

Title of the Course : ENVIRONMENTAL STUDIES

Category of the Course : ABILITY ENHANCEMENT COURSE

Code : U4R3EVS

Nature of the Skill : Skill Development

Marks : CIA : 25+ Ext: 75 = 100

Hrs / Week : 02

Credits : 02

Total Inst. Hrs : 30

COURSE OBJECTIVES

1. To impart basic knowledge of various natural resources
2. To understand the importance of ecosystem and biodiversity in Earth
3. To be effective in Pollution & waste water management of our nation.
4. To acquire knowledge on environmental issues & social issues.
5. To gain the knowledge about population management.

UNIT I : The Multidisciplinary Nature Of Environmental Studies: (Inst. Hrs:06)

Definition, Scope and Importance - Need Of Public Awareness. **Natural Resources:** Renewable And Non-Renewable Resource, Natural Resources And Associated Problems.

- a) Forest resources: Use and over-exploitation, Deforestation, Case studies. Timber extraction, mining, Dams and their effects on forests and tribal people.
 - b) Water resources: use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams - benefits of and related problems.
 - c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
 - d) Food resources: World food problems, changes caused by agriculture and overgrazing, Effects of modern agriculture, fertilizer and pesticide problems, Water logging, salinity, case studies.
 - e) Energy resources: Growing energy needs, Renewable and non-renewable energy resources, use of alternate energy sources, case studies
 - f) Land resources: land as a resource, land degradation, man induced landslides, soil erosion desertification.
- Role of an individual in conservation of natural resources.
 - Equitable use of resources for sustainable lifestyle.

Unit – II : Ecosystem: (Inst. Hrs: 06)

Concept Of An Ecosystem - Structure And Functions Of An Ecosystem – Producers, Consumers And Decomposers - Energy Flow In The Ecosystem - Ecological Succession - Food Chains, Food Webs And Ecological Pyramids. Types, Characteristic Feature, Structure And Functions Of The Following Ecosystem: Forest Ecosystems, Grassland Ecosystems, Desert Ecosystems And Aquatic Ecosystems (Ponds, Streams, Lakes, Rivers, Oceans, Estuaries).

Biodiversity:

Introduction - Definition: Genetic, Species And Ecosystem Diversity. Biogeographical Classification Of India, Value Of Biodiversity: Consumptive Use, Productive Use, Social, Ethical, Aesthetic And Option Values. Biodiversity At Global, National And Local Levels, India As A Mega-Diversity Nation, Hot-Spots Of Biodiversity, Threats To Biodiversity: Habitat Loss, Poaching Of Wildlife, Man-Wildlife Conflicts, Endangered And Endemic Species Of India, Conservation Of Biodiversity: *In-Situ* Conservation And *Ex-Situ* Conservation.

UNIT – III : Environmental pollution:

(Inst.Hours: 06)

Definition, causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Radioactive pollution.

Solid waste management:

Causes, effects and control measures of urban and industrial waste, Role of an individual in the prevention of pollution - pollution case studies - disaster management: floods, earthquakes, cyclones, landslides.

Effects of Fireworks:

Firework and celebrations, Health Hazards, Types of Fire, Firework and safety.

UNIT – IV: Social Issues and Environment:

(Inst. Hrs: 06)

From unsustainable to sustainable development, urban problems related to energy, water conservation, rainwater harvesting, watershed management. Resettlement and rehabilitation of people: Its problems and concerns - case studies, Environment ethics; issues and possible solutions. Climate change, Global Warming, Acid Rain, Ozone Layer Depletion, Nuclear Accidents and Holocaust - Case studies. Wasteland reclamation, Consumerism and waste products, Environment Protection Act - Air (prevention and control of pollution) Act, Water (prevention and control of pollution) Act - Wildlife Protection Act, Forest Conservation Act, Issues involved in the enforcement of environmental legislation. Public awareness.

UNIT – V: Human Population and the Environment:

(Inst. Hrs:06)

Population growth, variation among nations - Population explosion - Family Welfare Programmes; - Environment and human health -Human Rights and Value Education; - HIV/AIDS, Women and Child Welfare; -Role of Information Technology in Environment and Human Health; -Case Studies

Field work:

- Visit to a local area to document environmental assets: river / forest / grasslands/ hill / mountain.
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc.

REFERENCE:

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email:mapin@icenet.net (R)
- Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
- Manigandan G . 2020 Environmental Studies, PoGo publications, Trichy ISBN: 978-93-83069-36-1

COURSE OUTCOMES

Environmental Studies		Course Code : U2R2AECC1
S. No.	Course Outcome	Knowledge Level
Upon completion of course, the students will be able to		
CO - 1	Understand the resources of environment and its importance in detail.	K2
CO - 2	Get an in-depth knowledge about the nature of biodiversity.	K3
CO - 3	Apply their knowledge about solid waste management.	K3
CO - 4	Analyze various social issues & determining the solution from this.	K4
CO - 5	acquire knowledge on Human Population from case studies	K6

Relationship matrix for CO, PO and PSO

Course Outcome	Programme Outcome (PO)					Programme Specific Outcome (PSO)					
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO5	Mean
CO-1	3	2	2	2	2	3	3	2	2	3	2.4
CO-2	2	3	3	2	2	2	2	2	2	2	2.2
CO-3	2	3	3	1	3	2	3	3	3	3	2.6
CO-4	3	2	3	1	2	2	2	2	2	2	2.1
CO-5	2	2	2	3	3	3	1	3	3	2	2.4
Mean Overall Score											2.34
Result											High

Semester – V

Title of the Course : OPERATING SYSTEMS

Category of the Course : Core Course

Course Code : U5R3CACC9

Nature of the Skill : Skill Development

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 05

Credits : 05

Total Inst. Hrs : 75

COURSE OBJECTIVES

1. To introduce basic concepts and functions of operating systems.
2. To understand the concept of process, thread
3. To understand various Memory management techniques.
4. To understand the concept of Dead Locks and multiprocessor systems.
5. To understand I/O and File management techniques.

UNIT - I: Introduction

(Inst Hrs: 15)

Introduction - History of operating system- Different kinds of operating system (ICT) – Operating system concepts - System calls - Operating system structure.

UNIT - II: Processes and Thread

(Inst Hrs: 15)

Processes and Threads: Processes - threads - thread model and usage - inter process communication. (Assignment)- Scheduling.

UNIT - III: Memory Management

(Inst Hrs: 15)

Memory Management: Memory Abstraction - Virtual Memory (Seminar)- Page replacement algorithms. (ICT)

UNIT - IV: Deadlocks

(Inst Hrs: 15)

Deadlocks: Resources - introduction to deadlocks - deadlock detection and recovery - deadlocks avoidance - deadlock prevention. (Seminar). Multiple processor system: multiprocessors - multi computers. (Assignment)

UNIT - V: Input /Output and File Systems

(Inst Hrs: 15)

Input / Output: principles of I/O hardware - principles of I/O software (Seminar). Files systems: Files - directories - files systems implementation (ICT) - File System Management and Optimization.

TEXT BOOK(S)

1. Andrew S. Tanenbaum, "Modern Operating Systems", 2nd Edition, PHI private Limited, New Delhi, 2008.

REFERENCE BOOK(S)

1. William Stallings, "Operating Systems - Internals & Design Principles", 5th Edition, Prentice - Hall of India private Ltd, New Delhi, 2004.
2. Sridhar Vaidyanathan, "Operating System", 1st Edition, Vijay Nicole Publications, 2014.

ONLINE RESOURCE (S):

1. <https://www.geeksforgeeks.org/operating-systems>

COURSE OUTCOMES

After the successful completion of the Course the Students shall be to able to,

CO - 1. Describe the importance of computer system resources and the role of OS – **K3**

CO - 2. Understand the Process management policies & scheduling process by CPU - **K1**

CO - 3. Analyze the Memory management concepts and its allocation policies - **K4**

CO - 4. Gain knowledge about the concept of Deadlocks -**K3**

CO - 5. Evaluate the different functions & policies of File Management -**K3**

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	2	1	2	2	2	4	3	3	2	2
CO-2	3	2	2	3	3	3	2	3	2	3
CO-3	2	3	2	3	2	3	3	2	1	2
CO-4	3	3	2	1	3	1	2	3	2	1
CO-5	2	1	2	3	2	3	2	3	2	3

Mean Overall Relationship is **2.32** which is **HIGH**

Title of the Course : COMPUTER NETWORKS

Category of the Course : CORE COURSE

Course Code : U5R3CACC10

Nature of the Skill : Skill Development

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 05

Credits : 04

Total Inst. Hrs : 75

COURSE OBJECTIVES

1. To understand the basics of concepts pertaining to computer networks.
2. To know about sending data without errors during transmission.
3. To learn the various protocols in network environment.
4. To be aware of different algorithms involved in sending data.
5. To know about securing the data.

UNIT –I: Introduction to OSI Model

(Inst Hrs: 15)

Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP Models **(Assignment)** – Example Networks: Internet- ATM- Ethernet and Wireless LANs - Physical Layer – Theoretical Basis for Data Communication - Guided Transmission Media

UNIT – II: Wireless Transmission

(Inst Hrs:15)

Wireless Transmission - Communication Satellites – Telephone System: Structure- Local Loop- Trunks and Multiplexing and Switching. Data Link Layer: Design Issues – Error Detection and Correction.

UNIT – III: Data Link Layer

(Inst Hrs:15)

Elementary Data Link Protocols - Sliding Window Protocols **(ICT)** – Data Link Layer in the Internet - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols – Bluetooth **(Assignment)**.

UNIT – IV: Network Layer

(Inst Hrs:15)

Network Layer - Design Issues - Routing Algorithms **(ICT)** - Congestion Control Algorithms – IP Protocol – IP Addresses – Internet Control Protocols **(Seminar)**.

UNIT – V: Transport Layer

(Inst Hrs:15)

Transport Layer - Services - Connection Management - Addressing- Establishing and Releasing a Connection – Simple Transport Protocol **(Seminar)** – Internet Transport Protocols (ITP) - Network Security: Cryptography **(ICT)**.

TEXT BOOK (S):

1. A. S. Tanenbaum, “Computer Networks”, 4th Edition, Prentice-Hall of India, 2008.

REFERENCE BOOK (S):

1. B. A. Forouzan, "Data Communications and Networking", Tata McGraw Hill, 4th Edition, 2007.
2. F.Halsall, "Data Communications, Computer Networks and Open Systems", Pearson Education, 2008.
3. D. Bertsekas and R. Gallager, "Data Networks", 2nd Edition, PHI, 2008.
4. Lamarca, "Communication Networks", Tata McGraw- Hill, 2002

ONLINE RESOURCE (S):

1. <https://www.javatpoint.com/computer-network-tutorial>
2. <https://www.geeksforgeeks.org/basics-computer-networking/>

COURSE OUTCOMES

After the successful completion of the Course the Students shall be to able to,

- CO - 1.** Classify different types of networks. – **K4**
- CO - 2.** Decide which network to choose for different situations – **K5**
- CO - 3.** Utilize different types of protocols – **K3**
- CO - 4.** Develop a new routing algorithm – **K6**
- CO - 5.** Adapt new security mechanism in the network – **K5 & K6**

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	3	1	1	2	3	3	2	2	3	3
CO-2	3	3	2	2	2	3	2	2	2	3
CO-3	2	2	1	2	2	2	3	2	2	3
CO-4	3	1	1	2	2	2	3	2	3	3
CO-5	3	2	3	2	3	3	3	3	3	3

Mean Overall Relationship is **2.36** which is **HIGH**

Title of the Course : ASP.NET PROGRAMMING

Category of the Course : CORE COURSE

Course Code : U5R3CACC11

Nature of the Skill : Skill Development

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 05

Credits : 04

Total Inst. Hrs : 75

COURSE OBJECTIVE:

1. To understand the basics of .NET.
2. To understand the concepts anatomy of and ASP.NET.
3. To understand the validation.
4. To understand the data management.
5. To understand the concept of grid view.

UNIT – I: INTRODUCTION TO .NET (Inst Hrs:15)

The .NET framework-The Evolution of Web Development -The .NET Framework. The .NET Languages-C# Language Basics- Variables and Data Types. - Variable Operations- Object-Based Manipulation- Conditional Logic- Loops- Methods- The Basics About Classes- Building a Basic Class- Value Types and Reference Types- Understanding Namespaces and Assemblies- Advanced Class Programming

UNIT – II: HTML AND WEB CONTROL CLASSES (Inst Hrs:15)

The Anatomy of an ASP.NET Application - Introducing Server Controls- Improving the Currency Converter- A Deeper Look at HTML Control Classes- The Page Class- Application Events- Application Events- ASP.NET Configuration. Stepping Up to Web Controls- Web Control Classes- List Controls- Table Controls- Web Control Events and AutoPostBack- A Simple Web Page.

UNIT – III: Ad Rotator and Cookies (Inst Hrs:15)

Understanding Validation- The Validation Controls- The Calendar- The AdRotator- Pages with Multiple Views- User Controls. he Problem of State- View State- Transferring Information Between Pages- Cookies- Session State- Session State Configuration.

UNIT – IV: ADO.NET (Inst Hrs:15)

Understanding Data Management- Configuring Your Database- SQL Basics- ADO.NET Basics- Direct Data Access- Disconnected Data Access. Introducing Data Binding- Single-Value Data Binding- Repeated-Value Data Binding- Data Source Controls

UNIT – V: Grid View and File System (Inst Hrs:15)

The GridView- Formatting the GridView- Selecting a GridView Row- Editing with the GridView- Sorting and Paging the GridView- Using GridView Templates- The DetailsView and FormView. Files and Web Applications - File System Information- Reading and Writing with Streams- Allowing File Uploads

TEXT BOOK:

1. Mathew MacDonald, “**Beginning ASP.NET 3.5 in C# 2008: From Novice to Professional**”, Apress Publications, Second edition, 2007

REFERENCE BOOK:

1. Mirudula Parihar ,”**ASP.NET Bible**”, DreamTech Publication, 2007.

COURSE OUTCOMES

After the successful completion of the Course the Students shall be to able to,

- CO - 1.** To know the concept of basics of programming – **K4**
- CO - 2.** To understand the anatomy o ASP.NET – **K5**
- CO - 3.** Understand Ad Rotator components – **K3**
- CO - 4.** Develop a database programming – **K6**
- CO - 5.** Develop a program using grid and file system – **K5 & K6**

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	3	1	1	2	3	3	2	2	3	3
CO-2	3	3	2	2	2	3	2	2	2	3
CO-3	2	2	1	2	2	2	3	2	2	3
CO-4	3	1	1	2	2	2	3	2	3	3
CO-5	3	2	3	2	3	3	3	3	3	3

Mean Overall Relationship is **2.36** which is **HIGH**

Title of the Course : ASP.NET PROGRAMMING PRACTICAL

Category of the Course : CORE COURSE

Course Code : U5R3CACC12P

Nature of the Skill : Skill Development

Marks : CIA : 40 + Ext: 60 = 100

Hrs / Week : 05

Credits : 04

Total Inst. Hrs : 75

LIST OF PRACTICALS

1. Create an ASP.NET web site for job portal with web form controls, validation controls, rich controls and ADO.NET and data controls to store and retrieve data from the Sql Server database (Connected data access).
2. Create an ASP.NET web site for job portal with web form controls, validation controls, rich controls and ADO.NET and data controls to store and retrieve data from the MS Access database (Connected data access).
3. Create an ASP.NET web site for job portal with web form controls, validation controls, rich controls and ADO.NET and data controls to store and retrieve data from the Sql Server database (Disconnected Data Access).
4. Create an ASP.NET web site for college portal with web form controls, validation controls, rich controls and ADO.NET and data controls to store and retrieve data from the Sql Server database (Connected data access).
5. Create an ASP.NET web site for college portal with web form controls, validation controls, rich controls and ADO.NET and data controls to store and retrieve data from the MS Access database (Connected data access).
6. Create an ASP.NET web site for college portal with web form controls, validation controls, rich controls and ADO.NET and data controls to store and retrieve data from the MS Access database (Disconnected Data Access).
7. Create an ASP.NET web site for company portal with web form controls, validation controls, rich controls and ADO.NET and data controls to store and retrieve data from the Sql Server database (Connected data access).
8. Create an ASP.NET web site for company portal with web form controls, validation controls, rich controls and ADO.NET and data controls to store and retrieve data from the MS Access database (Connected data access).
9. Create an ASP.NET web site for company portal with web form controls, validation controls, rich controls and ADO.NET and data controls to store and retrieve data from the MS Access database (Disconnected Data Access).

Title of the Course : SOFTWARE ENGINEERING

Category of the Course : DISCIPLINE SPECIFIC ELECTIVE

Course Code : U5R3CADSE5:1

Nature of the Skill : Skill Development

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 05

Credits : 03

Total Inst. Hrs : 75

COURSE OBJECTIVES:

1. To understand the software engineering concepts.
2. To estimate the cost and requirements for developing software projects.
3. To know the various design concepts and notations for modeling the software.
4. To implement the coding techniques, strategies to evaluate the software.
5. To construct software with high quality and reliability.

UNIT- I: Introduction

(Inst Hrs: 15)

Introduction - Software Engineering Discipline - Evolution and Impact - Programs Vs Software Products. Software Life Cycle Models: Use of a Life Cycle Models - Classical Waterfall Model -Iterative Waterfall Model - Prototyping Model - Evolutionary Model - Spiral Model. **(ICT)** Software Project Management: Responsibilities of a Software Project Manager**(Seminar)** - Project Planning - Metrics for Project Size Estimation - Project Estimation Techniques -Risk Management. **(Assignment)**.

UNIT - II: Requirements Analysis and Specification

(Inst Hrs: 15)

Requirements Analysis and Specification: Requirements Gathering and Analysis - Software Requirements Specification (SRS) - Formal System Development Techniques. Software Design: Characteristics of a Good Software Design**(Seminar)** - Cohesion and Coupling - Neat Arrangement - Software Design Approaches.

UNIT- III: Function-Oriented Software Design

(Inst Hrs: 15)

Function-Oriented Software Design: Overview of SA/SD Methodology - Structured Analysis - Data Flow Diagrams (DFDs). Object Modeling Using UML: Overview of Object-Oriented Concepts - UML Diagrams - Use Case Model - Class Diagrams - Interaction Diagrams - Activity Diagrams - State Chart Diagram. **(ICT)**

UNIT- IV: User Interface Design and Testing

(Inst Hrs: 15)

User Interface Design: Characteristics of a Good User Interface - Basic Concepts - Types of User Interfaces(**Seminar**) - Component-Based GUI Development; Coding and Testing: Coding - Testing - UNIT Testing - Black-Box Testing - White-Box Testing - Debugging -Integration Testing - System Testing. (**Assignment**)

UNIT- V: Software Reliability and Quality Management

(Inst Hrs: 15)

Software Reliability and Quality Management: Software Reliability - Statistical Testing -Software Quality - Software Quality Management System - ISO 9000.Computer Aided Software Engineering: CASE Environment - CASE support in Software Life Cycle - Characteristics of CASE Tools - Architecture of a CASE Environment. (**ICT**) Software Maintenance: Characteristics of Software Maintenance - Software Reverse Engineering - Software Maintenance Process Models - Estimation of Maintenance Cost. Software Reuse: Issues in any Reuse Program - Reuse Approach.

TEXT BOOK(S)

1. Rajib Mall, "Fundamentals of Software Engineering",3rd Edition, Prentice Hall of India Private Limited, 2008.

REFERENCE BOOK(S)

1. Rajib Mall, "Fundamentals of Software Engineering", 4thEdition, Prentice Hall of India Private Limited, 2014.
2. Richard Fairley, "Software Engineering Concepts", TMGH Publications, 2004.

ONLINE RESOURCE (S):

1. <https://www.guru99.com/software-engineering>

COURSE OUTCOMES

After the successful completion of the Course the Students shall be to able to,

- | | |
|---|-------------|
| CO - 1. Understand about Software Engineering. | -K1 |
| CO - 2. Estimate the cost using various techniques. | -K5 |
| CO - 3. Model the software projects using design notations. | -K3 |
| CO - 4. Implement the coding with various techniques and strategies. | -K2 |
| CO - 5. Analyze, design, verify, validate, implement and maintain software systems | -K4. |

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	3	1	3	2	2	4	3	3	3	2
CO-2	3	2	2	3	3	3	2	3	2	3
CO-3	2	3	2	3	2	3	3	2	2	2
CO-4	3	3	2	2	3	2	2	3	2	1
CO-5	2	2	2	3	2	4	2	3	2	3

Mean Overall Relationship is **2.48** which is **HIGH**

Title of the Course : SOFTWARE PROJECT MANAGEMENT

Category of the Course : DISCIPLINE SPECIFIC ELECTIVE

Course Code : U5R3CADSE5:2

Nature of the Skill : Skill Development

Marks : CIA : 25+ EXT : 75 = 100

Hrs / Week : 05

Credits: 03

Total Inst.Hrs : 75

COURSE OBJECTIVES

1. To understand different Internet Technologies.
2. To learn java-specific web services architecture.
3. To learn servlet Architecture and Database connectivity.
4. To learn PHP and XML.
5. To learn AJAX and web services.

UNIT - I: Introduction

(Inst.Hrs:15)

Overview of a Project - Project types and operations - Program, Portfolio and Management - Characteristics and Goals of a Project - Project Execution and Stakeholders - Project Management with its cross functional nature - 4P's for effective Project Management - Principles of Project management - Software Project Life cycle phases.

UNIT – II: Software Process and Project Metrics

(Inst.Hrs:15)

Overview of Measures, Metrics, And Indicators - Metrics in the Process And Project Domains - Software Measurement - Metrics For Software Quality - Project Planning Objectives - Software Scope: Obtaining necessary information and Feasibility – Resources.

UNIT – III: Software Project Estimation

(Inst.Hrs:15)

What is Software Project Estimation? - Decomposition techniques: Software sizing, Problem based estimation, Process based Estimation - Empirical estimation models: COCOMO model.

Unit-IV: Risk Management

(Inst.Hrs:15)

Concept of Risk, Type of Risks - Risk Identification with Components and drivers - Risk Assessment - Risk Mitigation, Monitoring and Management.

UNIT – V: Project Scheduling and Tracking

(Inst.Hrs:15)

Introduction to Project Scheduling - Principles guide for Software Project Scheduling - Work Breakdown Structure(WBS) - Selecting Software Engineering Task - Concept of Task network and Scheduling Tool: Timeline Chart (Gantt Chart) - Concept and ways of Tracking the schedule.

Text Books:

1. Roger S. Pressman, “Software Engineering”, 2001, McGraw Hill.
2. S. A. Kelkar, “Software Project Management – A concise study”, 2nd Ed. PHI learning Pvt. Ltd. 2009
3. Walker Royce, “Software Project Management – A Unified Framework”, 2001, Pearson Education.

Reference Books:-

1. Ian Sommerville, “Software Engineering”, 2004, Addison Wesley.
2. Pankaj Jalote “An Integrated Approach to Software Engineering” 2nd Edition.

COURSE OUTCOMES

After the successful completion of the Course the Students shall be to able to,

- CO - 1.** Understand about Software Project **-K1**
- CO - 2.** Understand software development process **-K5**
- CO - 3.** Practice various software estimation techniques. **-K3**
- CO - 4.** Implement software development process risks and its mitigation **-K2**
- CO - 5.** Analyze software tracking **-K4.**

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	3	1	3	2	2	4	3	3	3	2
CO-2	3	2	2	3	3	3	2	3	2	3
CO-3	2	3	2	3	2	3	3	2	2	2
CO-4	3	3	2	2	3	2	2	3	2	1
CO-5	2	2	2	3	2	4	2	3	2	3

Mean Overall Relationship is 2.48 which is HIGH

Title of the Course : INTERNET OF THINGS

Category of the Course : DISCIPLINE SPECIFIC ELECTIVE

Course Code : U5R3CADSE6:1

Nature of the Skill : Skill Development and Employability skill

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 05

Credits : 03

Total Inst. Hrs : 75

COURSE OBJECTIVES

1. To understand the concept of IoT and its technologies.
2. To acquire knowledge on IoT Design methodology.
3. To acquire knowledge on IoT Design methodology.
4. To Excel in IoT logical design using Python.
5. To understand the IoT Physical Servers and cloud offerings.

UNIT –I: Introduction to Internet of Things

(Inst Hrs:15)

Introduction - Physical Design of IoT - Logical Design of IoT - IoT Enabling Technologies **(ICT)** - IoT Levels & Deployment Templates.

UNIT – II: Domain Specific IoT's

(Inst Hrs: 15)

Introduction – Home Automation – Cities – Environment – Energy – Retail – Logistics - Agriculture - Industry – Health & Lifestyle **(Seminar)**. IoT and M2M: Introduction - M2M - Difference Between IoT and M2M - SDN and NFV for IoT.

UNIT – III: IoT System Management with NETCONF-YANG

(Inst Hrs: 15)

Need for IoT Systems Management - Simple Network Management - Protocol [SNMP] - Network Operator Requirements - NETCONF-YANG - IoT Systems Management with NETCONF-YANG. IoT Platforms Design Methodology: Introduction - IoT Design Methodology **(Seminar)** - Case Study on IoT System for Weather Monitoring **(Assignment)**.

UNIT – IV: IoT System-Logical Design using Python

(Inst Hrs:15)

Introduction - Installing Python - Python Data Structures - Control Flow-Functions - Modules- Packages - File Handling - Data/Time Operations **(ICT)** - Classes - Python Packages of Interest for IoT**(Assignment)**.

UNIT – V: IoT Physical Devices & Endpoints

(Inst Hrs: 15)

Define IoT Device-Exemplary Device: Raspberry Pi-About the Board -Linux on Raspberry Pi-Raspberry Pi Interfaces-Programming Raspberry Pi with Python -Other IoT Devices. IoT Physical Servers & Cloud offerings: Introduction to Cloud Storage Models & Communication APIs – WAMP **(ICT)**- Auto Bahn for IoT - Xively Cloud for IoT – Python Web Application Framework - Django - Design a RESTful Web API-Amazon Web services for IoT- SkyNet IoT Messaging Platform**(Seminar)**

TEXT BOOK (S):

1. Arshdeep Bahga, Vijay Madisetti “Internet of Things – A hands on approach”, Universities Press 2015.

REFERENCE BOOK (S):

1. Andrew Minter “Analytics for the Internet of Things (IoT)” Packet Publishing Limited 2017.

ONLINE RESOURCE (S):

1. <https://www.edureka.co/blog/iot-tutorial>

COURSE OUTCOMES

After the successful completion of the Course the Students shall be able to,

CO - 1. Apply the concepts of IoT ` **– K3**

CO - 2. Use domain specific IoT **-K1**

CO - 3. Design and Develop the IoT system management with NETCONF-YANG **-K3**

CO - 4. Apply several logical designs of IoT using Python **-K3**

CO - 5. Design and implement successful recommendation engines for enterprises **-K3**

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	3	2	1	3	3	2	2	1	3	3
CO-2	2	3	2	2	2	2	1	2	3	2
CO-3	1	2	3	2	2	2	3	2	2	2
CO-4	3	2	3	2	2	2	3	2	2	3
CO-5	2	1	2	3	2	2	2	2	2	2

Mean Overall Relationship is **2.18** which is **HIGH**

Title of the Course : MOBILE COMPUTING

Category of the Course : DISCIPLINE SPECIFIC ELECTIVE

Course Code : U5R3CADSE6:2

Nature of the Skill : Skill Development and Employability

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 05

Credits : 03

Total Inst. Hrs : 75

COURSE OBJECTIVES

1. To study the specifications of various protocols of mobile networks.
2. To understand mobile computing in context of wireless network systems.
3. To emphasizes the database issues in mobile computing devices.
4. To learn about data delivery mechanisms and data synchronization.
5. To acquire knowledge about Ad-hoc networks considering futuristic requirements.

UNIT –I: Introduction –Telecommunications systems (Inst Hrs:15)

Mobile Computing – Paradigm – Promises/Novel Applications and Impediments and Architecture – Mobile and Handheld Devices – Limitations of Mobile and Handheld Devices – GSM(ICT) – Services – System Architecture – Radio Interfaces – Protocols – Localization – Calling – Handover – Security –New Data Services – GPRS(Assignment).

UNIT – II: Medium access control (Inst Hrs:15)

Motivation for a specialized MAC (Hidden and exposed terminals – Near and far terminals) – SDMA – FDMA – TDMA – CDMA – Wireless LAN/(IEEE 802.11) (ICT) –Mobile Network Layer IP and Mobile IP Network Layers – Packet Delivery and Handover Management(Seminar) – Location Management – Registration – Tunneling and encapsulation – Route Optimizations – DHCP.

UNIT – III: Mobile transport layer (Inst Hrs:15)

Conventional TCP/IP Protocols(Seminar) – Indirect TCP – Snooping TCP – Mobile TCP – Other Transport Layer Protocols for Mobile Networks – Database Issues(ICT): Database Hoarding and Caching Techniques – Client-Server Computing & Adaptation – Transactional Models – Query processing – Data Recovery Process & QoS Issues.

UNIT – IV: Data synchronization**(Inst Hrs:15)**

Communications Asymmetry – Classification of Data Delivery Mechanisms(**Seminar**) – Data Dissemination – Broadcast Models – Selective Tuning and Indexing Methods – Data Synchronization.

UNIT – V: Adhoc Networks**(Inst Hrs:15)**

Introduction – Applications & Challenges of a MANET(**Assignment**) – Routing – Classification of Routing Algorithms – Algorithms such as DSR – AODV – DSDV – Mobile Agents – Service Discovery. Protocols and Platforms for Mobile Computing: WAP – Bluetooth – J2ME – iOS/Windows CE – Android – Security.

TEXT BOOK (S):

1. Jochen Schiller – “Mobile Communications” – Addison-Wesley – Second Edition – 2009.
2. Raj Kamal – “Mobile Computing” – Oxford University Press – 2007 – ISBN:0195686772

REFERENCE BOOK (S):

1. Dharma Prakash Agarwal and Qing an Zeng – “Introduction to Wireless and Mobile Systems – Cengage Learning, Inc – 3rd Edition

ONLINE RESOURCE (S):

1. https://www.tutorialspoint.com/mobile_computing/mobile_computing_overview.htm
2. <https://www.javatpoint.com/mobile-computing>

COURSE OUTCOMES

After the successful completion of the Course the Students shall be to able to –

- | | | |
|----------------|---|-------------|
| CO - 1 | Discuss about Telecommunication systems | – K6 |
| CO - 2. | Elaborate about wireless LAN networks | – K6 |
| CO- 3. | Explain the database issues that arises in networks | – K5 |
| CO - 4. | Illustrate issues in Data delivery mechanisms | – K2 |
| CO - 5. | Define the importance of Ad-hoc Networks | – K1 |

Relationship Matrix for CO– PO– PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	2	2	2	3	2	2	1	2	3	1
CO-2	1	2	1	3	2	3	2	2	3	1
CO-3	3	1	2	1	1	2	3	1	2	2
CO-4	2	3	2	3	2	3	2	3	2	1
CO-5	1	2	2	3	1	2	3	2	2	3

Mean Overall Relationship is 2.04 which is Medium

SEMESTER-VI

Title of the Course : WEB TECHNOLOGY

Category of the Course : Core Course

Course Code : U6R3CACC13

Nature of the Skill : Skill Development and Employability

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 05

Credits : 04

Total Inst. Hrs : 75

COURSE OBJECTIVES

1. To Study the various HTML tags and design simple web pages.
2. To develop valid Hyperlinks– images– lists– tables and forms programs.
3. To Create web pages using HTML and Cascading Style Sheets.
4. To Build dynamic web pages using JavaScript (Client side programming).
5. To Learn Scripting language characteristics.

UNIT –I: Structuring Documents for the Web

(Inst Hrs:15)

Introducing HTML and XHTML – Basic Text Formatting (**ICT**) – Presentational Elements – Phrase Elements – Lists – Editing Text – Core Elements and Attributes – Attribute Groups - Links and Navigation: Basic Links – Creating Links with the <a> Element – Advanced E-mail Links – Images, Audio – and Video: Adding Images Using the Element – Using Images as Links - Image Maps – Choosing the Right Image Format – Adding Flash Video and Audio to your web pages.

UNIT – II: Tables

(Inst Hrs:15)

Tables: Introducing Tables (**ICT**) – Grouping Sections of a Table – Nested Tables (**Seminar**) – Accessible Tables - Forms: Introducing Forms – Form Controls – Sending Form Data to the Server. Frames: Introducing Frameset – <frame> Element – Creating Links Between Frames – Setting a Default Target Frame Using <base> Element – Nested Framesets – Inline or Floating Frames with <iframe>.

UNIT – III: Cascading Style Sheets

(Inst Hrs:15)

Introducing CSS(CT) – Where you can Add CSS Rules. CSS Properties: Controlling Text – Text Formatting(**Seminar**) – Text Pseudo Classes – Selectors – Lengths – Introducing the Box Model. More Cascading Style Sheets: Links – Lists – Tables – Outlines – The focus and activate Pseudo classes Generated Content – Miscellaneous Properties – Additional Rules – Positioning and Layout with CSS – Design Issues.

UNIT – IV: Learning Javascript

(Inst Hrs:15)

Java Script: How to Add Script to Your Pages – Variables and Data Types(**Seminar**) – Statements and Operators – Control Structures – Conditional Statements – Loop Statements – Functions - Message box – Dialog Boxes (**Assignment**) – Alert Boxes – Confirm Boxes – Prompt Boxes.

UNIT – V: Working with JavaScript

(Inst Hrs:15)

Practical Tips for Writing Scripts – JavaScript Objects: Window Object - Document object - Browser Object - Form Object(**Assignment**) – Navigator object Screen object – Events – Event Handlers – Forms – Validations – Form Enhancements – JavaScript Libraries

TEXT BOOK (S):

1. Jon Duckett– Beginning HTML– XHTML– CSS and Java script – Wiley Publishing

REFERENCE BOOK (S):

1. Chris Bates– “Web Programming”– Wiley Publishing 3d Edition.

ONLINE RESOURCE (S):

1. https://www.tutorialspoint.com/html/html_tutorial.pdf
2. https://www.cs.uct.ac.za/mit_notes/web_programming.html

COURSE OUTCOMES

After the successful completion of the Course the Students shall be to able to

- | | |
|---|-------------|
| CO - 1. Make use of the ‘language of the Web’ – HTML | – K3 |
| CO - 2. Write valid programs including hyperlinks, images, lists, tables and forms | – K2 |
| CO - 3. Match CSS to implement a variety of presentation effects in HTML | – K1 |
| CO - 4. Study the importance of scripting language Java Script | – K6 |
| CO - 5. Explain Event-driven programming | – K2 |

Relationship Matrix for CO– PO– PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	2	2	2	3	2	2	1	2	3	2
CO-2	2	2	1	3	2	3	2	2	3	2
CO-3	3	2	2	3	1	2	3	2	2	2
CO-4	2	3	2	3	2	3	2	3	2	2
CO-5	2	2	2	3	2	2	3	2	2	3

Mean Overall Relationship is 2.24 which is HIGH

Title of the Course : WEB TECHNOLOGY PRACTICAL

Category of the Course : Core Course

Course Code : U6R3CACC14P

Nature of the Skill : Employability and Entrepreneurship

Marks : CIA : 40 + Ext: 60 = 100

Hrs / Week : 05

Credits : 04

Total Inst. Hrs : 75

COURSE OBJECTIVES

1. To learn about the various tags in HTML.
2. To understand the basics of script languages.

LIST OF PRACTICAL PROGRAMS

1. Create a form having number of elements (Textboxes, Radio buttons, Checkboxes, and so on). **Write JavaScript code to count the number of elements in a form.**
2. Create a HTML form that has number of Textboxes. When the form runs in the Browser fill the textboxes with data. Write JavaScript code that verifies that all textboxes has been filled. If textboxes have been left empty, popup an alert indicating which textbox has been left empty.
3. Develop a HTML Form, which accepts any Mathematical expression. Write JavaScript code to Evaluates the expression and Displays the result.
4. **Create a page with dynamic effects. Write the code to include layers and basic animation.**
5. Write a JavaScript code to find the sum of N Natural Numbers. (Use user- defined function)
6. **Write a JavaScript code block using arrays and generate the current date in words, this should include the day, month and year.**
7. Create a form for Student information. Write JavaScript code to find Total, Average, Result and Grade.
8. Create a form for Employee information. Write JavaScript code to find DA, HRA, PF, TAX, Gross pay, Deduction and Net pay.
9. Create a form consists of a two Multiple choice lists and one single choice list
 - (a) The first multiple choice list, displays the Major dishes available
 - (b) The second multiple choice list, displays the Starters available.
 - (c) The single choice list, displays the Soft drinks available.
10. Create a web page using two image files, which switch between one another as the mouse pointer moves over the image. Use the on mouse over and on mouse out event handlers.

Title of the Course : ARTIFICIAL INTELLIGENCE

Category of the Course : DISCIPLINE SPECIFIC ELECTIVE

Course Code : U6R3CADSE7:1

Nature of the Skill : Skill Development and Employability

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 05

Credits : 03

Total Inst. Hrs : 75

COURSE OBJECTIVE

1. To learn various concepts of AI Techniques
2. To learn various Search Algorithm in AI.
3. To learn probabilistic reasoning and models in AI.
4. To learn about Markov Decision Process.
5. To learn various type of Reinforcement learning.

UNIT – I: Introduction:

(Inst Hrs:15)

Concept of AI, history, current status, scope, agents, environments, Problem Formulations, Review of tree and graph structures, State space representation, Search graph and Search tree.

UNIT – II: Search Algorithms:

(Inst Hrs:15)

Random search, Search with closed and open list, Depth first and Breadth first search, Heuristic search, Best first search, A*algorithm, Game Search.

UNIT – III: Probabilistic Reasoning:

(Inst Hrs:15)

Probability, conditional probability, Bayes Rule, Bayesian Networks-representation, construction and inference, temporal model, hidden Markov model.

UNIT – IV: Markov Decision process:

(Inst Hrs:15)

MDP formulation, utility theory, utility functions, value iteration, policy iteration and partially observable MDPs.

UNIT – V: Reinforcement Learning:

(Inst Hrs:15)

Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporal difference learning, active reinforcement learning - Q learning.

TEXT BOOK (S):

2. Stuart Russell and Peter Norvig, –Artificial Intelligence: A Modern Approach, 3rd Edition, Prentice Hall.
3. Elaine Rich and Kevin Knight – Artificial Intelligence, Tata McGraw Hill

REFERENCE BOOK (S):

1. Trivedi, M.C., – A Classical Approach to Artificial Intelligence, Khanna Publishing House, Delhi.
2. Saroj Kaushik – Artificial Intelligence, Cengage Learning India, 2011.
3. David Poole and Alan Mackworth – Artificial Intelligence: Foundations for Computational Agents, Cambridge University Press 2010.

ONLINE RESOURCE (S):

1. NPTEL & MOOC courses titled Artificial Intelligence and Expert Systems.
2. <https://nptel.ac.in/courses/106106140/>
3. <https://nptel.ac.in/courses/106106126/>

COURSE OUTCOMES

After the successful completion of the Course the Students shall be to able to,

- CO - 1.** Explain the knowledge about basics of AI – **K2**
- CO - 2.** Illustrate the services in AI – **K2**
- CO - 3.** Make use of AI Security and services –**K3**
- CO - 4.** Survey about the Markov decision process on AI –**K4**
- CO - 5.** Interpret the Reinforcement learning –**K6**

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	2	2	2	-
CO2	3	2	2	3	3	2
CO3	2	3	3	2	2	3
CO4	2	1	2	2	2	1
CO5	2	2	3	2	2	2
Weightage of course contributed to each PSO	11	10	12	11	11	8

Title of the Course : CLOUD COMPUTING

Category of the Course : DISCIPLINE SPECIFIC ELECTIVE

Course Code : U6R3CADSE7:2

Nature of the Skill : Skill Development and Employability

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 05

Credits : 03

Total Inst. Hrs : 75

COURSE OBJECTIVES

1. To understand the basic concepts of cloud computing, cloud components, cloud architecture and services
2. To understand the design of cloud services.
3. To learn about network security and services
4. To understand the overview of cloud storage.
5. To identify the service of software plus and its developing applications.

UNIT –I: Cloud Computing Basics

(Inst Hrs:15)

Cloud Computing Overview: Disambiguation - Cloud Components - Infrastructure – Services - Applications: Storage – Database Services(ICT) – Intranets and the Cloud: Components - Hypervisor Applications – First Movers in the Cloud: Amazon – Google - Microsoft.

UNIT – II: Cloud Computing Scenarios

(Inst Hrs:15)

Your Organisation and Cloud Computing: When You Can Use Cloud Computing: Scenarios: - Benefits: Scalability – Simplicity - Knowledgeable Vendors - More Internal Resources – Security - Limitations: Your Sensitive Information– Application Not Ready - Developing Your Own Applications(Seminar) – Security Concerns: Privacy Concerns with a Third Party - Security Benefits - Cloud Computing with the Titans(ICT): Google – EMC – NetApp – Microsoft – Amazon - Salesforce.com – IBM– Partnerships.

UNIT – III: Cloud Computing Services

(Inst Hrs:15)

The Business Case For Going to the Cloud: Cloud Computing Services (ICT) - Infrastructure as a Service - Platform as a Service - Software as a Service - How Those Applications Help Your Business: Operational Benefits - Economic Benefits - Tips for Evaluating SaaS(Seminar) - Staffing Benefits - Hardware and Infrastructure: Clients: Mobile – Thin –Thick - Security: Data Leakage - Offloading Work – Logging – Forensicss(Assignment) – Development – Auditing - Network: Basic Public Internet - The Accelerated Internet - Optimized Internet Overlay - Site-to-Site VPN Cloud Providers -

Cloud Consumers – Pipe – Redundancy - Services: Identity – Integration – Mapping – Payments - Search.

UNIT – IV: Cloud Storage Overview

(Inst Hrs:15)

The Basics-Storage as a Service-Providers-Security-Reliability-Cautions- Outages Theft - Cloud Storage for me - Cloud Storage Providers **(Assignment)**: Amazon Simple Storage Service (S3)- Nirvanix - Google Big table Data store- MobileMe- Live Mesh - Software as a Service: Overview**(Seminar)** : Advantages – Software – Considerations - Vendor Advantages-Limitations -Driving Forces: Popularity - Virtualization Benefits - SaaS and SOA -Economic Impact Company Offerings: Intuit- Google – Microsoft - IBM.

UNIT – V: Software plus Services

(Inst Hrs:15)

Overview: Pros – Cons – Vendors - Mobile Device Integration**(ICT)**: Google Android - Providers: Adobe AIR - Apple iPhone SDK - Developing Applications: Google Payment Force.com and Google Gears - Microsoft: Live Services - Microsoft SQL Services - Microsoft .NET Services - Microsoft SharePoint Services and Dynamics CRM Services - Migrating to the Cloud: Cloud Services for Individuals: Available Services - Skytap Solution - Cloud Services Aimed at the Mid Market:Force.com - Enterprise - ClassCloud Offerings: MS Exchange – Vmotion - VMware VCenter Converter – Hyper - VLive Migration.

TEXT BOOK (S):

1. Anthony T.Velte Toby J. VelteRobert Elsenpeter, "Cloud Computing: A practical Approach", TataMcGrow Hill, 2010

REFERENCE BOOK (S):

1. Barrie Sosinsky, "Cloud Computing Bible", 2011, Wiley Publishers.
2. Kris Jamsa, "Cloud Computing", 2015, Jones and Bartlett India Pvt Ltd.

ONLINE RESOURCE (S):

1. https://www.tutorialspoint.com/cloud_computing/cloud_computing_tutorial.pdf
2. <https://www.javatpoint.com/cloud-computing-tutorial>

COURSE OUTCOMES

After the successful completion of the Course the Students shall be to able to,

CO - 1. Explain the knowledge about basics of cloud computing – K2

CO - 2. Illustrate the services in cloud – K2

CO - 3. Make use of Cloud Network Security and services –K3

CO - 4. Survey about the overview of Storage on cloud –K4

CO - 5. Interpret the services of software plus –K6

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	2	2	2	1	2	2	1	2	3	2
CO-2	1	2	1	3	2	3	2	2	3	2
CO-3	1	1	2	2	1	2	3	2	2	2
CO-4	2	3	2	2	2	3	2	2	2	2
CO-5	2	2	2	3	1	2	2	2	2	2

Mean Overall Relationship is 2.02 which is Medium

Title of the Course : INTERNET PROGRAMMING

Category of the Course : DISCIPLINE SPECIFIC ELECTIVE

Course Code : U6R3CADSE8:1

Nature of the Skill : Skill Development and Employability

Marks : CIA : 25+ EXT : 75 = 100

Hrs / Week :05

Credits : 03

Total Inst.Hrs: 75

COURSE OBJECTIVES

1. To understand different Internet Technologies.
2. To learn java-specific web services architecture.
3. To learn servlet Architecture and Database connectivity.
4. To learn PHP and XML.
5. To learn AJAX and web services.

UNIT - I: Basics of Internet

(Inst.Hrs:15)

Web Essentials: Clients, Servers and Communications - The Internet - Basic Internet protocols World Wide Web - HTTP Request Message - HTTP Response Message - Web Clients - Web Servers - HTML5 Tables – Lists – Image - HTML5 control elements – Semantic elements - Drag and Drop – Audio - Video controls – CSS3 – Inline, Embedded and External Style Sheets - Rule Cascading -Inheritance – Backgrounds - Border Images - Colors Shadows – Text – Transformations – Transitions - Animations.

UNIT – II: Introduction to JavaScript

(Inst.Hrs:15)

JavaScript: An introduction to JavaScript - JavaScript DOM Model - Date and – Objects - Regular Expressions - Exception Handling – Validation - Built-in objects - Event Handling -DHTML with JavaScript – JSON introduction – Syntax – Function Files - HTTP Request - SQL.

UNIT – III: introduction to Servlet

(Inst.Hrs:15)

Servlets: Java Servlet Architecture - Servlet Life Cycle - Form GET and POST actions - Session Handling - Understanding Cookies - Installing and Configuring Apache Tomcat Web Server. - DATABASE CONNECTIVITY: JDBC perspective, JDBC program example – JSP: Understanding Java Server Pages - JSP Standard Tag Library(JSTL) - Creating HTML Forms by embedding JSP code.

UNIT – IV: Introduction to PHP and XML

(Inst.Hrs:15)

An introduction to PHP: PHP - Using PHP – Variables - Program Control - Built-in functions - Form Validation - Regular Expressions - File Handling – Cookies - Connecting to Database. XML: Basic XML - Document Type Definition - XML Shema DOM and

Presenting XML, XML Parsers and Validation, XSL and XSLT Transformation, News Feed (RSS and ATOM).

UNIT – V: Introduction to Web Services

(Inst.Hrs:15)

AJAX: Ajax Client Server Architecture – XML Http Request Object – Call Back Methods; Web Services: Introduction – Java Web Services Basics – Creating, Publishing – Testing and Describing a Web Services – Consuming a Web Service – Database Driven Web Service from an application – SOAP.

TEXT BOOK(S)

1. Deitel and Deitel and Nieto, “Internet and World Wide Web – How to Program”, Prentice Hall, 5th Edition, 2011.

REFERENCE BOOK(S)

1. Stephen Wynkoop and John Burke – Running a perfect Website, QUE, 2nd Edition, 1999.
2. Jeffrey C and Jackson – Web Technologies a Computer Science Perspective, Pearson Education, 2011.
3. Gopalan N.P. and Akilandeswari. J – Web Technology, Prentice Hall of India, 2011.

ONLINE RESOURCE(S):

1. <https://www.edu.gctglobal.org/en/internetbasics>

COURSE OUTCOMES

After the successful completion of the course the Students shall be to able to,

1. Gain the knowledge of different Internet Technologies. - **K1**
2. Gain the knowledge about java-specific web services architecture. - **K3**
3. Understand Servlet Architecture and Database Connectivity. - **K3**
4. Get the knowledge about PHP and XML. - **K3**
5. Understand about AJAX and Web Services. - **K3**

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Program Outcome (PO)					Program Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	3	2	2	3	3	1	3	2
CO2	3	2	2	3	3	3	2	3	2	3
CO3	2	3	2	3	2	3	3	2	2	2
CO4	3	3	2	2	3	2	2	3	2	1
CO5	2	2	1	3	2	3	2	3	2	3

Mean Overall Relationship is 2.36 which is HIGH

Title of the Course : E-COMMERCE TECHNOLOGIES

Category of the Course : DISCIPLINE SPECIFIC ELECTIVE

Course Code : U6R3CADSE8:2

Nature of the Skill : Skill Development and Employability Skill

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 05

Credits : 03

Total Inst. Hrs : 75

COURSE OBJECTIVES

1. Understand concept of Ecommerce and its types
2. Study the various online payment and marketing on Web
3. Understand various E-business Strategies.
4. Gain the Knowledge of Internet Banking
5. Learn the concept of mobile commerce

UNIT –I: Fundamentals of E-Commerce (Inst Hrs:15)

History of E-commerce and Indian Business Context: E-Commerce - Emergence of the Internet - Emergence of the WWW(**ICT**) - Advantages of E-Commerce - Transition to E-Commerce in India - The Internet and India - E-transition Challenges for Indian Corporate(**Seminar**).

UNIT – II: E-Business Models (Inst Hrs:15)

Business Models for E-commerce: Business Model(**ICT**) - E-business Models Based on the Relationship of Transaction Parties - E-business Models Based on the Relationship of Transaction Types.

UNIT – III: World Wide Web Technologies (Inst Hrs:15)

Enabling Technologies of the World Wide Web: World Wide Web - Internet Client-Server Applications(**Assignment**) - Networks and Internets - Software Agents - Internet Standards and Specifications - ISP.E-Marketing: Traditional Marketing - Identifying Web Presence Goals - Online Marketing(**Seminar**) - E-advertising –E-branding.

UNIT – IV: Internet Banking (Inst Hrs:15)

E-Payment Systems: Main Concerns in Internet Banking - Digital Payment Requirements - Digital Token-based e-payment Systems - Classification of New Payment Systems(**Assignment**) - Properties of Electronic Cash - Cheque Payment Systems on the Internet(**ICT**).

UNIT – V: Mobile Commerce Technologies

(Inst Hrs:15)

Information systems for Mobile Commerce: Introduction - Wireless Applications - Cellular Network - Wireless Spectrum - Technologies for Mobile Commerce - Wireless Technologies(**Seminar**).

TEXT BOOK (S):

1. P.T.Joseph, "E-Commerce - An Indian Perspective", 4th Edition, PHI Learning, 2012.
2. C Xavier, "World Wide Web Design with HTML", 13th Reprint, Tata McGrawHill, 2006.
3. A.Leon and M.Leon, "Introduction to Information Technology", 1st Edition, Vijay Nicole Publications, 2013.

REFERENCE BOOK (S):

1. David Whiteley, "E-Commerce Strategy, Technologies and Applications", 1st Edition, Tata Mc-Graw-Hill, 2001.
2. Kamalesh K Bajaj and Debjani Nag, "E-Commerce - The cutting edge of Business", 2nd Edition, Tata McGraw-Hill Education, 2005.

ONLINE RESOURCE (S):

1. <https://www.bigcommerce.com>
2. <https://www.salesforce.com>

COURSE OUTCOMES

After the successful completion of the Course the Students shall be to able to,

CO - 1. Apply the concept of E-Commerce	–K3
CO - 2. Develop the E-Business Model	-K3
CO - 3. Identify the WWW technologies	-K3
CO - 4. Apply the Internet banking in real life	-K3
CO - 5. Build the wireless technologies in E-Commerce	-K6

Relationship Matrix for CO, PO, PSO

Course	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
Outcome (CO)	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	2	1	3	2	2	1	3	3	3	1
CO-2	3	2	2	1	2	2	3	1	2	2
CO-3	2	1	3	1	2	3	2	3	1	3
CO-4	1	2	3	1	2	2	3	2	2	2
CO-5	2	2	2	3	2	2	3	3	1	3

Mean Overall Relationship is **2.28** which is **HIGH**

Title of the Course : SOFTWARE TESTING

Category of the Course : SKILL ENHANCEMENT COURSE

Course Code : U6R3CASEC7:1

Nature of the Skill : Skill Development and Employability Skill

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 03

Credits : 02

Total Inst. Hrs : 45

COURSE OBJECTIVE

1. To study fundamental concepts in software testing.
2. To discuss various software testing issues and solutions in software unit test, Integration and System Testing.
3. To study the basic concept of Data Flow Testing and Domain Testing.
4. To Acquire knowledge on path products and path expressions.
5. To learn about Logic based testing and decision tables

UNIT – I: INTRODUCTION TO TESTING (Inst.Hrs:10)

Introduction: Purpose – Productivity and Quality in Software – Testing Vs. Debugging – Model for Testing – Bugs – Types of Bugs – Testing and Design Style.

UNIT – II: Graph (Inst.Hrs:10)

Flow / Graphs and Path Testing – Achievable paths – Path instrumentation
Application Transaction Flow Testing Techniques.

UNIT – III: Types of Testing (Inst.Hrs:10)

Data Flow Testing Strategies - Domain Testing: Domains and Paths –
Domains and Interface Testing.

UNIT –IV: Testing Metrics (Inst.Hrs:10)

Linguistic – Metrics – Structural Metric – Path Products and Path
Expressions. Syntax Testing – Formats – Test Cases.

UNIT – V: Decision Table (Inst.Hrs:05)

Logic Based Testing–Decision Tables–Transition Testing–States, State
Graph, State Testing.

TEXT BOOK (S):

- 1.B.Beizer, “Software Testing Techniques”, II Edn., DreamTech India, New Delhi, 2003.
2. K.V.K.Prasad, “Software Testing Tools”, DreamTech. India, New Delhi, 2005.

REFERENCE BOOK (S):

1. I.Burnstein, 2003, “Practical Software Testing”, Springer International Edn.
2. E. Kit, 1995, “Software Testing in the Real World: Improving the Process”, Pearson Education, Delhi.
3. R.Rajani, and P.P.Oak, 2004, “Software Testing”, TataMcgrawHill, New Delhi.

ONLINE RESOURCE (S):

1. <https://www.javatpoint.com/software-testing-tutorial>
2. <https://www.guru99.com/software-testing.html>

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	2	2	2	-
CO2	3	2	2	3	3	2
CO3	2	3	3	2	2	3
CO4	2	1	2	2	2	1
CO5	2	2	3	2	2	2
Weightage of course contributed to each PSO	11	10	12	11	11	8

Title of the Course : WIRELESS NETWORK

Category of the Course : SKILL ENHANCEMENT COURSE

Course Code : U6R3CASEC7:2

Nature of the Skill : Skill Development

Marks : CIA : 25 + Ext: 75 = 100

Hrs / Week : 03

Credits : 02

Total Inst. Hrs : 45

COURSE OBJECTIVES

1. To learn about the wireless networks.
2. To understand in detail about Mobile IP and MANET.
3. To have a keen knowledge in TCP.
4. To know about UMTS and 3G.
5. To learn about 4G.

UNIT –I: WLAN

(Inst Hrs: 10)

Introduction-WLAN Technologies: Infrared- UHF Narrowband- Spread Spectrum - IEEE802.11: System Architecture- Protocol Architecture- Physical Layer- MAC Layer- 802.11b- 802.11a – Hiper LAN: WATM- BRAN- HiperLAN2 **(ICT)** – Bluetooth: Architecture- Radio Layer- Baseband Layer- Link Manager Protocol- Security – IEEE802.16 **(Assignment)** -WIMAX: Physical Layer- MAC- Spectrum Allocation For WIMAX.

UNIT – II: Mobile IP

(Inst Hrs: 10)

Introduction – Mobile IP: IP Packet Delivery- Agent Discovery- Tunneling and Encapsulation- IPV6 **(ICT)** -Network Layer in the Internet- Mobile IP Session Initiation Protocol – Mobile Ad-Hoc Network: Routing- Destination Sequence Distance Vector- Dynamic Source Routing **(Seminar)**.

UNIT – III: TCP

(Inst Hrs: 10)

TCP Enhancements For Wireless Protocols – Traditional TCP: Congestion Control- Fast Retransmit/Fast Recovery- Implications Of Mobility – Classical TCP Improvements: Indirect TCP- Snooping TCP- Mobile TCP- Time Out Freezing- Selective Retransmission- Transaction Oriented TCP – TCP Over 3G Wireless Networks **(Assignment)**.

UNIT – IV: UMTS and 3G

(Inst Hrs: 10)

Overview Of UMTS Terrestrial Radio Access Network-UMTS Core Network Architecture: 3G-MSC - 3G-SGSN - 3G-GGSN- SMS-GMSC/SMS-IW MSC - Firewall **(Seminar)**- DNS/DHCP-High Speed Downlink Packet Access (HSDPA) **(ICT)** - LTE Network Architecture And Protocol.

UNIT – V: 4G Technologies**(Inst Hrs: 05)**

Introduction – 4G Vision – 4G Features And Challenges – Applications Of 4G – 4G Technologies: Multicarrier Modulation- Smart Antenna Techniques- OFDM- MIMO Systems - Adaptive Modulation And Coding With Time Slot Scheduler- Cognitive Radio.

TEXT BOOK (S):

1. Jochen Schiller, “Mobile Communications”, Second Edition, Pearson Education, 2012.
2. Vijay Garg , “Wireless Communications And Networking”, First Edition, Elsevier 2007.

REFERENCE BOOK (S):

1. Erik Dahlman, Stefan Parkvall, Johan Skold And Per Beming, “3G Evolution HSPA And LTE For Mobile Broadband”, Second Edition, Academic Press, 2008.
2. Anurag Kumar, D.Manjunath, Joy Kuri, “Wireless Networking”, First Edition, Elsevier 2011.

ONLINE RESOURCE (S):

1. <https://www.javatpoint.com/mobile-communication-tutorial>
2. https://www.tutorialspoint.com/wireless_communication/index.htm

COURSE OUTCOMES

After the successful completion of the Course the Students shall be to able to,

- CO - 1.** Experiment with latest wireless technologies and trends in the communication **-K3**
- CO - 2.** Elaborate the transmission of voice and data through various networks. **-K6**
- CO - 3.** Develop a MANET for critical situations like Tsunami or Earthquake. **-K6**
- CO - 4.** Utilize TCP Enhancements for Wireless Protocols **-K3**
- CO - 5.** Compare and contrast the 3G and 4G services **-K4&K5**

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1	3	2	2	1	2	3	2	3	2	2
CO-2	3	1	2	1	2	2	3	3	2	2
CO-3	3	3	3	3	3	3	3	3	3	3
CO-4	3	1	1	1	2	2	1	2	1	2
CO-5	3	2	1	1	3	2	2	2	3	3

Mean Overall Relationship is **2.22** which is **HIGH**